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To cite this article: Peter Mudie , Angela Cottam & Robert Raeside (2003) An Exploratory Study of Consumption Emotion in Services, The Service Industries Journal, 23:5, 84-106, DOI: [10.1080/02642060308565625](https://doi.org/10.1080/02642060308565625)

To link to this article: <https://doi.org/10.1080/02642060308565625>



Published online: 16 Jun 2008.



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An Exploratory Study of Consumption Emotion in Services

PETER MUDIE, ANGELA COTTAM
and ROBERT RAESIDE

This article addresses the significance of emotions in the consumption of services. There has been little investigation of emotions in services. This study attempts a general examination of consumers' emotional experiences across four quite distinct services. Six hypotheses test the significance of emotions and/or emotional involvement in areas regarded as important in marketing, namely the service itself, satisfaction, frequency of usage, age and gender. Particularly, the authors explore the appropriateness of the Consumption Emotion Scale in a service consumption setting. The findings from this study do not suggest that services may be classified by emotion descriptors. Equally there is little evidence of emotions explaining satisfaction, and distinctiveness in emotional responses by frequency of usage, age and gender was not much in evidence.

INTRODUCTION

Ever since the 1960s, consumption behaviour has been modelled (Engel, Kollat and Blackwell, 1968, Howard and Sheth, 1969) and understood in terms of a decision-making process in which consumers make choices on the basis of a rational assessment of products/services capacity to meet needs. Consumer decision making has been viewed, largely, as a problem-solving process (need recognition, information search, evaluation of alternatives, purchase decision, post-purchase behaviour). It was all very systematic, ordered and rational. Psychological phenomena such as emotions did not figure in the process. Of those psychological factors that did (motivation, perception, attitude, belief), their focus was at the level of the product or service attribute. These in turn, were of a mainly functional

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The Service Industries Journal, Vol 23, No 5 (November 2003), pp 84-106
PUBLISHED BY FRANK CASS, LONDON

nature, e.g. for a camera, consumers would be required to judge it in terms of picture quality, ease of use, size and price. What motivates people to desire and consume particular products or services was in effect portrayed in terms of bundles of attributes often defined by the marketer.

Although the traditional models of consumption behaviour endure (Engel, Blackwell and Miniard, 1995), increasing acknowledgement is being accorded to the role that emotions play in the consumption process. Emotional judgements and subjective feelings are now deemed as important for the understanding of consumption as available budgets, functional benefits and price. The distinctive characteristics of services suggest that it is particularly apt that consumers' emotional responses are now also being considered. Services are experienced, and together with difficulties surrounding measurement and evaluation of their specific attributes, this makes them ideal candidates for assessment in terms of holistic, subjective feelings. The present study seeks to extend our understanding of consumers' emotional experiences of services by utilising Richin's Consumption Emotions Scale (1997) across a number of service settings.

THE ROLE OF EMOTION IN CONSUMPTION

Although emotions and feelings are often considered the most idiosyncratic of psychological phenomena, a coherent body of theory and data has emerged, including a set of laws for describing the phenomenon (Frijda, 1988). Some of these laws have been argued as crucially important in understanding consumer behaviour (Elliott, 1998). Further support for contextuality has been offered in terms of the manner in which emotions pervade the consumption experience (Holbrook and Batra, 1987). Historically, marketers and consumer researchers have portrayed consumer behaviour as a cognitive decision-making process. The original model incorporated a linear, sequential process in which cognitive variables (e.g. information processing) determined affective responses (Engel, Kollat and Blackwell, 1968).

A challenge to the information processing models may be found in the work of Zajonc (1980) who argued that, to arouse emotions, objects need to be cognised very little. Consumer researchers recognised the need to go beyond the cognitive component to provide empirical evidence for the role of emotions and feelings in the formation of satisfaction judgements (Dubé-Riou, 1989; Westbrook, 1987). However, the suggestion that feeling is not free of thought, nor is thought free of feeling (Zajonc, 1980) has left open the possibility that 'emotion and cognition are best thought of as separate but interacting mental functions mediated by separate but interacting brain systems' (LeDoux, 1996, Oatley, 1992). The subjective aspect of the

consumption experience has in addition, raised issues of focus and definition. Terms such as affect, emotions, mood and attitudes have frequently been used interchangeably in the literature (Bagozzi, Gopinath and Nyer, 1999). So, for example, the term affect has been used to describe a consumer's 'subjective feelings' resulting from a consumption experience (Westbrook, 1987), or the consumer's 'mood', which is in turn 'a sub-category of feeling states' (Gardner, 1985).

Thus, the affective or emotional response has been defined in a variety of ways in the literature. Many early attempts to include a measure of affect in models of consumer behaviour restricted the concept by including only one aspect of emotion in the design of the empirical measures. So the familiar multi-attribute attitude model deals with only one aspect of emotion, namely favourable predisposition or liking. This narrow conceptualisation of affect ignores the remainder of the emotional spectrum, love, hate, fear, anger, joy, sorrow and so on (Peterson, Hoyer and Wilson, 1987).

However, for some marketing researchers, the broadening of the concept to equate affect with either feelings or mood is still too restrictive an interpretation of the notion of an affective response. They believe that as a measure of the non-cognitive response to a consumption experience, affect is about a consumer's emotions. (Westbrook and Oliver, 1991). They refer to the affective response as 'consumption emotion' and distinguish this concept from Gardner's (1985) concept of mood on the basis that consumption emotion has 'relatively greater psychological urgency, motivational potency, and situational specificity'.

Whatever degree of congruity exists between the concepts of affect and emotion, in consumer behaviour research, scales developed for measuring the latter have been used to measure the former. However, the appropriateness of these frameworks for consumer behaviour applications has recently been questioned (Richins, 1997). Specifically, it was considered that the terminology in these measures, along with the contexts for much emotional research (intimate, interpersonal relationships) were unsuitable for researching emotions in consumer behaviour.

Where *consumption*-related emotions have been studied, they have been found to be an important component of consumer response and their importance in the sphere of consumer behaviour has been firmly established (Richins, 1997). As previously noted, however, consumption emotion has been measured in these studies using scales developed for assessing emotions in predominantly non-consumption situations. The studies have examined emotions over a range of applications: specific products (Holbrook et al., 1984; Mehrabian and Wixen, 1986); satisfaction judgements with services (Westbrook, 1987; Dubé-Rioux, 1989; Oliver,

1994), hedonic consumption (Arnould and Price, 1993; Krishnan and Olshavsky, 1995), consumer behaviour prediction (Allen and Kleine, 1992), affective response to advertisements (Aaker, Stayman and Hagerty, 1986; Batra and Ray, 1986; Edell and Moore, 1991), favourite possessions (Schultz, Kleine and Kernan, 1989), and a variety of consumption situations (Derbaix and Pham, 1991; Havlena and Holbrook, 1986; Richins, McKeage and Najjar, 1992).

Little empirical investigation has taken place in the services sector, and where it has, the research has focused on a specific service. No previous study has attempted a general examination of consumers' emotional experiences in the consumption of services.

OBJECTIVES

The overall purpose of the study is to extend our understanding of consumers' emotional experiences in the consumption of services. More specifically we address:

- Whether service types may be classified in terms of emotions, and the intensity to which emotions are experienced.
- The relationship between emotional involvement and satisfaction.
- The extent of emotional involvement between services.
- The variation of emotional involvement by age and gender.

SERVICES STUDIED – RATIONALE FOR SELECTION

It was necessary to select a range of services that would: (1) represent the phenomenon (consumer services); and (2) adequately serve the intended purpose – examining consumers' emotional experience in the consumption of services.

We began by recognising the importance of classification in marketing: 'Although classification schemes have their limitations they can offer important insights for both practitioners and researchers' (Hunt 1976).

A number of variables or characteristics have been used to classify services. Initially, for the purpose of this study, it was considered necessary to select from the most basic of the frameworks, the nature of the service act (Lovelock, 1996). Of the four categories, three were selected (services directed at people's bodies, people's minds and physical possessions). The remaining category (services directed at intangible assets) was considered too complex for this particular study. Given that the purpose of categorisation is that of grouping services with similar characteristics/properties, facing the same type of challenges, we selected one service from

each of the three categories to represent that category. In making that selection, we were keen for our sample to reflect varying degrees of three further variables – perceived risk, involvement and heterogeneity. Previous research has demonstrated the importance of these variables in the consumption of services (Murray and Schlacter, 1990). It was intended that these variables should be considered in the construction of the sample, but as an exploratory study, it was never intended that comprehensive coverage of the primary classification by varying degrees of all three variables would be achieved. The four services that were selected to provide coverage of the key variables are displayed in Table 1.

TABLE I
LEVELS OF PERCEIVED RISK, INVOLVEMENT AND HETEROGENEITY
EXPERIENCED IN SERVICES SELECTED FOR THE SAMPLE

Services selected	Nature of the service act	Perceived risk	Involvement	Heterogeneity
Health club	Peoples' bodies	Medium/High	High	Low/Medium
Theatre	Peoples' minds	Low	Med	Low
Dry cleaning	Possessions	Low	Low	Low
Garage	Possessions	High	Low	Medium

The categories and variables selected were felt to be significant in mediating the emotional responses of service consumers. Additionally, they offered guidance in hypotheses development, and potential for overall discussion.

METHOD

Procedure

Two hundred and sixteen respondents participated in this study. Five questionnaires were unusable leaving 211 for analysis purposes. The responses were comprised of 83 theatre, 21 dry cleaning, 44 garage and 63 health/sports. The study area was the city of Edinburgh in Scotland. Theatre goers were randomly sampled on leaving the theatre; those using dry cleaning services were approached by interviewers as they left a city centre outlet; those using a national chain of tyre and exhaust fitters were approached on completion of the service and those using Edinburgh's Commonwealth swimming pool and health centre were interviewed on exiting the facility. In the sample, the sex of respondents was similar to that of the UK adult population: 49 per cent male, 51 per cent female. The breakdown of the sample by age also broadly reflected the population's

profile: 18–34 (48 per cent), 35–54 (34 per cent), and 55+ (18 per cent).

All respondents completed a questionnaire as they exited a particular service. The questionnaire asked about the emotions they had experienced during service consumption. Specifically, respondents were asked to rate the intensity of the emotions experienced on a four-point scale (not at all – greatly) using Richin's (1997) 47 item Consumption Emotion Scale. To minimise potential bias from order effect, listings of the 47 descriptors were randomly rotated. Additionally, respondents reported their degree of satisfaction, frequency of usage, age and gender details.

HYPOTHESES

Several of our hypotheses test for emotional involvement and the distinction must be drawn between that and emotional states, e.g. happy, sad. Emotional involvement is operationalised as the intensity or strength of feeling. In the context of services consumption characterised as an experience, and marked by some risk and uncertainty, we recognised the importance of intensity of feeling as well as feeling states per se.

Six hypotheses were formulated and, in accordance with the study objectives, sought to test the significance of emotions and/or emotional involvement in four areas regarded as important in marketing. These were:

- The product (service types, hypotheses 1, 3, 4a and 4b)
- Customer perception measure (satisfaction, hypothesis 2)
- Customer action measure (frequency of usage, hypothesis 5)
- Customer characteristics (age and gender, hypotheses 6a and 6b)

Of the five primary criteria for evaluating classification schemes, two are particularly relevant in considering service type and emotional response. They are mutual exclusivity and usefulness. If a service fits one category or class, it will not fit any other class (mutual exclusivity). It has been noted that many classifications in marketing do not meet the mutually exclusive criterion (Hunt, 1991), as circumstances or conditions under which definitions occur can vary, e.g. banking services can be both high contact (visit a branch) and low contact (home banking). Equally, classification schemes are devised to assist marketing managers in the solving of problems (usefulness). In this regard, classifying services in terms of emotional response may offer valuable insights of the consumers that marketers are seeking to influence. Thus, on the basis that the services have been classified and the bases for classification are assumed in turn to mediate emotional response, we expect that:

Hypothesis 1: Services will differ in terms of the emotions felt.

Involvement as it relates to type of product/buying situation refers to 'the level of perceived personal importance, and/or interest, evoked by a stimulus (or stimuli) within a specific situation' (Antil, 1984). It is viewed as 'the motivation to process information' (Mitchell, 1979). Where involvement is more processual in nature, emotional involvement is more goal oriented and directional towards satisfaction. In consumer behaviour, the type of buying situation defined in terms of the degree of involvement, impacts on the extent and formality of the decision-making process. (Oliver and Westbrook, 1993) used this standard view of involvement in a study of its influence on satisfaction (post-purchase behaviour). The products studied ranged from toothpaste and breakfast cereal to cars and personal computers. Satisfaction was found to be unaffected by involvement. A number of reasons were cited, the first being 'that satisfaction judgements are involvement neutral and universal in their use. When consumers respond to a satisfaction query little attention is given to product involvement'. This study is important in that it seems to discount the type of product/ buying situation as an important discriminator in consumer satisfaction. On the other hand, affect has been acknowledged as being antecedent to, and necessary for, satisfaction (Oliver, 1993, Alford and Sherrell, 1996). More specifically, emotions, it has been argued, may play a distinct role in post-exposure processes including satisfaction/ dissatisfaction (Oliver, 1992).

Unlike the study cited above of product involvement, where satisfaction/ dissatisfaction occurs independent of product type, affective and/or emotional states are viewed as potentially strong determinants of satisfaction/dissatisfaction. Westbrook and Oliver (1991) found that certain affect dimensions explained approximately 40-45 per cent of the variance in various satisfaction measures. Given that the construct (emotion) itself is seen as valuable in predicting satisfaction/dissatisfaction, it is to be expected that variations in that construct, and the strength of emotional involvement (intensity of feeling) will predict the extent of satisfaction. Thus,

Hypothesis 2: The intensity of emotional involvement will be related to the extent of customer satisfaction.

Service businesses are deemed more difficult to manage. This is unsurprising given their unique characteristics. Unlike the standardised operation of many manufactured goods, services operation and delivery can be an intricate, multi-faceted process. As a result, things can go wrong.

Customers are often physically present and, consequently, directly experience the problem(s). Where consumers are not present, they are invariably made aware of problems by, inter alia, the service provider. Additionally, customers have been viewed as a major source of uncertainty (Argote, 1982; Danct, 1987; Larsson and Bowen, 1989). Taken together then, there is much variability and uncertainty surrounding the service experience. By using the critical incident technique, services researchers have sought to test this variability (Bitner, Booms and Tetreault, 1990 [AU?]). Across services, and within services, customers come to experience a number of 'moments of truth' (Carlzon, 1989; Normann, 1991). The variety of service encounters is likely to give rise to a range of emotional involvement or strength of feeling. We therefore expect that:

Hypothesis 3: The degree of emotional involvement will not differ between services.

Using the standard classification of goods framework, garage services can be thought of as a convenience good (emergency class) where purchase is immediate when the need is great. It can also be thought of as a regular, unsought good in that consumers are not motivated to buy until out of necessity,

Nobody wants to come to us. People can be suspicious of car repair companies. In our business customers make a 'distress purchase. They don't plan for their car to break down and when it happens, it usually comes at the worst possible time (Tom Farmer, quoted in Horovitz and Panak, 1993).

There is indeed evidence of a negative affect (anger, disgust, contempt) with regard to car repairs (Westbrook, 1987).

It is safe to assume that putting a car in for repair is not a particularly pleasurable experience. Furthermore, garage services are high in credence qualities, namely characteristics that customers find hard to evaluate even after consumption (Zeithaml, 1981). In effect, 'the harder a product is to evaluate in advance of purchase and use, the greater the risk for the consumer'. (Lovelock, 1996). Taken together, credence qualities and distress purchase lead us to assume that:

Hypothesis 4a: The consumption of garage services will result in a predominately negative emotional response.

The satisfaction of consumer needs lies at the heart of the marketing concept. Needs may be predominantly utilitarian (a desire to obtain some

functional or practical benefit) or hedonic (an experiential need involving emotional responses or fantasies). It can be argued that hedonism, or the pursuit of personal pleasure, is the driving force behind attendance at concerts or theatres. For example, consumers may experience excitement and interest during a music concert, and evaluate the experience as 'joyful' (Krishnan and Olshavsky, 1995). Evidence of hedonic pleasure was obtained in a study of emotions prompted by various types of consumption experiences:

I went to a Rolling Stones concert two years ago where I felt surrounded by the music which made me feel happy and energetic (almost high) for three hours. I felt transported to another world where the music just made me feel great and glad to be alive (Havlena and Holbrook, 1986).

One writer, attending a particular concert, even went so far as to suggest that the deep emotional reaction witnessed 'represented a profound aesthetic response far deeper than anything that might be characterised as simple hedonic pleasure'. (Holbrook, 1995).

Therefore, we would anticipate that:

Hypothesis 4b: The consumption of live concerts/theatre performance will result in a predominately positive emotional response.

Frequency of usage is a basis for segmenting consumer markets. Marketers acknowledge the value of dividing users by their weight of consumption (often defined as light, medium and heavy). It offers a valuable framework for determining the extent to which different usage groups share common personal characteristics, along with strategies for retention, acquisition and conversion. In service industries its relevance is equally important, e.g. the arts market. What accounts for the structure of usage rates in this market can be attributed to a number of factors (Mudie, 1997). Emotional involvement is not one of these factors, as it can only figure as a consequence rather than a predictor of usage. A single experience of a theatre performance offers as much potential for intense emotional involvement as repeated exposure to theatre performances. Thus we expect that:

Hypothesis 5: Emotional involvement will not be related to frequency of usage.

The development of lifecycle stage as a basis for market segmentation signals the significance of age as an important variable for understanding consumption patterns. It is reasonable to expect that advancement in age will be accompanied by changes in needs and demands for particular

products and services. Whilst many of these changing consumption patterns stem from changes in biology/physiology, emotional involvement (intensity of feeling) may be characterised as a psychological/ sociological phenomenon. People mellow and mature with age. Consequently we anticipate that:

Hypothesis 6a: Emotional involvement will vary by age.

Gender roles and stereotyping are much in evidence as marketing opportunities. However, unlike the biological/physiological bases of age, gender identity and differentiation is less clear:

Sex role identity is a state of mind as well as body. A person's biological gender (i.e. male or female) does not totally determine whether he or she will exhibit sex-typed traits, or characteristics that are stereotypically associated with one sex or the other. A consumer's subjective feelings about his or her sexuality are crucial as well. Unlike maleness and femaleness, masculinity and femininity are not biological characteristics (Fischer and Arnold, 1994).

Therefore, we expect that:

Hypothesis 6b: Emotional involvement will vary with gender.

RESULTS

A total intensity score was created by adding all the intensity scores for each Ritchin variable – this variable is called *totint*.

Factor analysis was performed on the Consumption Emotion Scale and the 47-item scale was subjected to a varimax rotation factor analysis. A five-factor solution was obtained with a cumulative variance explained of 61 per cent (see Appendix). Each factor comprised of those emotional responses with the highest factor loading against the scale item. In all cases these loadings were 0.40. In order of decreasing variance explained, the factors have been named:

- *Factor 1:* Negative – high on panicky, afraid, scared, worried, humiliation, nervous, tense, miserable, homesick, depressed, discontented.
- *Factor 2:* Positive – high on enthusiastic, amazed, excited, thrilled, surprised, joyful, astonished, pleased, happy, encourage.
- *Factor 3:* Settled – eager, peaceful, calm, contented, fulfilled.
- *Factor 4:* Relationship – high in romantic, passionate, loving and sexy.
- *Factor 5:* Unsettled – high in sentimental, envious, jealous and lonely.

Many of our hypotheses examine issues of emotional involvement. In this study, we have measured emotional involvement solely by the intensity (on the four-point scale) to which individual items on the Consumption Emotion Scale were experienced. So while some of the item descriptors could be regarded as displaying an emotional intensity hierarchy, e.g. amazed being a more intense expression of surprise, (Plutchik, 1980) we have not attributed an involvement hierarchy to the 47-item descriptors.

Hypothesis 1 Services Will Differ in Terms of the Emotions Experienced

There is no clear variation, as illustrated in Figures 1 to 4. These figures show the percentage of respondents who experienced each of the 47 emotion descriptors for the four services in the sample. The overall shape of the chart suggests that regardless of service a similar emotional experience (as measured by the 47-item scale) was expressed. One-way analysis of variance was conducted on the scores of each of the items and there were found to be significant differences between the services at the 5 per cent level in all the positive items with the exception of relieved, which was significant at the 10 per cent level, peaceful, contented, optimistic and proud were found not to display significant variation between the services. No significant variation between the services was found to exist for any of the negative items.

Hypothesis 2: The Intensity of Emotional Involvement will be Related to the Extent of Customer Satisfaction

This was tested using regression analysis and the following relationship was determined:

$$\text{Satisfaction} = 1.07_{(0.205)} + 0.0212_{(0.005)} \text{ totint}$$

The standard errors are in brackets and subscripted and, although the coefficients are significant at the 1 per cent level, the link between emotional intensity is very weak as the R² value is only 10 per cent.

Using the five factors to explain the level of satisfaction yielded the model:

$$\begin{aligned}\text{Satisfaction} = & 1.80_{(0.09)} - 0.192_{(0.09)} \text{ Factor1} - 0.609_{(0.09)} \\& \text{Factor2} - 0.123_{(0.09)} \text{ Factor3} + 0.043_{(0.09)} \\& \text{Factor4} - 0.007_{(0.09)} \text{ Factor5}\end{aligned}$$

FIGURE 1
EMOTIONS EXPERIENCED BY THEATRE CUSTOMERS

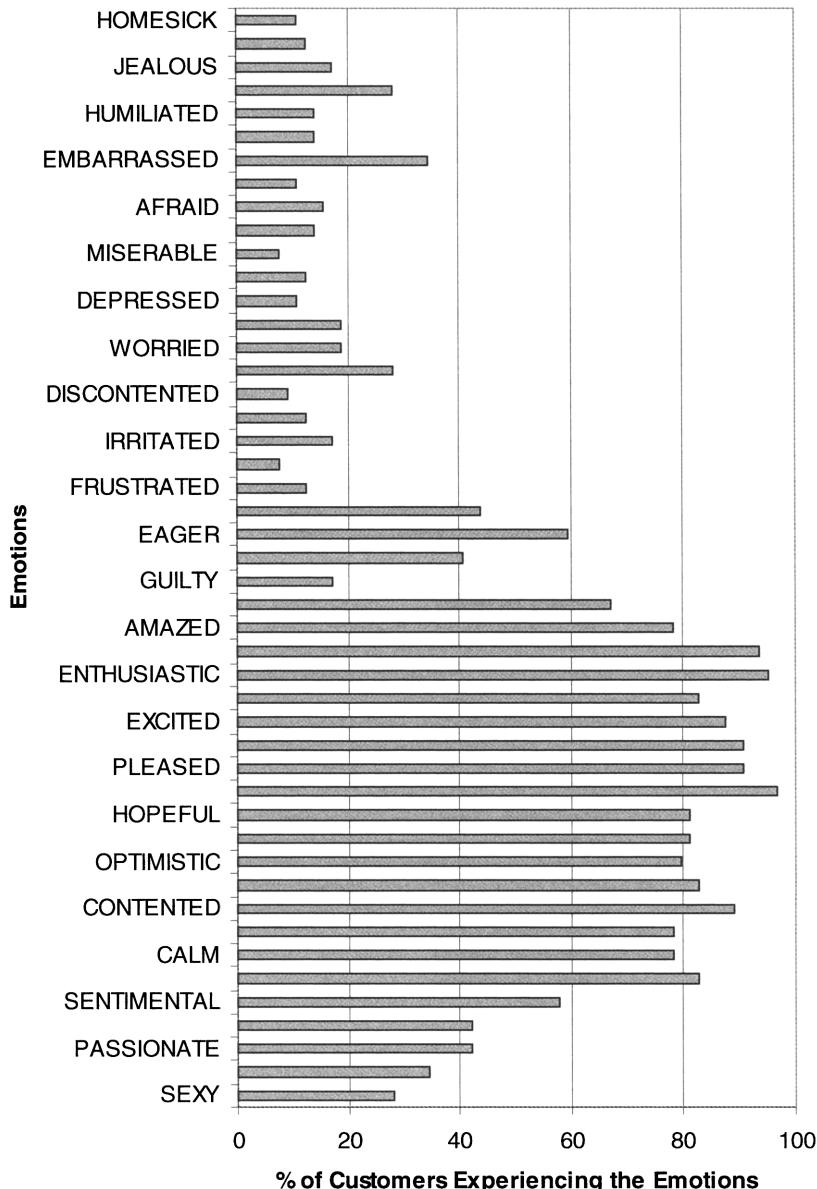


FIGURE 2
EMOTIONS EXPERIENCED BY DRY-CLEANING CUSTOMERS

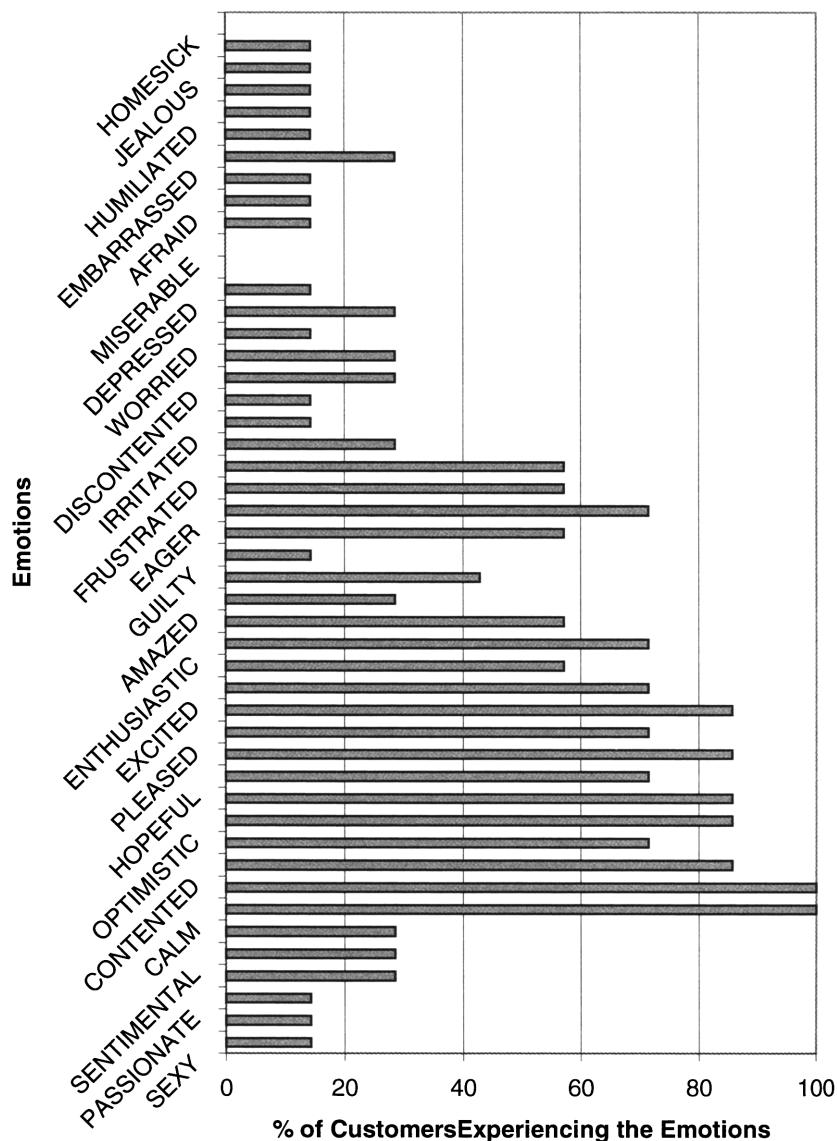


FIGURE 3
EMOTIONS EXPERIENCED BY GARAGE CUSTOMERS

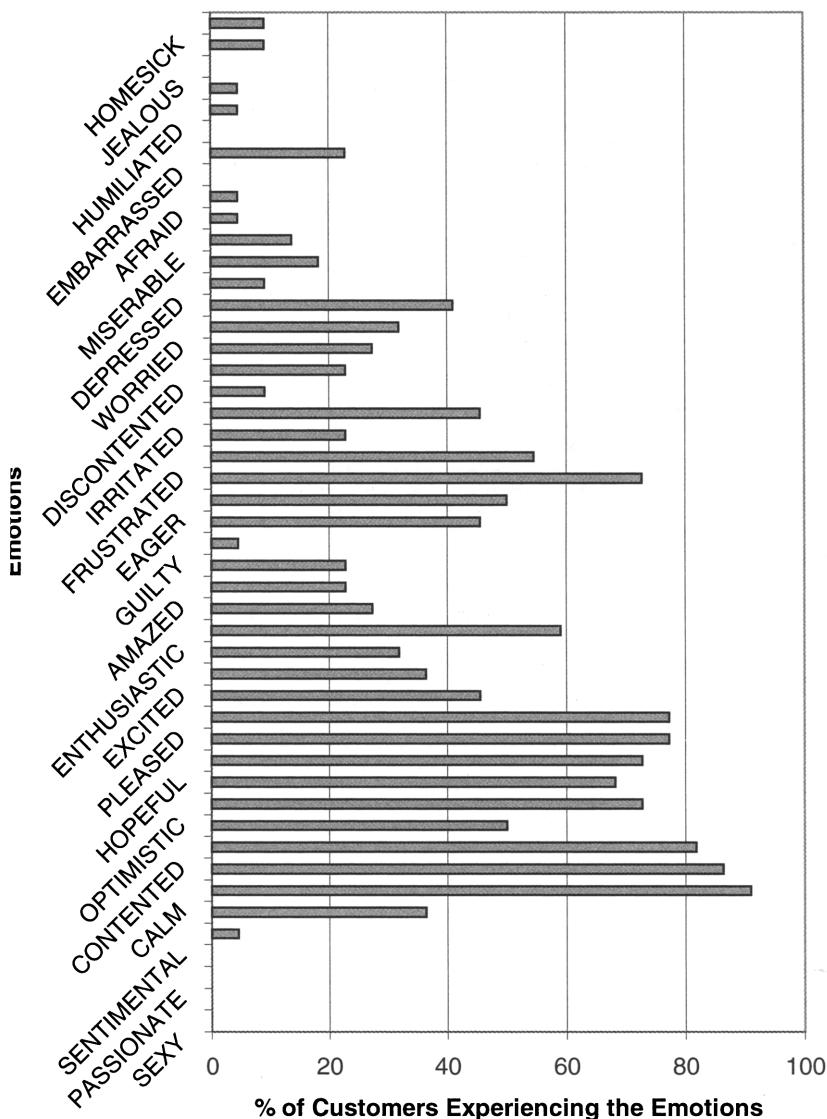
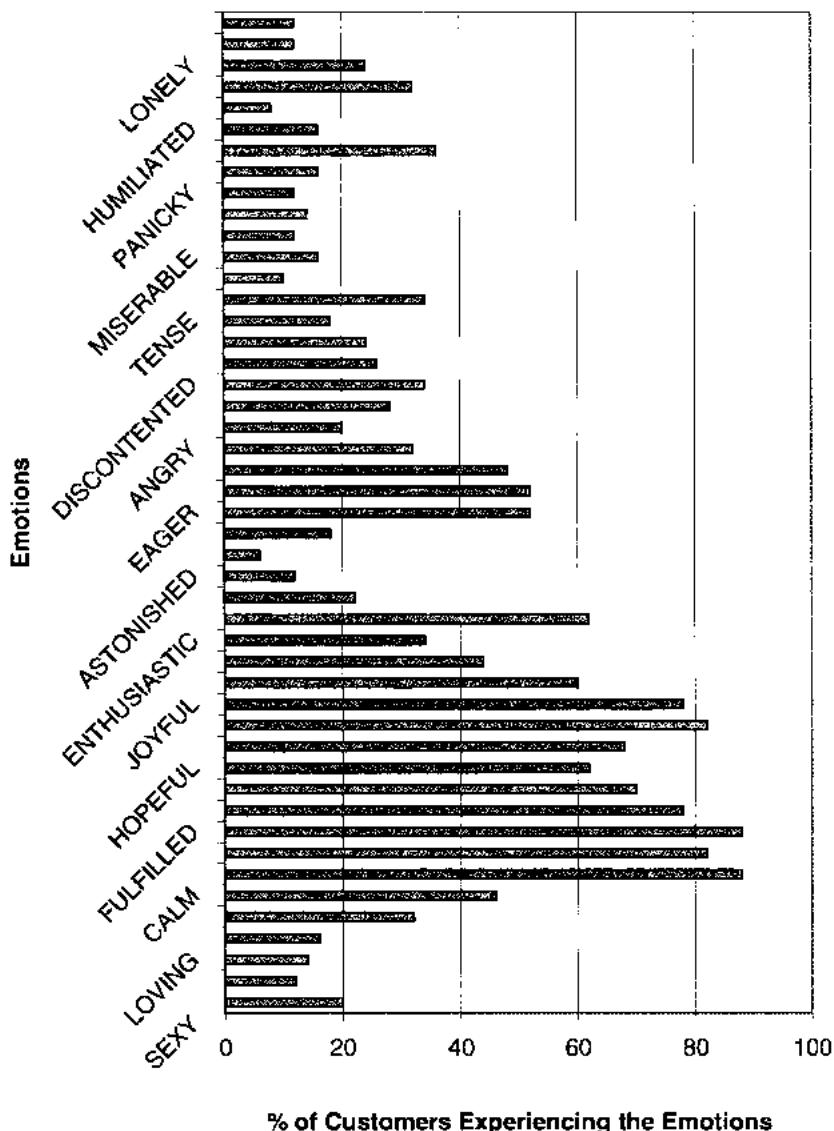


FIGURE 4
EMOTIONS EXPERIENCED BY HEALTH/SPORTS CUSTOMERS



This model explained 28 per cent of the variation; only Factors 1 and 2 were significant at the 5 per cent level. This indicates that as one experiences more negative emotions satisfaction falls, while if positive emotions are experienced satisfaction increases.

When age and gender are added to the model age is found not to be a significant effect on satisfaction, but that females were significantly more satisfied than males. The final equation is:

$$\text{Satisfaction} = 1.96_{(0.12)} \quad 0.579_{(0.091)} \text{ Factor2} - 0.42_{(0.19)} \text{ Male}$$

Again this had an R^2 value of 29 per cent.

Hypothesis 3: The Degree of Emotional Involvement will not Differ between Services

To test for this one way analysis of variance was used, with *totint* as the response variable, yielding the results displayed in Table 2:

TABLE 2
ANALYSIS OF VARIANCE FOR *TOTINT*

Source	DF	SS	MS	F	P
Service	3	6911	2304	8.83	0.000
Error	140	36544	261		
Total	143	43454			
Individual 95% CIs For Mean Based on Pooled StDev					
Level	N	Mean	StDev	-----+-----+-----+-----	
D_Clean	7	31.71	18.05	(-----*-----)	
Garage	23	24.48	13.81	(-----*-----)	
Pool	50	30.18	13.45	(-----*-----)	
Theatre	64	42.02	18.49	(-----*-----)	
Pooled StDev = 16.16					
				24.0	32.0
					40.0

From the post-hoc Tukey's pairwise comparisons test it is suggested that it is the theatre that has significantly higher emotional intensity than the garage or the pool. Thus there is evidence that the degree of emotional involvement does vary between services with those attending the theatre experiencing the highest involvement. When the factors are considered Factors 2 and 4 display significant differences between the services at the 1 per cent level of significance and Factor 3 is significant at the 10 per cent level. No significant effects are found for Factors 1 and 5.

Hypothesis 4a: The Consumption of Garage Services will Result in a Predominately Negative Emotional Response

To test for this, Factor 1, whose largest loadings were associated with negative emotions, was used in a one-way analysis of variance (see Appendix). This did not give any significant results. Thus one is unable to separate the garage customers from the others on grounds of negative emotions felt. The insignificance of the differences are confirmed by Tukey's pairwise comparisons post hoc test.

Hypothesis 4b: The Consumption of Live Concerts/Theatre Performance will Result in a Largely Positive Response

This was tested using Factor 2, which was comprised of the strong positive emotions (see Appendix). (Note that as a result of the factor rotation used, high positive emotions are associated with large negative values in the factor). This is displayed in Table 3.

TABLE 3
ANALYSIS OF VARIANCE FOR FACTOR 2

Source	DF	SS	MS	F	P
Service	3	48.643	16.214	26.44	0.000
Error	118	72.357	0.613		
Total	121	121.000			
Individual 95% CIs For Mean Based on Pooled StDev					
Level	N	Mean	StDev	-----+-----+-----+-----+	
D_Clean	6	0.0629	0.7976	(-----*-----)	
Garage	18	0.6094	0.7141	(-----*-----)	
Pool	45	0.5829	0.6912	(---*---)	
Theatre	53	-0.7090	0.8714	(--*--)	
Pooled StDev		0.7831		-0.60 0.00 0.60 1.20	

From the Tukey pairwise comparison test it is indicated that the theatre is significantly different from the other services, with the exception of dry cleaning. Thus the hypothesis is confirmed and the emotions experienced by the theatre customers are confirmed as being more positive than the customers of the other services.

Hypothesis 5: Emotional Involvement will not be Related to Frequency of Service Usage

The correlation between frequency and the total intensity of emotion was not significant, the correlation coefficient being only 0.053. Similar findings were found when the factors were considered.

Hypothesis 6a: Emotional Involvement will Vary with Age

There was found to be no significant association between *totint* and age, the correlation coefficient being only 0.08. Age is slightly associated with Factor 2, ($r=0.238$, p -value=0.008, this suggests that as people get older they experience more positive emotions) and Factor 3 ($r=0.17$, p -value=0.057), but not to any of the other factors.

Hypothesis 6b: Emotional Involvement will Vary with Gender

A t-test was used to determine the effect of gender on the intensity variable *totint* and the factors that were obtained from the Ritchin variables. No significant difference in emotional involvement was found between gender at the 5 per cent level. There is some slight evidence that females experience more positive emotions than males (p -value=0.097).

DISCUSSION

Our research was prompted by an interest in whether consumers experience similar or different emotions across a range of services. In effect do a priori classifications of services advance our understanding of emotions experienced by consumers. There have been few studies of consumers' emotional responses to services. One study reported little or no response, either positive or negative, to service encounters (Price and Arnould, 1995). Another study, addressing emotions in the context of service episodes (Muller 1991) argued that emotions are present in all instances of an episode. Our findings from hypothesis 1 lend some support to these earlier studies. In our study, type of service has not acted as a clear discriminator in terms of emotions experienced by consumers (see Figures 1-4). Relatedly, we wish to explore the appropriateness of the Consumption Emotion Scale (Richins, 1997) in a service consumption setting. To what extent would each of the 47 items in the CES capture the emotions experienced by services consumers? Our results do not lend support to Richins's view that the CES provides 'a set of descriptors that represent a range of emotions consumers most frequently experience in consumption situations'. From Figures 1-4 it is evident that a number of emotions were experienced either by a small percentage of consumers or not at all. A similar finding of consumers reporting very few emotions in unspecified

service encounters was also found in a study by Price and Arnould (1995).

On satisfaction, it is evident from our findings that it is not explained ($R^2=0.10$) by variations in the intensity of emotional involvement as measured on our scale. It would appear that variation in satisfaction is dependent more on the emotional items consumers experience than the intensity with which they experience them. This is in contrast to findings from the psychological literature where amongst other things mood intensity has been reported as a determining variable on learning (Izard, 1990). For emotions researchers in marketing, intensity equates to strength of emotional descriptor, e.g. amazed versus surprised. Many take on a directional status, notably positive or negative, and have been shown to be related to satisfaction (Oliver, 1993; Muller, Tse and Venkatasubramaniam, 1991). We report similar results from our regression model (Factor 1, negative and Factor 2, positive, $p<0.05$).

Whereas emotional involvement was unable to explain variations in satisfaction, we did find evidence contrary to our hypotheses that it does vary between services. In particular Factor 2 (positive) and Factor 4 (relationship) displayed significant differences between services. This seems to suggest that for consumers it is the type of service which determines emotions. What this study has not addressed is whether characteristics perceived as common across services, e.g. variability, give rise to similar emotional reactions. For example, how would consumers' emotional reactions compare in respect of the same service delivery problem, one in a desirable service and the other much less desirable? Equally, how comparable would reactions be to excellent performance in a less desirable service and poor performance in a desirable service. Surprisingly, the results from the garage service did not prove to be more negative than other services. To test the traditional classification of garages as a negative consumption experience, consideration should be given to pre-versus post-purchase emotions together with mediating variables such as garage loyalty, type of car, nature of work to be done and customer knowledge. Our assumption that the theatre would prove significantly more positive than other services was correct. This is not surprising as the theatre is intrinsically a place of enjoyment and pleasure. Additionally, we were unable to report distinctiveness in emotional responses by frequency of usage, age and gender.

Our exploratory research presents a rather mixed picture of just how significant consumers' emotions are in a services marketing context. We can report some evidence that services differ in terms of emotions experienced. However, there is little evidence of emotions explaining satisfaction. Where the research has been of value is in questioning the

relevance and appropriateness of particular emotional descriptors (Richins, 1997). Further research needs to address whether emotional involvement is the product of a descriptor plus the intensity with which it is experienced. In our study the modal response on our scale of intensity was 'a little' rather than 'a fair amount' or 'greatly'. Furthermore we acknowledge the limitation of gathering only post-consumption data. More may be learned through comparing pre, during and post-consumption.

Given the experiential nature of services one might reasonably agree with the claim that 'moods and emotions are critical factors that shape the perceived effectiveness of service encounters' (Zeithaml and Bitner, 1996). However the research to date suggests that emotions have not appeared a critical factor in furthering our understanding of services consumption. The question remains as to whether type of service proves a credible basis for determining the nature of consumption emotions.

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APPENDIX 1

The 47 Ritchin variables reduced using varimax rotation, to the five factors displayed below. These factors explained 60 per cent of the original variation.

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Communality
PANICKY	0.873	-0.031	-0.013	0.110	0.001	0.775
AFRAID	0.845	-0.073	-0.033	0.208	0.057	0.766
SCARED	0.834	-0.073	-0.035	0.143	0.009	0.723
WORRIED	0.795	0.003	0.142	-0.024	0.162	0.678
HUMILIAT	0.768	0.025	0.015	0.269	0.124	0.679
NERVOUS	0.767	-0.043	0.189	-0.018	0.164	0.654
TENSE	0.750	0.058	0.155	0.034	0.165	0.618
MISERABL	0.720	0.152	-0.156	0.254	-0.055	0.633
HOMESICK	0.702	-0.029	0.034	0.190	-0.169	0.560
DEPRESSE	0.617	0.193	-0.037	0.256	0.089	0.492
DISCONTE	0.614	0.192	0.274	-0.063	0.178	0.525
EMBARRAS	0.546	0.033	-0.084	-0.070	0.523	0.585
ASHAMED	0.508	0.171	-0.125	0.259	0.381	0.516
IRRITATE	0.476	0.174	0.105	-0.060	0.087	0.279
SAD	0.473	0.237	-0.069	0.350	0.209	0.450
GUILTY	0.454	0.096	-0.300	0.299	0.178	0.427
UNFULFIL	0.403	0.216	0.278	-0.067	0.337	0.405

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Communality
ENTHUSIA	-0.009	-0.818	-0.154	0.033	-0.027	0.696
AMAZED	-0.073	-0.814	0.204	0.090	0.081	0.725
EXCITED	0.004	-0.814	-0.138	0.073	-0.041	0.688
THRILLED	0.025	-0.810	-0.009	0.172	-0.076	0.693
SURPRISE	-0.061	-0.788	0.238	0.106	0.093	0.701
JOYFUL	-0.099	-0.749	-0.395	-0.000	-0.123	0.742
ASTONISH	-0.065	-0.729	0.140	0.133	0.191	0.610
PLEASED	-0.214	-0.697	-0.459	0.007	-0.052	0.746
HAPPY	-0.273	-0.687	-0.376	-0.077	-0.049	0.696
ENCOURAG	0.016	-0.612	-0.409	0.157	-0.075	0.609
HOPEFUL	-0.077	-0.575	-0.317	0.155	0.125	0.476
OPTIMIST	0.050	-0.535	-0.456	0.118	-0.136	0.528
WARM-HEA	-0.200	-0.470	-0.145	0.283	0.216	0.408
EAGER	-0.008	-0.444	-0.393	-0.108	0.374	0.503
PEACEFUL	-0.189	0.092	-0.742	0.205	-0.037	0.638
CALM	-0.265	0.096	-0.741	0.116	0.066	0.646
CONTENTE	-0.182	-0.352	-0.697	0.085	0.005	0.649
FULFILLE	-0.026	-0.402	-0.599	-0.031	-0.014	0.522
PROUD	0.225	-0.146	-0.488	-0.120	0.262	0.393
RELIEVED	0.227	-0.212	-0.432	0.084	0.143	0.310
ROMANTIC	0.223	-0.173	-0.075	0.880	0.077	0.866
PASSIONA	0.202	-0.247	-0.061	0.847	0.132	0.841
LOVING	0.191	-0.207	-0.103	0.824	0.067	0.774
SEXY	0.328	-0.154	-0.059	0.782	-0.007	0.747
SENTIMEN	0.091	-0.379	-0.043	0.444	0.277	0.428
ENVIOUS	0.088	-0.025	-0.084	0.197	0.846	0.769
JEALOUS	0.147	0.020	-0.116	0.196	0.830	0.762
LONELY	0.363	-0.039	0.117	0.038	0.482	0.381
Variance	8.5270	7.7305	4.1382	3.9907	2.9286	27.3150
% Var	0.189	0.172	0.092	0.089	0.065	0.607

Home and away: Why do consumers shy away from reporting negative experiences in the peer-to-peer realms?

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Abstract

This study investigates how customers use their construct of "home" in evaluating their experience in peer-to-peer rented accommodation, as opposed to traditional hotels. The literature has paid considerable attention to people's perceptions of destinations, but almost none to their perceptions of "home" and its complexities whilst visiting a destination. We examine the relationships between the concepts of "home" or "here" represented in peer-to-peer accommodation and the construct of "away" or "there" represented in traditional hotels. A mixed-method approach determines the existence of bias in reporting behavior. Our findings indicate that there is a consistent review gap between institutional actors and peer-to-peer actors. Also, consumers of peer-to-peer accommodation prefer not to engage in negative reporting if a bond with the host is developed. This perception of a home shapes consumers' relationship with the host and leads to reporting bias. This study provides clear theoretical insights to advance our knowledge about the underlying motives behind reporting behavior of negative experiences. Furthermore, it offers practical implications for both institutional and peer-to-peer contexts.

KEY WORDS

airbnb, here and there, home and away, online reviews, reporting bias, social distance

1 | INTRODUCTION

Despite evidence in the marketing literature that consumers weigh negative reviews more heavily than positive ones (Yan & Jiang, 2018), in most reputation systems, reviews are overly positive and suffer from a degree of nonresponse bias (Fradkin, Grewal, Holtz, & Pearson, 2015; Resnick, Zeckhauser, Swanson, & Lockwood, 2006). Reputation systems serve as a new kind of digital institutions, helping to foster trust and loyalty in online markets (Caruana & Ewing, 2010). Their value is however at risk when online feedback is affected by reporting biases (nonreporting of negative experiences). The accuracy of reputation is even more questionable within transactions associated with the "sharing economy" where uncertainty, asymmetrical information, and risk are high. Within such an environment, average reviews are unrealistically high (Ert, Fleischer, & Magen,

2016). It follows that where accurate reputation systems are more needed, biases are even more severe. In a study conducted by Zervas, Proserpio, and Byers (2015) on over 600,000 Airbnb properties around the world, it was evident that 95% of these properties enjoyed a consumer average rating of 4.5–5 stars. This was compared with hotels rated on TripAdvisor where the average rating was much lower reaching 3.5.

This study explores the bias in consumer reviews for peer-to-peer rented accommodation and how the construct of home, "here," affects feelings towards the host. The notion of home is used here because this type of accommodation is someone else's home which can be experienced based on the consumer's frame of reference is their actual home. On the other hand, traditional hotels in this study can be associated with the construct "away" due to being in a business-like environment where interactions with the hosts are low

compared with a peer-to-peer context. Reviews for traditional hotels often reflect less bias due to the perceived distance from the host. The type of reporting bias the current study focuses on is the nonreporting of negative experiences in the case of peer-to-peer accommodation.

Furthermore, this study aims to understand whether the home construct reduces the social distance and lead to negative reporting bias, i.e., consumers less willing to report negative experiences. According to Liberman, Trope, and Stephan (2007) there are various dimensions of psychological distance, temporal, spatial, social, and hypothetical. In this paper we focus on social distance. When the interaction is institutional, e.g., a receptionist at the hotel counter, the social distance is high due to limited interactions between the parties. Conversely, when the interaction is peer-to-peer, social distance is lower and there is a rapport between the actors enabled by a home-like environment (Priporas, Stylos, Rahimi, & Vedanthachari, 2017).

Our argument is that the social distance between the actors affects the way in which consumers interpret the experience of stay. In particular, we argue that consumers' home construct "here," used in shaping their experience, reduces the social distance in a peer-to-peer business model, in which the consumer and the provider interact more directly and develop a balanced (i.e., same level) relationship. Therefore, in the case of a negative experience, we expect the customers' willingness to report it will be lower. This is due to the empathetic appraisal of their experience.

Conversely, in traditional business models, the consumer and the service provider interact in an institutional setting. In these situations, consumers appraise service experiences in a business-like fashion, with higher social distance, reducing in turn reporting biases. Furthermore, the construct "there" adds to the distance and reduces the empathetic appraisal of the experience.

Our paper poses the question of how our own homes, acting as frames of reference, affect our traveling experiences and whether this leads to closer relationships with the host resulting in the lack of reporting of negative experiences. Very little is known about the construct "here" that accompanies the traveler, or how it may manifest itself in constructing the destination. The current study addresses this gap in knowledge by looking into tourist's construct of home, "here," and how it is used to interpret their destination and shape their experience in the context of peer-to-peer accommodation. The understanding of the consumer's experience based on how their frame of reference "here" or "home," affects their evaluation of it and lead to reporting bias is significant and leads to important theoretical and practical implications. Not only that this understanding will fill the gap in the literature about the role of the home in interpreting and shaping a traveler's experience, but it also helps practitioners understand how their products are evaluated through online reviews. Similarly, it will shed light on hosts' provision and promotion of their products on social platforms such as Airbnb. Therefore, the study is important for product development and online marketing and management.

1.1 | The issue of reporting biases among reviews' platforms

Several scholars have highlighted the existence of a consistent positivity bias among online reviews platforms (Resnick et al., 2006), and this happens both among product websites (e.g., Amazon; Hu, Zhang, & Pavlou, 2009) and the tourism ones, such as Yelp (Jurafsky, 2014), or TripAdvisor (Feng, Xing, Gogar, & Choi, 2012) characterizing the so-called J-shaped distribution of reviews' ratings.

More recently, scholars pointed how this effect is even more present among the sharing economies platforms (Bridges & Vásquez, 2018; Feng et al., 2012; Pera, Viglia, Grazzini, & Dalli, 2019; Zervas et al., 2015). For instance, Zervas et al. (2015) found how 95% of Airbnb online reviews score 4.5–5, meaning negative ratings on the platform are very rare (Cansoy & Schor, 2016), and representing only 2% of the total (Bridges & Vásquez, 2018).

The reasons behind this phenomenon have been focused on by an increasing number of marketing and tourism scholars (Bridges & Vásquez, 2018; Mauri, Minazzi, Nieto-García, & Viglia, 2018; Pera et al., 2019), showing how, when specifically examining sharing economies settings (e.g., Airbnb), elements like human interaction between actors as well as fear of retaliation in the reviewing process play a critical role for this purpose. Moreover, according to Yannopoulou, Moufahim, and Bian (2013) another crucial element could be the different level of expectations between institutional customers and peer-to-peer guests, the latter being more realistic and focused on the human interaction rather than on the service standards. Ikkala and Lampinen (2015) found how Airbnb users enjoy the membership of this community even as an opportunity to enhance their social connections. However, other elements have been investigated by scholars. One of these is the reciprocity in the reviewing system of Airbnb, as found by Fradkin et al. (2015) which can also contribute to the overall positive bias. Moreover, due to the lack of anonymity, reviews are less likely to be overtly negative (Sun, Youn, Wu, & Kuntaraporn, 2006; Wang, 2010). In addition, since many users integrate their profiles across different social media platforms, this may affect their propensity to publicly share negative commentary as they may be reluctant to share such information on their private accounts. This also may have an impact on the positivity bias in the ratings and reviews system (Bridges & Vásquez, 2018). Furthermore, part of the underrepresentation of negative reviews may also be ascribable to the peer-to-peer platform's practices (e.g., Airbnb), as it is not possible to know the actual number of received reviews as well as of filtered ones, but we can rely only on the published comments.

In this scenario, several elements may affect the reputation system of sharing economy platforms, and an accurate investigation of the actual drivers is still needed (Zervas et al., 2015). To dig into this topic, it is important to pay attention to actual consumer experiences and what affects their perception of those experiences (Han, Mankad, Gavirneni, & Verma, 2016). In this vein, our study, therefore, aims to explore how the concepts of "home" and "away" may play a critical role affecting the reviewing process and, in turn, the positivity bias among peer-to-peer platforms.

2 | CONCEPTUAL FRAMEWORK

2.1 | The notion of “here” (home) and “there” (away) as a way to influence the social distance between the host and the guest

Social distance is theoretically defined as the closeness of individuals in a social exchange (Liberman et al., 2007). Liviatan, Trope, and Liberman (2008) found that being closer to the target people produce higher-level representations and judgements of their actions. Moreover, there is well-supported evidence that feelings of closeness to a person promote allocation of resources to him or her (e.g., Dovidio et al., 1997; Hoffman, McCabe, & Smith, 1996; Nadler, 1999). However, White, MacDonnell, and Dahl (2011) have expanded this by showing that having a human connection or sharing spaces is a key determinant of social distance. Within psychological distance, the construct of social distance reflects the level of closeness of individuals in a social exchange (Liberman et al., 2007: p. 357) and particularly refers to the social proximity between parties (Darke, Brady, Benediktus, & Wilson, 2016; Stephan, Liberman, & Trope, 2010).

Construal level theory (CLT) proposes that psychological distance—the removal of events from direct experience in terms of time (when), space (where), social distance (who), or hypotheticality (whether)—influences how people perceive, represent and judge events (Liberman & Trope, 2008; Trope & Liberman, 2010).

Inspired by CLT, we propose that social distance plays a key role in how guests behave in their reviewing processes, after experiencing a negative stay, exploring how the role of feeling at “home” or “away” conceptualized in the CLT framework may affect their reviewing behavior.

We found the literature on “here” and “there” the closest to the construct “home and away” and therefore useful in exploring consumers’ relationship with the host and consequently their reporting behavior. The consumers’ experience of travel may be considered a binary opposition between the destination and home, which functions as a reference-point (Rojek, 1997). These locations presently designated “here” and “there” are socially and personally constructed, as well as having a physical existence (Entrikin, 1991; Willis, Ladkin, Jain, & Clayton, 2017), and the relationship perceived between them during the process of touring is also socially constructed (Crouch, Aronsson, & Wahlström, 2001; Rojek, 1997). The construct “here” is often the source of the preconceptions, feelings, attitudes, and symbols that make up the tourist’s construct “there” (Crouch & Desforges, 2003; Crouch et al., 2001; Oakes, 2005), and the process of touring seems to involve an existential comparison and perhaps stock-taking of one’s “here” and “there” constructs (Urry, 1990: p.12; Steiner & Reisinger, 2006; Wang, 1999). Yet although much has been written about the symbolic gaze (e.g., Bærenholdt, Haldrup, & Urry, 2017; Bruner, 1991; Urry, 1990; Urry & Larsen, 2011) and the social construction of tourist destinations and attractions (Bærenholdt et al., 2017; Crouch et al., 2001; Graburn, 1989; Hennig, 2002; Johns & Clarke, 2001; Laing & Crouch,

2009; Martin, 2010; Selwyn, 1996), Willis et al. (2017) challenged the conventional notion of the tourist gaze. They posit that, through modern technology, consumers can disconnect from the destination and be virtually present at home “to take part in the mundane rituals of everyday life.” This way, the business traveler is inclined to focus on what is missing from the destination and long to be present in the familiar and the routine of home (Willis et al., (2017): p. 49).

Besides being relative points in space, “here” and “there” also carry connotations of familiarity and otherness, influenced *inter alia*, by role, tradition, and culture. Rather than exchanging one “here” for another (e.g., “wish you were here”), travelers take the familiar world with them into the unfamiliar (Willis et al., 2017). Meinecke (2015) comments: “Individual values appear as universal to the man who pursues them. But they are never universal, for they always bring with them a clump of native soil from the national sphere, a sphere that no individual can completely leave behind.” “Here” is not just a spatial “clump of soil” but is rich with personal, social, and ideological meaning, since “here” is where one dwells and where familiarity confers a sense of ownership (Crouch, 2010; Crouch et al., 2001). The values and norms of “here” are one’s own property, and one’s own properties, making “here” in many ways equivalent to self.

Both “here” and “there” define and are defined by roles, the “here” role set being especially associated with heritage and tradition. For instance, MacIntyre (2003): p. 560 comments: “I inherit from the past of my family, my city, my tribe, my nation, a variety of debts, inheritances, rightful expectations, and obligations”. These properties bind “here” intricately to one’s concept of self, so that the “clump of native soil” influences everything the individual does whilst “there”; as MacIntyre (2003): p.561 notes: “the individual’s search for his or her good is generally and characteristically conducted within a context defined by those traditions of which the individual’s life is a part.” When individuals go abroad, to “there,” not only do the traditions of “here” go with them, but “here” also provides the tools with which “there” is interpreted and understood: as Bruner (1991) and Suvantola (2017) assert the best way to discover the real is through one’s symbolic system, therefore, it is important to explore the tourist’s point of view.

Part of being both “here” and “there” consists in seeing things in person (i.e., in light of one’s “here”) that one knows are “there” and thus Urry (1990): p. 12 notes the significance to tourists of the unfamiliar juxtaposed to the familiar, such as home amenities in a peer-to-peer type of accommodation, or everyday activities carried out in an unfamiliar manner or situation. The experience thus seems to depend upon juxtaposing oneself and hence one’s “clump of native soil” alongside what is being visited. This appears to answer a deep human need for self-identity, perhaps forming the basis of the transformation that tourists hope to find through their travels (Bruner, 1991; Graburn, 1989; Suvantola, 2017).

Place and space are also distinguished by the strategic or tactical approaches one takes to one’s environment (De Certeau, 1984: pp. 35–36). The peer-to-peer accommodation sector operates, beyond trading (Sigala, 2015), by occupying space, making it one’s own “place”, where one can bide one’s time and make one’s plans, and

from which resources can be marshaled to accomplish one's ends. In general, tourists traveling from "here" where they own territory, by law or familiarity, to "there", become strangers in a land belonging to others, and are thereby transferred from a strategic to a tactical position. Removed from their strategic power base, they feel in the position of outwitting more powerful opponents, through ruses, in their own territory. Staying in someone's home, helps reduces this distance. This psychological distance represents a subjective experience in which an object or event is close or far in the temporal dimension, spatial dimension, or social dimension (Liberman & Trope, 1998). While several different kinds of psychological distance have received attention in research, the social distance appears relevant for studying institutional versus peer-to-peer communities.

The current study contributes theoretically to the understanding of the social/personal dimension and its relationship with the home construct in online peer-to-peer reviews. In particular, whether consumer's home construct allows them to feel at a lower level of social distance, i.e., higher-level of interaction between actors, which might prevent a negative review thanks to the activation of vicarious experience in the shoes of the (non) reviewed.

3 | EMPIRICAL CONTEXT

This study uses the principles discussed above to mainly examine the way customers use their perceptions of "here" as they construct and interpret their experience and whether this reduces social distance leading to online review bias.

It explores an institutional and a peer-to-peer environment, characterized by different levels of social interactions. The empirical context is the accommodation realm. For the sake of comparability between environments, we consider just platforms involving a monetary transaction.

We study whether reporting behavior after having a bad experience differs in relation to social distance manifested in the notion of "home and away". In this case, "home" being Airbnb and "away" being traditional operators.

3.1 | Peer-to-peer accommodation networks

In recent years, the phenomenon of sharing economy has emerged in tourism marketplaces (Abbate & Viglia, 2019) as a form of collaborative consumption. Sharing economies concept refers to the consumer's possibility to temporarily access other's products and services (Bardhi & Eckhardt, 2012) by paying for this experience. This tendency has been recently facilitated by the increasing connectivity of social network platforms helping peers' connections (Tussyadiah & Pesonen, 2018).

The rapid growth of sharing economies is driven by several factors, including societal, technologic, and economic (Owyang, 2013), although collaborative consumption is driven by motivations that extend beyond the mere cost savings (Botsman & Rogers, 2011) and have to do with a consumers' changing attitude towards

consumption (Gansky, 2010). Interestingly, younger consumers (Gaskins, 2010; John, 2013) and consumers with higher income levels (Olson, 2013) are more likely to participate in collaborative consumption.

Within the hospitality industry, the most successful peer-to-peer platform is Airbnb (Gutiérrez, García-Palomares, Romanillos, & Salas-Olmedo, 2017), connecting hosts and guests across 190 countries and over 2 million listings. Since the advent of Airbnb has revolutionized the accommodation realm, several studies attempted to estimate its disruptive effects on the business (Abbate & Viglia, 2019) and its competition with the traditional accommodation (Choi, Jung, Ryu, Kim, & Yoon, 2015; Zervas, Proserpio, & Byers, 2015). Hospitality plays a critical role in peer-to-peer accommodation experience, although its concept differs from the professional hospitality typical of hotels (Brotherton, 1999). In peer-to-peer accommodation systems, indeed, the host-guest direct interaction is predominant and personal experiences sharing drives travelers to connect with local communities (Abbate & Viglia, 2019).

3.2 | Peer-to-peer exchange relationships

These environments encompass peer-to-peer platforms based on monetary transactions. In this case, the social component is predominant and, thus a monetary transaction is present, people are mainly driven by social norms, given an even power position (Visconti, 2016). The degree of interaction goes from moderate, i.e., renting the whole listing, to very high, where the experience is the result of a high interaction between customer and provider, i.e., renting part of a house. The adopted case for this context is Airbnb.

3.3 | Traditional market exchange relationships

These environments include business to customer platforms, where consumers review traditional operators (e.g., Booking, TripAdvisor, Yelp), following business-set rules.

In choosing a specific source to mirror these markets we focused on Booking.com, given its popularity and trustworthiness compared with similar competitors (Filieri, 2016).

4 | RESEARCH METHODOLOGY

The empirical approach consists of two different phases.

The first, exploratory in nature, compare quantitatively the average review scores of hotels and listings in Booking.com and Airbnb, respectively.

The second phase investigates qualitatively through in-depth interviews whether and how the social/personal dimension driven by the construct of "home" hinders the willingness to express bad experiences through online reviews.

4.1 | Methods

4.1.1 | Quantitative exploratory analysis

To provide a general picture of the possible bias in reporting negative experiences among traditional hotels and Airbnb accommodation, in November 2016 the study compared the average review scores of hotels in Booking.com and the average review scores of listings in Airbnb for the six most popular European destinations according to the global destination cities index (GDCI, 2015). This index ranks the travel destinations worldwide based on the overnight incoming visitor volume and expenditure (D'Acunto, Tuan, Dalli, Viglia, & Okumus, 2019) offering a certain degree of variety in the sample. The reason of comparing traditional hotels (Booking.com) versus peer-to-peer platform (Airbnb) comes from the assumption that a home-like environment associated with the construct of "here" enables a lower social distance due to higher personal interaction between the host and guest. This appears to influence the reporting behavior of negative experiences (Liviatan et al., 2008; White et al., 2011).

As can be seen from Table 1, there is a consistent gap in the average review score in favor of Airbnb listings compared with Booking.com, with the former being around 20% higher and presenting a left-skewed distribution, by means of skewness normality test (-0.6). Specifically, through a bootstrap estimation of the standard error at different levels of the distribution (Wilcox, Erceg-Hurn, Clark, & Carlson, 2014), we find that the proportion of negative ratings is higher in Airbnb vs. Booking.com; $p < .01$.

This exploratory phase suggests us to qualitatively dig further in the direction of possible reviewing bias. Preliminary findings will be discussed in the related section.

4.1.2 | Qualitative research

Qualitative research was selected as an approach to some of the data collection in this study. This allowed participants to tell their stories and express their feelings without restriction, Figueroa-Domecq, Pritchard, Segovia-Pérez, Morgan, and Villacé-Molinero (2015). The qualitative data was collected through a semistructured interview method and an interview guide with a list of topics was prepared. As the topic being researched has been sparingly documented (Grove &

TABLE 1 Average review score for hotels in Booking.com and listings on Airbnb

City	Booking.com		Airbnb	
	Average score (SD)	Numerosity	Average score (SD)	Numerosity
Amsterdam	7.42 (0.67)	357	9.03 (0.31)	442
Barcelona	7.53 (0.54)	397	8.98 (0.32)	687
Istanbul	6.97 (0.69)	395	8.92 (0.34)	259
London	7.11 (0.70)	777	9.12 (0.31)	912
Paris	7.23 (0.64)	1187	8.97 (0.34)	893
Rome	7.50 (0.65)	853	9.07 (0.29)	523

Abbreviation: SD, standard deviation.

Fisk, 1997) the interviews are used as a companion research method in mixed-method studies (Gremler, 2004; Kolbe & Burnett, 1991). A flexible approach was taken to allow participants to lead discussions; this was found useful in such an exploratory study on a topic on which relatively little is known. According to Jones and Crompton (2013) semistructured interviews are known for their flexibility and spontaneity. The interviews explore the customer (non) reporting behavior following a negative service experience specifically in a peer-to-peer context.

4.2 | Sampling and process

Purposive and convenience sampling was employed to select "information rich" individuals (Devers & Frankel, 2000: p.264) and have a good understanding of participants' experiences. Participants were selected among hotel customers who are active online reviewers and have stayed at both Airbnb and traditional hotels while traveling for leisure. The sample of participants was chosen through the authors' professional and personal networks please see Table 2 for the participant profiles. To avoid possible influences of the price level, we considered situations in both institutional and peer-to-peer context ranged between 60 and 80 euros. Data collection ended when saturation was reached at 35 interviews (Tracy, 2010).

Ethical considerations were followed to ensure that participants were made aware of the aim of the research and were asked to provide their consent. Participants were also informed that they would be able to terminate the interview and withdraw at any time and without the need to give reasons. Participants' confidentiality was also promised and maintained.

Interviews were conducted over a period of 32 weeks with each one lasting from 45 to 60 min. Data were digitally recorded and transcribed by the authors. Conversations revolved around participants' feelings about their experience, staying at a hotel or an apartment within the sharing economy sector Airbnb. Their accounts of happiness and/or disappointments with the experiences were explored. Participants were also asked to elaborate on their online reporting behavior in both situations and to shed light on the reasons behind not taking action in the case of negative experiences. Most importantly, interactions with the host or hotel staff were also explored to see if the notions of "here" and "there" and the social distance influenced participants' experiences and consequently their reporting behavior.

5 | DATA ANALYSIS

A general analytic framework (Yin, 2013) was used to analyze and interpret the data. This analytic framework comprised three stages: (a) Analysis of individual interviews and transcripts, (b) identification of common recurrent themes and, (c) analysis of shared themes.

Each transcript was analyzed separately as a unit of analysis to understand both the experience of those individuals and to identify

TABLE 2 Sample profile

Sample profile: Last 5 years visits and reviews													
Pseudonym	Age	Sex	Profession	nº of visit Airbnb	nº of reviews left on Airbnb*	%	Of which negative*	%	nº of visit Hotels	nº of Hotel reviews left**	%	Of which negative**	%
Fred	42	Male	Physicist	10	8	80%	0	0%	40	40	100%	3	8%
Sam	35	Male	Strategic Consultant	5	4	80%	0	0%	20	18	90%	4	22%
Sara	39	Female	Researcher	6	4	67%	1	25%	25	24	96%	2	8%
Sivlia	35	Female	Doctor	3	0	0%	0	0%	10	10	100%	2	20%
Kerry	26	Female	Professional	8	6	75%	1	17%	28	24	86%	6	25%
Alfred	28	Male	Engineer	13	9	69%	2	22%	46	36	79%	8	22%
John	36	Male	Teacher	5	4	80%	0	0%	18	16	91%	5	31%
Andy	35	Male	Computer Engineer	6	5	83%	1	20%	21	20	95%	5	25%
Veronica	32	Female	House wife	5	3	60%	0	0%	18	15	86%	4	27%
Paula	35	Female	Pharmacist	9	6	67%	0	0%	32	28	89%	6	21%
Yara	23	Female	House wife	4	3	75%	1	33%	14	12	86%	4	33%
Han	25	Male	Builder	3	2	67%	0	0%	11	11	100%	4	36%
Lan Dan	23	Female	Shop assistant	10	7	70%	1	14%	35	30	86%	9	30%
Laila	35	Female	Front office employee	8	6	75%	1	17%	28	24	86%	6	25%
Ming	25	Female	journalist	25	21	84%	2	10%	88	80	91%	21	26%
Hania	24	Female	Teacher	11	9	82%	1	11%	39	36	94%	8	22%
Mahmoud	47	Male	Personal Trainer	8	6	75%	1	17%	28	24	86%	6	25%
Gigi	44	Male	Freelance journalist	30	18	60%	1	6%	105	72	69%	19	26%
Morris	42	Male	Tree surgeon	6	5	83%	0	0%	21	20	95%	3	15%
Alex	27	Male	IT technician	5	3	60%	1	33%	18	15	86%	3	20%
Michael	26	Male	Physicist	8	5	63%	1	20%	28	23	82%	6	26%
Marcel	28	Male	Computer Scientist	12	8	67%	2	25%	42	35	83%	15	43%
Eric	33	Male	Sociologist	14	7	50%	1	14%	49	40	82%	12	30%
Cristine	33	Female	Psychiatrist	6	4	67%	0	0%	21	20	95%	8	40%
Donna	35	Female	Doctor	5	3	60%	0	0%	18	16	91%	5	31%
Dalia	51	Female	Shop assistant	6	5	83%	1	20%	21	20	95%	5	25%
Matt	50	Male	Shop manager	8	5	63%	0	0%	28	25	89%	10	40%
Mario	47	Male	teacher	12	7	58%	1	14%	42	34	81%	8	24%
Ed	55	Male	Scientist	10	6	60%	1	17%	35	30	86%	6	20%
Veronica	56	Female	Head teacher	9	5	56%	1	20%	32	27	86%	8	30%
Anabella	32	Female	Hair dresser	6	5	83%	0	0%	21	20	95%	4	20%
Jerry	49	Male	Gardener	3	0	0%	0	0%	11	11	100%	3	27%
George	38	Male	Professional	18	10	56%	1	10%	63	45	71%	4	9%
TOTAL				9.0	6.1	67.4%	0.7	11.0%	31.9	27.3	88.7%	6.7	25.3%

the emerging themes. The coding scheme was unrestricted, imaginative, and was not content-specific (Miles & Huberman, 1994). All three authors undertook the coding of data independently in parallel to provide researcher triangulation (Denzin, 2012).

The second stage involved categorical aggregation and the search for emerging patterns. The third stage organized the data into more abstract units of information by building categories and patterns inductively so that meaning could be extracted and theory developed. The data were revisited to search for relationships between the shared themes and the different concepts that had emerged. Potential patterns and relationships within and between the shared themes and the core theme of "response-bias" were examined to determine how exactly they influenced the shared aspects of the informants "lived experience." For example, it was found that the intensity of interaction with the host affected reporting bias. Respondents who had a meaningful interaction with the host tended not to report their negative experiences or not to mention them in their review.

Reliability assessment was independently repeated by the three authors analyzing a randomly chosen five questions per 10 interviews as a reliability check, which scored 79%. The items on which there was no initial consent were discussed and agreed on.

5.1 | Findings

5.1.1 | Preliminary exploratory findings

The quantitative exploratory findings are consistent with the ones of Ert et al. (2016) and Zervas et al. (2017) regarding the distributions of ratings when comparing peer-to-peer accommodations with institutional ones (see Table 1). As a possible explanation, we propose that when guests experience the feeling at "home" condition (i.e., renting a room on Airbnb) they feel more reluctant to leave a bad review in case of negative experience. On the other hand, consumers traveling in traditional hotels (i.e., "away" condition) do not feel restrained in negatively reviewing when something goes wrong during their stay. On a large scale, this phenomenon may contribute in affecting such differences in the average ratings between Airbnb and Booking.com listings. Our argument is that personal experiences lead consumers to a more indulgent attitude toward service failure, refraining from providing negative reviews. However, there are at least three alternative explanations for these quantitative evidence. First, consumers might self-select into these two categories (institutional vs. peer-to-peer) based on personal predisposition. Second, peer-to-peer platforms like Airbnb include different levels of social interaction. The most prominent difference is whether customers rent the whole listing or share spaces with the host (rent a room). These two groups of Airbnb customers have been also found to be substantially different (Lutz & Newlands, 2018). Third, different average levels in the ratings across platforms might simply point at different quality levels, and not at reporting biases. In other words, average experiences in peer-to-peer platforms could simply be better than good experiences in institutional environments.

To control for these alternative explanations, (a) we conduct a qualitative analysis with leisure travelers who have been both in Booking.com and in Airbnb, (b) we consider different levels of peer-to-peer involvement: renting of entire houses and renting of rooms and, (c) we take the social distance and the construct of home and away as a theoretical framework to explore the underlying motives behind reporting bias in negative experiences especially in the peer-to-peer context.

Given our aim of exploring the negative reporting behavior of customers, our focus is on phenomenographic conceptions, that is, consumers' understandings of their lived negative experiences, and their attitudes towards leaving feedback about it. The core themes emanating from interviews are (a) the value of negative reviews during decision making, (b) consumers' reporting behavior of experiences in a traditional institutional exchange context, (c) consumers' reporting behavior of experiences in a peer-to-peer context and, (d) characteristics of the biased reviews in the peer-to-peer context. A specific emphasis on nonreviewing behaviors was given during the interviews.

5.1.2 | The value of negative reviews in decision making

The key starting point for understanding consumers' potential bias in reporting negative experiences is the understanding of the weight consumers place on negative reviews. The qualitative findings clearly unveil that participants highly value negative reviews in their decision-making process, considering them more informative and useful than positive ones. In all two contexts, negative reviews are generally read first and considered more relevant; "*I concentrate only on negative reviews, I always leave out the positive one, they never give any information*" Andy; "*Negative information is much more useful ... if someone writes negative things there must really have been a reason to do it,*" Mahmoud.

O'Connor (2010) stated that 60% of people checked consumer reviews before purchasing products or services online. Out of these, 80% of consumer decisions were influenced by the reviews. Also, (Öğüt & Onur Taş, 2012) found that 84% of all hotel guests use online reviews to help them plan their holidays. Furthermore, Nieto-Garcia, Resce, Ishizaka, Occhiocupo, and Viglia (2019) and Viglia, Minazzi, and Buhalis (2016) argue that hotel managers should strive to understand the effect of consumers' attitude to online reviews on their decision making and in turn hotel performance.

There is no doubt that consumers pay more attention to negative reviews to find out about nonbiased views on such an intangible service. This is in line with Yan and Jiang's (2018) view about consumers' placing more weight on negative reviews. Sparks and Browning (2011) found that consumers look for early negative information first. They assert that positively framed reviews, on the other hand, influence consumer's choice and increase consumer trust and intention for booking. Recognizing the influence of online reviews, participants seem to avoid the reporting of their own negative experiences fearing potential harm to the provider. Viglia

et al. (2016) argue that hotel managers should strive to understand the effect of consumers' attitude to online reviews on their decision making and in turn hotel performance.

The following sections explain more about the motives behind the nonreporting behavior in both traditional institutional and peer-to-peer contexts and the influence of social interaction between the actors following a negative experience.

5.1.3 | Consumers' reporting behavior of experiences in a traditional institutional exchange context

It became apparent from the interviews that only five out of 35 participants opted not to leave a review after a negative experience in a hotel. Reasons for this ranged from not wishing to waste time or the triviality of the issue as put forward by Lan; "*I found the issue not worth wasting time over*". Furthermore, it is interesting to note that there was a sense of disengagement against the organization prevailed among participants who chose not to leave negative feedback. Some felt that they were only "a number" to the organization due to the minimum interaction they had with the hotel staff and the lack of interest expressed in their stay. "*No one really talked to us much and no one was interested to ask us at check out how our experience was*" Peter. "*I felt like I was talking to myself*," Hania. This feeling of alienation supports the notion of "there" explored in the literature review for this study. The participants felt like strangers in a place belonging to others imposing some kind of a psychological distance on them (Liberman & Trope, 1998). This distance affected their reporting behavior and discouraged them from leaving a review altogether.

Alternatively, the majority of the respondents who encountered negative experiences engaged in negative online reporting. The motivation was partially to seek compensation from the hotel as part of a customer care recovery approach.

"I complained with Customer Care and they took care of the matter"; "I left a negative review, I had no pity, and when I returned they were very kind to me" shared by Morris and Sam, respectively. By taking direct action and voicing their disappointment towards the organization, the participants enact a problem coping strategy (Stephens & Gwinner, 1998), obliging the organization to acknowledge and solve the problem. When this happens, a forgiving attitude is elicited (Jin, Nicely, Fan, & Adler, 2019). Conversely, the lack of reporting leads to a lack of responsiveness in dealing with the failure of the service triggering negative reviews. Yang and Mattila (2012) emphasized that most dissatisfied customers do not complain, but rather express negative word-of-mouth or terminate their business relationship with the company.

Moreover, the findings do not report any evidence of felt sympathy towards members of the staff who appeared empathetic towards customers' negative experiences, as expressed in Sam's comment above. Staff empathy did not prevent customers from voicing their dissatisfaction through their negative online reporting.

"I didn't know that the hotel was being refurbished at the time of booking. I arrived with my son who suffers from severe allergies. My son reacted badly to the dust and smells of paint. I was very scared and had to ask the receptionist if we could be moved. She tried everything she could but there were no vacant rooms. She was very distressed about not being able to help us. We understood her reasons but still left a horrid review," Gigi.

It is interesting to note here that consumers were able to view staff members as separate from the company and therefore, were not sympathetic towards them. Consumers disengaged themselves from the company and in the same way they did the hotel staff. Reporting negative experiences was, in their mind, an act directed at the company and not at the staff. This perceived separation from the organization is driven from the low level of interaction resulting in a greater sense of "there" leading to a strategic and tactical approach to their environment (De Certeau, 1984). In other words, despite recognizing the staff member's empathetic response and her justification for the lack of corrective action, the customer's behavior was influenced by the formal and impersonal relationship with the staff member. This distance did not help against a negative review, where the element under attack becomes the institution as a whole, instead of a person: "*I wanted to share the negative experience so that others know and avoid that hotel*," Alex. The overall goal of writing a negative review is both to punish the hotel and to protect other future customers.

Furthermore, the construct "there" adds to the distance and reduces the empathetic appraisal of the experience. The perceived social distance with the institution as something "there" makes the low level of interaction seem normal and leads to customers feeling less empathetic to individuals working in the institution (Darke et al., 2016). This can be seen as a reason for the indifference in leaving a negative online review.

Interestingly, it was evident from the interviews that participants tend not to leave a review if their expectations were solely met. They left a positive review only in cases of extraordinary service, "*the breakfast is to die for, the service is top, they almost iron my underwear when I leave it on the bed, they are extremely clean that you do not want to leave a mess in the room, I do not know how to explain it, you feel in kind of awe*" Fred. This finds an echo in Hu, Kandampully, and Juwaheer (2009) in that consumers who experienced the moderate quality of service were less inclined to report their experiences. Viglia et al. (2016) corroborated that this under-reporting bias affects the reliability of online reviews.

5.1.4 | Consumers' reporting behavior of experiences in a peer-to-peer exchange context

On the contrary, the interviews show that empathic vicarious experiences prevent guests to post a negative review in a peer-to-peer context. Undergoing negative experiences without the willingness to report them was evident whenever hosts and guests developed some

kind of a bond. A bond where an emotional context based on elements such as feeling "here," at home and a genuine concern for the other person's welfare was experienced. This is explained in Dalia's negative experience below:

"To get to the fourth floor there was a lift but to use it you needed to put 5 cents into a box. I did not have them... I decided to exercise... The place was a dump! (...) and it was really pricy!I do not know how we stayed up until 1.00 am and she (Vera the host) told me how her Egyptian husband had left her with two kids as soon as he managed to get a residence permit. Now she was on her own without knowing where he ended up. I decided I would give her a good review despite everything. It almost felt I could not betray her."

The participant in the above example has chosen not to report her negative experience online to warn other potential customers, unlike in the case of hotels reported by Alex, as she felt high empathy for the host. This is only possible when the guest and the host overcome the social distance and engage in a self-disclosure and self-revelation process. This is enabled by the feeling of "here" or home created by living in with the host and sharing life stories. The home environment also allowed for a degree of relax and coziness which led the host to involve the guest with personal accounts of her life. The bond created as a result made for an authentic environment naturally encountered at the guest's actual home, consequently evading the reporting of any negative aspects of the experience to protect the host.

Another participant went a step further feeling that he was obliged to leave a positive review regardless of the experience, "I feel almost obliged especially if the host is very participatory, it seems wrong not to leave a good review," Sergio. Same view expressed by Sam "in the case of Airbnb, you have a person who opens his home, so you feel obliged to leave a good review, there's a bond due to the fact that you have come to know the person."

What is described is an unpredictable script, social in nature, where there is a genuine concern between the actors. Genuine interest between the actors lead to unexpected outcomes: "When I arrived home very late, the girl (the host), who had been studying all day, instead of going to bed as she had to sit an early exam the following day, stayed up to chat with me only to get to know me better" Anabella. The participant explained how friendliness and hospitality corroborate to create a personal bond between the two.

Furthermore, when the participant feels empathy towards the host who showed regret for the service failure, he or she tends to refrain from leaving a negative review, as shared by Jerry: "He looked apologetic and regretful, and excused a lot. I was really touched by it."

In sum, being in an Airbnb was reported in the finding as being "home away from home," a phrase often associated with hotels, however, the relatively new phenomenon of the sharing economy, with all what entails from sharing a part of one's self (own home) makes it seems more appropriate. 'They talked to us about their

children, we felt included and this is the reason we stay at an Airbnb, George. When hosts and guests share a physical space (i.e., shared accommodation) a personal connection occurs. Such factors are key in placing the guest "here" (at home) leading to a low social distance where the guest-host relationship is conducted within a context defined by those traditions of which each individual's life is a part (MacIntyre, 2003).

Conversely, a feeling of being 'away, leading to a high social distance still occurred in the context of peer-to-peer exchange when interactions with the host were superficial or kept to a minimum. In this case, participants did not seem to hesitate in reporting a negative experience despite any sympathy with the host's circumstances. This happens especially when the service offered by a host is perceived as impersonal (letting out a whole apartment and not meeting the owner upon arrival or leaving the key in an automated safe). A traditional hotel provision comes to mind. This is described in the examples below:

"The problem was the bathroom. We had booked the whole flat with two bathrooms but one was out of order. The owner arrived only after 2 days of complaining, probably because she had many apartments. She was old and very tired. I was sorry for her being so old and still needing to sort out "work" but this did not prevent me to leave a negative review." Christine.

Similarly, Fred, who reported his negative experience, stressed the fact that his was an impersonal one and unexpected in a peer-to-peer context: "He (the host) was one with many apartments to rent out, he was not waiting for us at his place, he did not welcome us, instead we had a Russian guy arrive by scooter with two envelopes with keys for two apartments asking us which one was for us."

It is interesting to note that any similarity with a traditional hotel model, defying the notion of the shared economy, is immediately perceived by consumers as an impersonal experience contributing to the feeling of "there" and increasing the social distance and. In this context, the host is taking a transactional approach to business which was found by Osman, Hemmington, and Bowie (2009) to focus more on a high volume of sales and less on building a rapport with the consumer. The determinant of success, in this case, is the number of transactions, revenue, and profitability. The notion of sharing a part of one's home, naturally sought after by Airbnb consumers, with all what entails from intimate social and cultural exchanges with feelings of authenticity, familiarity, and spontaneity, is eradicated with any glimpse of a transactional model typically followed by traditional hotels (one with many apartments to rent out, Fred).

While the above examples took place in a peer-to-peer context, it echoed the offering of a traditional hotel where a formal exchange occurred preventing the guest to immerse themselves in the host's life and build a close bond. This bond appeared in the data to be the reason behind the nonreporting of negative experiences in this context.

It needs to be acknowledged however, that reporting bias can occur when participants are afraid of retaliatory outcome resulting from negative feedback. For example, two interviewees chose not to report the negative experience confirming the importance of the aspects of reciprocity and retaliation (Bolton, Greiner, & Ockenfels, 2013). Marcel, for example, not being sure of the consequences of his potential negative review decided not to give one; "*I did not leave a review because I intended to use the same account also to host.*" As stated by Pera et al. (2019), reciprocity is an important feature which may affect the reporting behavior. Fabio also agreed '*it is a "do ut des" Airbnb. If I evaluate you well, you evaluate me well... It is a barter.*' It can be argued that this fear of host retaliation contributes to the evident inflation of positive reviews in the peer-to-peer context.

5.1.5 | Characteristics of the reviews in a peer-to-peer exchange context

Alternatively, participants who reported positive experiences, their reviews were mainly host driven and emanated from a distinct social exchange: "She welcomed us in a wonderful way, prepared us tea, it was delicious." "it was a home of an artist, she was extremely clean, very kind, once we arrived, she prepared us some Italian Bruschetta," Fabio. Same as Anna's experience, "he (the host) ordered the objects in the room in a parallel way, he is like this, a really nice guy, he gave me a bottle of wine, and they were a wonderful couple." In this case, the host personality enriches the experience and allows for a more authentic cultural exchange.

Furthermore, the feeling of home, 'here, in the context of peer-to-peer enables service recovery to go over and beyond what is expected from a traditional model of hospitality. In the case of George who lost his dog as a result of inadequate arrangement from the host to accommodate his family and pet, found their effort to help similar to those of close family members:

"The whole family was mobilized immediately, the grandfather asked me to look after his nephew and loaded my partner on the scooter and went around looking for it on the streets, the sister helped us make a Facebook post, her husband took us to the police station to report our dog missing, it was extraordinary help, when we found our dog, the grandfather helped us build a gate in the garden to keep our dog from escaping again."

George left positive feedback about the host despite the distress caused as a result of losing his dog on their first day of arrival. It is evident that in the nature of the social encounter facilitated by a peer-to-peer context, enables a type of bond which can only be experienced at home among family members who group, in most cases, to extend a helping hand in times of trouble. This personal dimension was always present in positive reviews.

6 | DISCUSSION AND CONCLUSION

In the traditional accommodation realm, guests experience a feeling of alienation which supports the notion of "away" or "there" explored in the literature review for this study. The participants felt like strangers in a place belonging to others feeling a psychological distance (Liberman & Trope, 1998). This distance affected their reporting behavior discouraging them from leaving a review.

Moreover, staff empathy did not prevent customers from voicing their dissatisfaction through their negative online reporting since consumers are able to view staff members as separate from the company. This perceived separation from the organization is driven from the low level of interaction resulting in a greater sense of being "away" leading to a strategic and tactical approach to their environment (De Certeau, 1984).

Within traditional hotels, the interaction takes place according to prescribed roles and institutional scripts. The process is described as predictable in terms of behaviors and roles. The findings show how the traditional industry does not only rely on providing accommodations, food, and drinks but also prescribed social interaction between staff and guests (Hochschild, 1983). If something goes wrong in intrinsic terms (characteristics of the rooms, etc.) they generally choose to write a negative review. This is exaggerated by the construct of "away" where institutions are psychologically placed, increasing the social distance. The fact that traditional hotels are psychologically removed from "here" or "home" makes a negative review impersonal.

Conversely, in peer-to-peer context, despite a contractual and economic agreement between hosts and guests, conformity to social obligations, more than to economic ones, is present. Participants experience a low social distance as a consequence of a strong interaction between hosts and guests and a feeling of being "home." This feeling of "home" makes for a feeling of social togetherness that crosses the boundaries of economic transactions and transcends both hosts' and guests' economical gains. The interaction is embedded in an unpredictable, informal, and open process and is the prerequisite of a potential bonding and connection where social distance plays a key role in explaining why dissatisfied consumers become lenient when providing feedback. In the case of a negative experience, they try not to harm the provider if a positive and fruitful relationship has developed.

To conclude, the current research is inspired by the significant disparity of consumer reviews between institutional and peer-to-peer platforms, with the latter being characterized almost by the absence of negative reviews. Such evidence occurs despite the fact that consumers weigh negative reviews higher than positive ones when making purchase decisions.

The research looked into the construct of "here" and "there" as a theoretical framework in an attempt to understand the reporting behavior and bias in the case of peer-to-peer context versus a traditional institutional context. This construct is helpful in unpacking the psychological innuendos leading to the decision to protect the host. It sheds light on the underlying motives behind the empathetic approach taken in the case of negative experiences. This attitude,

while protective, appears to be unhelpful in informing potential customers and/or alerting hosts to existing problems. The value of reputation systems is at risk when online feedback is overloaded with reporting bias. Therefore, the construct mentioned above helped to provide insights on reporting bias especially in the case of a negative experience in a peer-to-peer context, which is apparently, disperse (Zervas et al., 2017). In the overall peer-to-peer environment, there are mixed interests. Platforms are generally willing to collaborate to maximize the accuracy of their systems to avoid a loss of image. On this line, Airbnb changed its policy precisely to avoid retaliation and biased review (Ert et al., 2016). Service providers instead have no interest to reduce biases, monetizing an empathic competitive advantage toward traditional operators.

Our quantitative research helped to identify the surge on average review scores in the peer-to-peer context as opposed to traditional hotels. While this is useful, an investigation using qualitative interview is allowed for an understanding of the underlying motives behind the nonreporting behavior of negative experiences. Interview data indicated the strong presence of reporting bias based on the proportion of peer-to-peer participants who have not left a review out of the total number who have experienced poor service.

6.1 | Theoretical contributions

This study contributes to the current body of knowledge with regard to reporting behavior in the shared economy accommodation

platforms (e.g., Ert et al., 2016; Pera et al., 2019; Zervas et al., 2015). The social distance appeared to have an influence on reporting bias (Liberman et al., 2007; Trope & Liberman, 2010), affecting guests' perception of feeling at "home" when traveling in peer-to-peer accommodation, rather than "away" when traveling in hotels. Also, this study is the first to use the literature on "here" and "there" (Crouch et al., 2001; Rojek, 1997) to advance our understanding of the construct of "home" and "away" and its effect on social distance contributing further to the body of knowledge of consumer reporting behavior (Ert et al., 2016; Pera et al., 2019; Zervas et al., 2015). The dimension of the helpfulness of reviews is also an emerging contribution of this study. Consumers who experienced poor service in hotels, a business environment, offered realistic reviews with the intention to protect future guests and/or seek corrective action. Alternatively, consumers who shared someone's home felt a low social distance with the host and developed a special bond. This bond stemmed from being "home" and taking social responsibility to protect members of the household, hence, not reporting a negative experience or reporting positive aspects of the experience masking reality in the process. In this case, the usefulness of the review is questioned. It can be argued that the perception of "home" decreases the social distance which impacts the accuracy of the reviews. When consumers feel at "home" in an informal, peer-to-peer context allowing a bond to develop with the host, reporting bias occurs. Similarly, consumers experiencing a highly personalized service in a hotel tend to only report overly positive

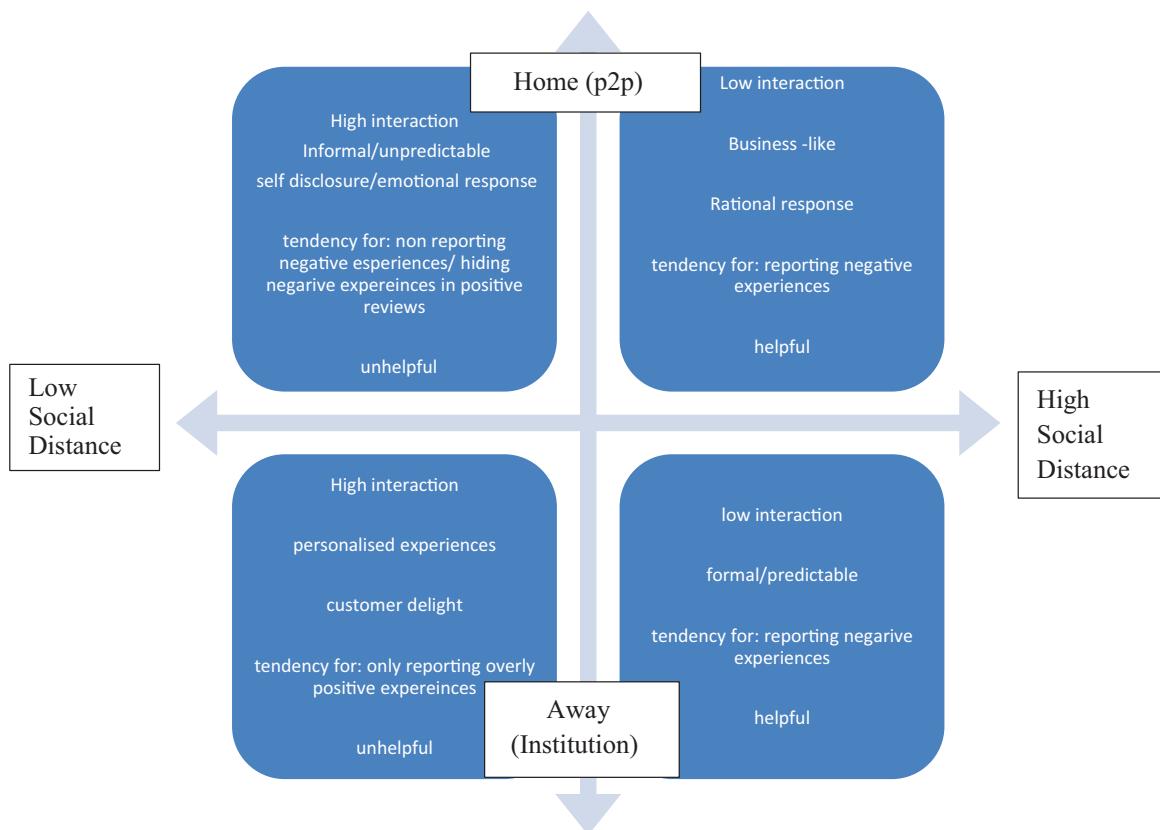


FIGURE 1 Theoretical contributions [Color figure can be viewed at wileyonlinelibrary.com]

experiences. On the contrary, feeling “away” or detached from the organization, allows for more realistic reviews.

Our theoretical contribution is shown in Figure 1.

6.2 | Managerial implications

From a managerial standpoint, this study offers three clear implications and actionable levers for managers. First, improving the understanding of how reporting attitudes are formed helps traditional and peer-to-peer platforms alike in managing consumer experiences. Second, emphasizing the strong role of social distance, institutional operators are encouraged to expand on personal elements, favoring personalization of service and human connections (Mauri et al., 2018; Pera et al., 2019), to generate the “home” feeling in guests. Third, exploring the reasons behind the severed bias in peer-to-peer cases where consumers share spaces with the host, would serve as an informative cue for new potential customers and the way they perceive online reviews. Despite the common perception that reviews have empowered consumers, (Labrecque, vor dem Esche, Mathwick, Novak, & Hofacker, 2013) they are not always reliable. Therefore, there is a need for consumers to be transparent and voice their experiences to provide true and helpful information for others, the notion upon which the sharing economy lies.

6.3 | Limitations and future research

The study is not without limitations. Our approach aimed to provide a perspective about a topic that is largely debated offering a new theoretical angle. However, looking at causal relationships by an experimental design would allow testing how the actual guests’ feeling at “home” or “away” affect their reporting behavior of negative experiences. Moreover, an experimental approach allowed us to overcome the retrospective approach inherent in the qualitative study, which represents a second limitation due to potential reinterpretation and memory lapses (Johnston, 1995). Also, despite that this study considers the six most popular European destinations, cultural differences across countries and reviewers’ profile may be present, affecting the results. Future studies should look at this point, as well as considering hotels’ level (e.g., stars) and classifications (e.g., chain/no chain, brands).

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests.

AUTHOR CONTRIBUTIONS

All authors have contributed to the overall design and execution of the paper. H. O. and D. A. have proposed the original idea and developed the empirical approach. N. J. and H. O. have developed the theoretical part. All three authors’ helped shape the analysis and conclusion. All authors read and approved the manuscript.

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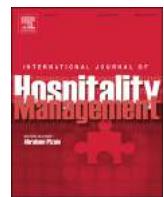
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How to cite this article: Osman H, D'Acunto D, Johns N. Home and away: Why do consumers shy away from reporting negative experiences in the peer-to-peer realms? *Psychol Mark*.

2019;36:1162–1175. <https://doi.org/10.1002/mar.21264>



Original Research Article

The complexity of consumer experience formulation in the sharing economy

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ARTICLE INFO

Keywords:

Peer-to-peer accommodation
Holidaymakers
fsQCA
Chaos and complexity
Athens

ABSTRACT

The study examines the complexity of the factors that influence overall perception among tourists who use peer-to-peer accommodation during their vacations. More specifically, it employs fuzzy-set Qualitative Comparative Analysis to analyse data from a sample of 712 peer-to-peer holidaymakers visiting Athens, Greece, and examines the socio-demographics of age and income along with the simple attributes of perceived risks, marketing and advertising, social aspects, and price and quality issues. The findings reveal three sufficient configurations that are able to influence the overall experience: (i) the price-quality nexus, (ii) risk perspective, and (iii) social interaction. The research also compares nonlinear analysis with the dominant parametric methods in tourism and hospitality research (regression; Cramer's V), highlighting the suitability of the former for complexity examination. It further progresses from fit to predictive validity for the examined models, and contributes to both theoretical and methodological domains.

1. Introduction

The sharing economy in the accommodation industry represents a transformative innovation revolutionized by new internet and mobile technologies (Guttentag et al., 2018). These aspects have allowed the sharing economy to scale-up dramatically by facilitating virtual markets where trust and communication are established between hosts and guests (Guttentag, 2015). This exponential dynamic has led traditional accommodations to increasingly view sharing economy establishments as a significant threat (Martin, 2016), since peer-to-peer (P2P) not only shapes and evolves the sharing economy's related accommodation market, but is also able to provide a commercialised 'authentic' hospitality experience (Sigala, 2018).

The dominant P2P short-term rental firms such as Airbnb, and HomeAway, and Widu have transformed within a few years from entrepreneurial start-up companies into multi-billion turnover internationally operating corporations (Konrad and Mac, 2014; Lashinsky, 2015). More specifically, in peer-to-peer accommodation rentals there were more than 3.7 million listings until the beginning of 2017, having an estimated value of US\$34 billion, and operating in more than 190 countries (EPRS, 2017). As a result, development of the sharing economy is likely to transform the global tourism system and the way it serves societal needs (Martin, 2016). Several factors, such as social interaction with locals and its generated authenticity (Lamb, 2011; Tussyadiah and Personen, 2016), P2P product awareness and

marketing (Wilhelms et al., 2017), and price efficiency (Morgan Stanley, 2015; Tussyadiah, 2015), have been identified as the drivers of this success, while P2P rentals appear to have higher risks than traditional accommodation establishments (Pappas, 2017). Although a rapidly increasing number of clients are turning their backs on traditional establishments, the literature fails to identify the formulation of the overall customer experience in P2P accommodation.

Within the last decade, sharing economy businesses have evolved from simple P2P lending initiatives to complex platforms and networks of companies and people, strongly interacting for new resources or collective use (Muñoz and Cohen, 2017). Despite the increasing interest of policy makers in the complex transformation of networks, empirical studies have not yet addressed these dynamics of the sharing economy (Mair and Reischauer, 2017). Therefore, it is necessary to focus on our understanding of complexity in this field.

Against this backdrop, this article examines the complexity of attribute configurations that affect consumers' formulation of overall experience in P2P accommodation and the sharing economy in Athens, Greece. Tourism is the largest economic sector of the country generating more than 18 per cent of its GDP (17 billion Euros [52% of tourism revenues] come from the accommodation sector), while its tourism related sharing economy for 2017 is estimated to worth between 1.71 and 1.75 billion Euros, half of it concerning accommodation/short term rentals, and the other half other tourism services (Krinis, 2017). More specifically the study evaluates the influence of the

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perceived risks, marketing and advertising, social aspects, and price and quality issues that influence the perceived experience of adult holidaymakers who have selected P2P accommodation in Athens. The research contributes to both the theoretical and methodological domains. Literature-wise, it provides an understanding of the complexity of formulation of consumers' overall experience, with special reference to the sharing economy. Methodologically, the research employs fuzzy-set Qualitative Comparative Analysis (fsQCA) which is new to the study of hospitality and tourism, also comparing its suitability for examining complexity aspects with regression and Cramer's V, the most commonly used linear methods of correlational analysis. It further progresses from fit to predictive validity for the suggested models.

2. Chaos and complexity

Chaos is considered to be a phenomenon of long-term disorderly-looking evolution occurring in a deterministic nonlinear system (Williams, 1997). The theory of chaos was introduced in 1963 (Lawrence et al., 2003) and extensively used for the analysis of complex systems (Mahmoudabadi, 2015). The theory suggests that seemingly random events can result from normal equations due to the complexity of the systems involved (Ravi et al., 2017), while even small behavioral differences can generate significant diverging outcomes to dynamic systems making long-term patterns impossible to predict (Kellert, 1993). The theory of chaos recognizes the unpredictable, random, complex, and dynamic nature of systems, and although it denies the predictability of those systems, it does not suggest that they are inevitably disordered and random (Speakman and Sharpley, 2012).

The theory of complexity has evolved from chaos theory and focuses on complex systems that operate with nonlinear dynamics, and are characterized by emergence, self-organization and evolution (Arévalo and Espinosa, 2015). It actually "deals with systems that have many interacting agents and although hard to predict, these systems have structure and permit improvement" (Zahra and Ryan, 2007, p. 855). The theory is used to examine and explain the nonparametric, heterogeneous, and dynamic processes of complex phenomena in various disciplines (Olya and Al-ansi, 2018). It has the ability to justify complex systems in which approaches dealing with linearity cannot adequately describe the interactions of a large number of components (Baggio, 2008).

Both, chaos and complexity theories deal with nonlinearity with a high level of sensitivity to initial conditions (Hock, 1999). In a business and management context, complexity is considered synonymous with the theory of chaos, and in some cases, chaos theory is introduced as a manifestation of complexity (Daryani and Amini, 2016). The difference between them is that in chaos theory there can be no forecast, while in complexity theory this unpredictability of behavioral patterns may be framed as quasi-stable (Olmedo and Mateos, 2015). In generic management studies, chaos and complexity have been extensively implemented, but their examination in tourism and hospitality remains limited (Pappas and Papatheodorou, 2017).

2.1. Complexity in tourism and the sharing economy

The complexity in tourism arises from a series of conflicting elements, including the heterogeneity of actors, translocal relationships and multilocality, the globalization of places and governance, the extreme diversity of practices, and the processes of civilization (Darbellay and Stock, 2012). Moreover, tourism is characterized by complex policies involving multiple actors, and multi-level and multi-sector coordination, in an international context of constant change (Lai et al., 2016; Stens et al., 2016). However, the traditional tourism research approach assumes substantial stability, and mainly employs linear analysis as the appropriate profile for stable systems (Papatheodorou and Pappas, 2017) even if tourism initiates sustained instability since it is in constant flux with outliers (Russel and Faulkner, 2004). In reality,

tourism and hospitality research has failed to adequately examine chaos and complexity theories since it has followed, until now, a predominantly reductionist approach (McDonald, 2009). The unpredictable and, as a result, uncontrollable nature of tourism, alongside the failure of most organizations and businesses to effectively plan for the future, constitutes a chaotic system (McKercher, 1999). Moreover, tourist behavior can be systematically affected by numerous endogenous and exogenous factors (Boukas and Ziakas, 2014) although these factors seem to have stable features as some kind of order exists in their configuration (Olmedo and Mateos, 2015). Therefore, the degree of complexity of behavioral patterns renders Newtonian (linear) thinking inadequate and suggests the need for nonparametric (nonlinear) analysis (Laws and Prideaux, 2005).

Sharing economy involves the sharing of private goods, automobiles, and services (Benkler, 2004). The growing complexity of the sharing economy lies in the growing diversity of sharing businesses since they are quite disparate (Muñoz and Cohen, 2017). According to Belk (1988, 2010) the growing market commoditization challenges the sharing in aspect, since the latter dissolves interpersonal boundaries influenced by the possession attachment and nowadays materialism. The sharing economy is contingent and complexly articulated, since it has the potential to both further entrench and shake up 'business-as-usual' through an ongoing reconfiguration of a divergent range of activities (Richardson, 2015). The systemic complexity of markets and social provisioning is considerably high in the sharing economy since the sharable goods and services in reference are capable of being provisioned and exchanged either through markets or through social systems (Benkler, 2004). As a result, it has the paradoxical potential to construct economic activities characterized by diversity, while it invites the deconstruction of ongoing dominant practices (Gibson-Graham, 2008). For example, the study of Bardhi and Eckhardt (2012) in car sharing revealed identified several different dimensions such as lack of identification, negative reciprocity resulting in a big-brother model of governance, varying significance of use and sign value, and a deterrence of brand community. Concerning sharing economy in hospitality several aspects can generate higher levels of complexity. For example, uncertainty levels are higher when tourists book peer-to-peer accommodation than traditional establishments (Pappas, 2017). As the study of infographics (2016) reveals, 67.6% of visitors are reluctant renting a room in someone else's house, whilst 51.4% have no trust for renting a property for vacations from someone else. Moreover, the decision-making complexity of tourists also increases due to the uncertainty of transactions. This is because in the sharing economy the transaction platform owner (i.e.: Airbnb) operates as the exchange intermediary, providing trust through its reputation for sharing transactions among unknown counterparts (client and peer-to-peer accommodation provider) (Akbar and Traconga, 2018).

Several studies such as Olya and Altinay (2016) and Papatheodorou and Pappas (2017) focus on tourism complexity, while some others (i.e.: Ordanini et al., 2014; Pappas, 2018) examine the complexity in the accommodation sector. However, the sharing economy complexity is under-researched even if – as indicated by the study of Pappas (2017) – the decision-making of people participating in such activities is influenced by the higher risks and uncertainty, ultimately generating higher complexity. Meyer et al. (2005) suggest that the sharing economy market processes include complex adaptive systems, self-organizing networks, and autocatalytic feedback. Thus, the complexity of the sharing economy tests and challenges the boundaries of economic and social life, and therefore warrants theoretical and empirical scrutiny (Mair and Reischauer, 2017).

3. Study tenets

When the term 'tenet' is used in service industry research it concerns testable precepts dealing with the identification order of conditions characterized by complexity (Papatheodorou and Pappas, 2017).

Consistency metrics and statistical hypotheses are not usually involved where outcome scores are being used for the determination of adequacy in complex configurations (Wu et al., 2014). As configuration theory indicates, concerning factor arrangement, the same set of causal factors can lead to different outcomes (Ordanini et al., 2014). This study evaluates the formulation of overall experience in P2P accommodation holidaymakers, as highlighted by the relevant literature (Papatheodorou and Pappas, 2017; Pappas, 2017; Sanchez et al., 2006; Sincovics et al., 2010; Tarnanidis et al., 2015; Tussyadiah and Personen, 2016; Wu, 2016). Thus, the current research examines the presence or absence of issues (binary states) concerning consumer experience in P2P accommodation. Along with the socio-demographic characteristics (age; income) of holidaymakers the examined attributes were: risk, marketing and advertising, social aspects, price issues, and quality issues. The study formulated six tenets:

T1: The same attribute can determine a different decision for overall experience depending on its interaction/configuration with other attributes.

T2: Recipe principle: The creation of a complex configuration with two or more simple conditions leads to an outcome condition that can have a consistently high score.

T3: Complex configurations/interactions are likely to influence the overall experience of P2P accommodation holidaymakers.

T4: Different combinations of the simple conditions of configurations/interactions are likely to positively or negatively influence the overall experience of P2P accommodation holidaymakers.

T5: Equifinality principle: A sufficient overall experience does not always result in a high outcome score.

T6: When the Y scores are high, a given recipe for the overall experience is not relevant for all cases.

4. Method

4.1. Participants

The study examined adult holidaymakers who booked P2P accommodation in Athens, Greece. The research period was June to August 2017. Structured questionnaires written in English were distributed to respondents. This was perceived to be the most appropriate method of obtaining the primary data, due to built in anonymity, the potential response rate, and the opportunity to examine a considerable number of people in a short period of time (Sekaran and Bougie, 2013). Following research by Pappas (2017), the questionnaires were left at the properties offered as P2P accommodation before the arrival of the guests. Holidaymakers were asked to fill them in during their stay and leave them at the property when they left. The selected properties were situated in the historical center of Athens (area enclosed by Stadiou Ave., Ermou Rd. and Piraeus Ave.), Exarxeia, Koukaki, and Neos Kosmos, because these are the most popular areas for P2P accommodation in Athens city center; almost half of several thousand rentals offered in the wider city center are located there (Rousanoglou, 2017). Listwise deletion (exclusion of the entire record from the analysis) was adopted as the least problematic method for missing data handling (Allison, 2001).

4.2. Sample determination and collection

Following Akis et al. (1996), when the proportions of a population are unknown, a conservative response format of 50/50 (negative perceptions exist among 50% of the respondents, and 50% have positive ones) should be chosen for sample size determination. A 95% confidence level and 5% sampling error were selected. The cumulative probability (Z) from a t-table was 1.96 (Sekaran and Bougie, 2013). According to Akis et al. (1996), the appropriate sample size is:

$$N = \frac{Z^2(hypothesis)}{S^2} \Rightarrow N = \frac{1.96^2(0.05)(0.05)}{0.05^2} \\ = 384.16 \text{ Rounded to 400}$$

The sampling size calculation is independent of the overall population size, since the error is determined by the sampling size (Aaker and Day, 1990). In total, 712 useful questionnaires were collected, generating a statistical error of 3.67%.

4.3. Measures

The research consisted of 34 items, measured using Likert Scale (1 strongly disagree/5 strongly agree) statements, and two socio-demographic (age; income) questions. The questionnaire was based on prior research by Pappas (2017) [four statements for risks], Papatheodorou and Pappas (2017) [five statements for marketing and advertising], Tussyadiah and Personen (2016) [four statements for social aspects], Sanchez et al. (2006) [four out of eight statements for price issues; four out of six statements for quality issues], Tarnanidis et al. (2015) [four out of eight statements for price issues], Sincovics et al. (2010) [two out of six statements for quality issues], and Wu (2016) [seven statements for overall experience]. According to Trading Economics (2017), for 2016 the GDP per capita in the European Union is estimated to have been US\$35,632.22 (nearly US\$3000 per month), which was set as the grouping threshold for income.

The study employs fuzzy-set Qualitative Comparative Analysis (fsQCA) for the examination of complex configurations. This method evaluates the potential of relationships to have a bearing upon the outcome of interest, and identifies any potential combinations of binary sets generated from its predictors (Longest and Vaisey, 2008). QCA is considered to be a mixed-methods technique, since it is based on the combination of quantitative empirical testing (Longest and Vaisey, 2008) and qualitative inductive reasoning through the analysis of specific cases (Ragin, 2000). The logical complexity is based on the fact that different combinations of characteristics are able to generate different results through their combination with other events or conditions (Kent and Argouslidis, 2005). Following Woodside and Zhang (2013), the research also estimated negated sets (presence or absence of a given condition). In these sets, the calculation of a membership is made by taking in the original fuzzy-set one minus the score of membership of the examined case (Skarmeas et al., 2014). The symbol “~” was used to indicate an attribute's absence.

According to Ordanini et al. (2014), in set theory a sub-relation with fuzzy measures is consistent when in a specific attributional causal set the membership scores are consistently less or equal to the membership scores in the outcome set. Accordingly, the coverage entails the assessment of the sufficient empirical importance of the configurations (Ordanini et al., 2014). Thus, consistency and coverage have to be calculated as follows:

$$\text{Consistency}(X_i \leq Y_i) = \sum_i [\min(X_i; Y_i)] / \sum_i (X_i)$$

$$\text{Coverage}(X_i \leq Y_i) = \sum_i [\min(X_i; Y_i)] / \sum_i (Y_i)$$

where, for holidaymaker i , X_i is the membership score in the X configuration and Y_i is the membership score for the outcome condition.

As Skarmeas et al. (2014) indicate, a general asymmetry towards the respective relationships is present when the absolute values of all correlated coefficients are lower than 0.60. Table 1 presents the correlation values, which are all less than 0.60, thus the causal conditions produced by the alternative combinations can lead to the same outcome condition (Woodside, 2013). The research aim is to examine, through fsQCA, the formulation of overall experience by P2P holidaymakers. This is achieved through the estimation of complex antecedent conditions (causal recipes) leading to high membership in the following conditions: (i) risks (ii) marketing and advertising (iii) social aspects

Table 1
Correlation matrix.

	1	2	3	4	5	6
1 Risks	1					
2 Marketing & Advertising	0.064	1				
3 Social Aspects	−0.109**	−0.038	1			
4 Price Issues	0.171**	0.075*	−0.086*	1		
5 Quality Issues	0.036*	0.037	−0.012	0.024*	1	
6 Overall Experience	−0.084*	−0.044	0.154**	−0.038	−0.075	1

* Correlations are significant at 0.05 level.

** Correlations are significant at 0.01 level.

(iv) price issues, and (v) quality issues. It also considers the socio-demographic characteristics of respondents concerning age and income. In a membership score of a recipe the case is the membership degree to which simple causal conditions of fuzzy-sets intersect and include the recipe (Woodside and Zhang, 2013). In the causal recipe, this intersection is the minimum score between the simple conditions that have been selected (Skarmeas et al., 2014). Through the combination of complexities this research assumes that nonlinear (non-parametric) relationships exist contrary to having Newtonian (linear) net effects.

Woodside (2014, p. 2499) suggests that the nonlinear consistency metric is analogous to the linear correlation metric, while the nonlinear coverage metric is analogous to the linear “coefficient of determination”. A solution is informative and acceptable when the solution coverage of the model(s) is between 0.25 and 0.75 and the respective consistency is above 0.74 (Skarmeas et al., 2014).

4.4. Implementation of fsQCA algorithms

The current research aims to achieve a holistic view of its antecedents by employing fsQCA. It examines the complex antecedent conditions (causal recipes) that can provide a high membership. The research was calibrated using a group of 47 randomly selected individual cases. For the evaluation of the holidaymakers' overall experience (f_{oe}) the calibrated fuzzy-sets used were ' f_a ' for age, ' f_i ' for income, ' f_r ' for risks, ' f_ma ' for marketing and advertising, ' f_sa ' for social aspects, ' f_pi ' for price issues, and ' f_qi ' for quality issues.

5. Results

As previously highlighted in the ‘Methods’ section, the research includes responses from 712 P2P accommodation holidaymakers visiting Athens during the summer of 2017. The socio-demographics of the sample are presented in Table 2, while Table 3 shows the descriptive statistics of the study.

5.1. Sufficient complex statements

Three sufficient configurations have been generated through the implementation of fsQCA (Table 4). The first complex solution ($f_a*f_i*f_r*f_ma*f_sa*f_pi*f_qi$) indicates that the inclusion of

both examined socio-demographics (age; income) with high price and quality issues can lead to high membership scores concerning overall experience. This configuration has both the highest coverage (0.488392) and consistency (0.884572). The second sufficient configuration ($f_a*f_i*f_r*f_ma*f_sa*f_pi*f_qi$) suggests that the inclusion of age with high risks and quality issues is able to influence the overall experience of P2P accommodation holidaymakers. This solution has the lowest coverage (0.418653) of the three sufficiently complex statements. The third sufficient configuration produced by this research ($f_a*f_i*f_r*f_ma*f_sa*f_pi*f_qi$) does not include any of the examined socio-demographics, but is based on high risks, marketing and advertising, and social aspects. This complex solution appears to have the lowest consistency (0.825736) compared with the other two.

6. Discussion

The study findings form the basis for an interesting discussion. According to the research results, the first sufficient configuration indicates that in P2P accommodation the price-quality nexus defines the overall experience of consumers. The price-quality nexus supports “the generalized belief across product categories that the level of the price cue is related positively to the quality level of the product” (Lichtenstein et al., 1993, p. 236), and suggests that customers use price in order to holistically evaluate product superiority or excellence (Zeithaml, 1988). As a result, the price-quality nexus significantly influences the purchasing decisions of consumers, highlighting its importance. Moreover, age and income are integral parts of this configuration, showcasing the significance of the examined socio-demographics in the formulation of P2P overall experience.

Risk aspects are highlighted in numerous studies as factors affecting consumer tourism decision-making and experience (Yonghwan Chang and Ko, 2017; Le and Arcodia, 2018; Singal, 2015), and also concerning the sharing economy (Cheng, 2016) and P2P accommodation (Ert et al., 2017; Martin-Fuentes et al., 2018; Pappas, 2017). The second solution indicates that perceived risks, along with quality issues, influence the formulation of overall experience. As a result, the risk perspective seems to play a considerable role in the formulation of consumer experience. In addition, age constitutes a factor affecting risk perspective, something that has also been highlighted in previous tourism research (the older people become, the more they are susceptible to perceived risks) (Lawson et al., 2013; Bruwer et al., 2017). This is also confirmed by the study’s descriptive statistics (Table 1) since the influence of the examined perceived risks increases in all related statements (R1–R4) as we progress from younger to older age groups.

The third sufficient configuration concerns social interaction. It has long been established that the context of social interaction intersects with vacation experiences (Yarnal and Kerstetter, 2005). This solution connects the social aspects with the expectations created by marketing activities and with perceived holiday risks, highlighting that the associated social interaction, with its respective expectations and uncertainties, can significantly influence the overall experience of visitors. The potential to provide a significant social interaction is also considered to be a pivotal benefit of the sharing economy (de Riveraa et al., 2017). This sufficient configuration highlights the importance of societal aspects in the sharing economy and provides foundations for our further understanding of tourist behavior with special reference to the formulation of overall experience.

6.1. Confirmation of tenets

The findings indicate that the coverage of the three fsQCA sufficient configurations is high (0.442) (Table 4). Moreover, all five simple conditions evaluated by this research appear at least once in the generated solutions. As a result, the first tenet is confirmed: T1: The same attribute can determine a different decision for overall experience depending on its interaction/configuration with other attributes.

Table 2
Socio-demographics.

	N	%
<i>Age</i>		
18–35	345	48.5
36–50	326	45.8
Over 50	41	5.8
<i>Income</i>		
< \$3000	522	73.3
> \$3000	190	26.7

Table 3
Descriptive statistics.

Statements	SD	Means					
		Total	18–35	36–50	50+	< \$3000	> \$3000
<i>Risks</i>							
R1 I think about the risk of not having made a good purchase bearing in mind the price I pay	0.561	4.09	3.91	4.26	4.29	4.10	4.07
R2 When booking peer-to-peer accommodation I consider the risks in the way the product is organized	0.604	3.97	3.74	4.19	4.17	3.96	4.01
R3 When booking peer-to-peer accommodation I consider the risk that I will not receive what I expected	0.602	4.17	3.99	4.32	4.56	4.18	4.14
R4 When booking peer-to-peer accommodation I consider its quality compared with other relevant accommodation products	0.611	4.13	3.89	4.32	4.66	4.14	4.10
<i>Marketing and Advertising</i>							
MA1 Direct marketing activities (i.e. direct mail and e-mails) influence my purchasing decisions	0.717	3.49	3.49	3.46	3.76	3.31	3.99
MA2 The ‘above the line’ promotional activities (i.e. TV and radio advertisements) influence my purchasing decisions	0.836	3.36	3.34	3.35	3.61	3.20	3.81
MA3 The tourism product’s branding influences my purchasing decisions	0.920	3.28	3.26	3.30	3.24	3.03	3.95
MA4 Promotional activities undertaken by tourist agencies/operators influence my decision to select the accommodation I intend to book	0.776	3.62	3.57	3.63	3.93	3.46	4.07
MA5 Promotional activities undertaken by destinations influence my decision to select the tourist product/package I intend to buy	0.885	3.94	3.93	3.91	4.24	3.86	4.15
<i>Social Aspects</i>							
SA1 I use peer-to-peer accommodation rentals because I like to get to know people from the local neighbourhood	0.812	3.81	4.11	3.63	2.78	3.90	3.56
SA2 I use peer-to-peer accommodation rentals because I like to have a meaningful interaction with the hosts	0.892	3.90	4.23	3.72	2.63	3.99	3.65
SA3 I use peer-to-peer accommodation rentals because I like to support local residents	0.778	3.62	3.78	3.54	2.80	3.67	3.47
SA4 I use peer-to-peer accommodation rentals because I like to get insider tips on local attractions	0.809	3.85	4.19	3.61	3.02	3.94	3.62
<i>Price Issues</i>							
PI1 The higher the price of the product, the better its quality	0.858	3.38	3.06	3.60	4.24	3.34	3.46
PI2 I prefer to book the best-selling accommodation	0.866	3.52	3.25	3.71	4.34	3.50	3.60
PI3 I buy as many of my tourist products as possible at sale prices	0.846	3.44	3.26	3.54	4.05	3.44	3.42
PI4 The price is the main criterion for my purchasing decision	0.882	3.66	3.52	3.74	4.24	3.69	3.58
PI5 I look carefully to find the best value-for-money	0.916	3.96	3.95	3.93	4.34	4.00	3.86
PI6 I usually choose lower priced accommodation	0.924	4.02	4.01	3.98	4.46	4.04	3.98
PI7 I think about the risk of not having made a good purchase bearing in mind the price I pay	0.892	3.61	3.31	3.82	4.44	3.60	3.64
PI8 The accommodation I book should be reasonably priced	0.873	4.14	4.06	4.20	4.41	4.13	4.18
<i>Quality Issues</i>							
QI1 When booking accommodation, I consider the potential quality in the way the relevant product is organized	0.612	3.83	3.78	3.86	4.10	3.83	3.84
QI2 When booking accommodation, I consider the potential risk that I will not receive what I expected	0.682	3.97	3.90	4.00	4.34	3.97	3.98
QI3 When booking accommodation, I consider its quality compared with other relevant available accommodation choices	0.650	3.92	3.92	3.90	4.10	3.93	3.89
QI4 I have very high standards and expectations with regard to the accommodation I book	0.756	3.68	3.54	3.77	4.15	3.68	3.67
QI5 In general, I try to buy the best overall quality	0.670	3.88	3.84	3.88	4.22	3.87	3.92
QI6 When it comes to booking accommodation, I try to get the very best, or perfect, choice	0.667	4.04	4.02	4.03	4.32	4.03	4.08
<i>Overall Experience</i>							
OE1 My experience of using peer-to-peer accommodation was as I expected	0.752	4.02	4.11	3.96	3.76	4.11	3.78
OE2 The visit made me happy	0.741	4.14	4.26	4.04	3.95	4.20	3.96
OE3 My decision to use peer-to-peer accommodation was a wise one	0.750	4.09	4.22	4.01	3.61	4.18	3.84
OE4 I would recommend peer-to-peer accommodation to others	0.730	4.09	4.21	4.02	3.61	4.17	3.88
OE5 I will use peer-to-peer accommodation in the future	0.732	4.06	4.13	4.05	3.59	4.11	3.92
OE6 Peer-to-peer accommodation is my first choice among accommodation types	0.770	4.10	4.21	4.06	3.51	4.20	3.82
OE7 I will say positive things about peer-to-peer accommodation	0.774	4.16	4.29	4.09	3.73	4.26	3.89

Table 4
Complex solutions for overall experience.

Complex Solution	Raw Coverage	Unique Coverage	Consistency
Model: $f_{oe} = f(f_a, f_i, f_r, f_ma, f_sa, f_pi, f_qi)$			
$f_a * f_i * f_r * f_ma * f_sa * f_pi * f_qi$	0.488392	0.158285	0.884572
$f_a * f_i * f_r * f_ma * f_sa * f_pi * f_qi$	0.418653	0.129571	0.842028
$\sim f_a * \sim f_i * f_r * f_ma * f_sa * f_pi * \sim f_qi$	0.438527	0.134820	0.825736
Solution Coverage: 0.442158	Solution Consistency: 0.858372		

The sufficient configurations presented in Table 4 reveal that at least two simple conditions are included in each generated solution. More specifically, the first solution ($f_a * f_i * f_r * f_ma * f_sa * f_pi * f_qi$) includes price and quality issues, the second one ($f_a * f_i * f_r * f_ma * f_sa * f_pi * f_qi$) embeds risks and quality issues, while the third sufficient configuration ($\sim f_a * \sim f_i * f_r * f_ma * f_sa * f_pi * \sim f_qi$) consists of risks, marketing activities and social aspects. This is a finding also confirmed by previous studies such as Olya

and Altinay (2016) and Pappas (2017), leading to the confirmation of the second tenet: T2: Recipe principle: The creation of a complex configuration with two or more simple conditions, leads to an outcome condition that can have a consistently high score.

The generated sufficient configurations deal with (i) an outcome concerning the way the related variables are combined, and (ii) the association of the groups of variables within the combination. This is because fsQCA is based on cases instead of variables (Ordanini et al., 2014). As presented in Table 4, the first solution focuses on the price-quality nexus, the second one on the risk perspective and the third configuration deals with social interaction. Therefore, the third tenet is confirmed: T3: Complex configurations/interactions are likely to influence the overall experience of P2P accommodation holidaymakers.

Contrarian case analysis (inclusion/exclusion of the examined attributes) was employed. For example, none of the simple conditions appears in all sufficient configurations, although they all appear in at least one solution. This supports the view that the formulation of positive or negative overall experience in the sharing economy is determined by the extent to which a simple condition is present or absent.

This is also evidenced in previous research (Brauer and Leischning, 2016; Woodside, 2014) and confirms the fourth tenet: T4: Different combinations of the simple conditions of configurations/interactions are likely to positively or negatively influence the overall experience of P2P accommodation holidaymakers.

The literature suggests that “different paths usually do not occur with the same frequency among the set of paths” (Woodside, 2014, p. 2499). The equifinality principle indicates that, for the prediction of an outcome, multiple sufficient causal configurations can occur (Olya and Altinay, 2016). As presented in Table 4 the outcome scores of the generated solutions are not high. Thus, the fifth tenet is also confirmed: T5: Equifinality principle: A sufficient overall experience does not always result in a high outcome score.

Finally, the coverage of the three complex solutions varies from 0.419 to 0.488, suggesting that none of the generated configurations applies in all cases (Pappas, 2017). Therefore, the last (sixth) tenet is confirmed: T6: When the Y scores are high, a given recipe for the overall experience is not relevant for all cases.

6.2. Fit and predictive validity

The vast majority of studies dealing with the evaluation of specific models employ model fit in an effort to ensure that the data are able to create substantial grounds for the inclusion of factors among the observed variables and in their respective relationships (Pappas and Papatheodoro, 2017). Therefore, only a handful of studies concentrates on predictive validity (Wu et al., 2014), suggesting that a good model is not necessarily dependent on a relevant good fit to observations (Gigerenzer and Brighton, 2009). This study proceeds from fit to predictive validity for the examined models, and follows the process described by Wu et al. (2014), and Olya and Altinay (2016). It divides the sample into equally sized holdout and modeling subsamples, on the basis that the patterns of tourism decision-making are a consistent indicator of high score generation. The holdout sample's configurational models were evaluated using the modeling subsample. The holdout sample's algorithm combination was similar to that found from fsQCA for the whole sample. Finally, the modeling subsample was used to test the holdout sample. The overall consistency was 0.817 ($C_1 > 0.74$) and the coverage was 0.452 ($0.75 > C_2 > 0.25$). The findings suggest that the predictive validity of the model is good.

6.3. fsQCA versus linear analysis

Structural Equation Modeling (SEM) was used to examine the linear relationships between model constructs. Confirmatory Factor Analysis was implemented since all the examined items are based on previous analytic research, and were adopted from previous studies. An examination of the structural model was conducted in order to determine the structural model fit, and identify the causal relationships among the constructs. The most common measure of SEM fit is χ^2 (Martens, 2005), and in a good fitting model it should be non-significant (Hallak et al., 2012). Since the research sample was large ($N = 712$), for a better estimate of goodness-of-fit the χ^2 ratio was divided by the number of degrees of freedom (χ^2/df) (Chen and Tsai, 2007). The research estimated the value of χ^2 , the Comparative Fit Index [CFI], Root-Mean-Square Error of Approximation [RMSEA], and Standardised Root-Mean-Square Residual [SRMR], since these are considered to be the four most important indices, from among numerous others (Kline, 2010). The model fit is as follows: $\chi^2 = 548.921$, $df = 307$, $\chi^2/df = 1.723$ (acceptable value $0 \leq \chi^2/df \leq 2$ [Schermelleh-Engel et al., 2003]), CFI = 0.918 (acceptable value is when CFI is close to 1.0 [Weston and Gore, 2006]), RMSEA = 0.436 (acceptable value is when RMSEA < 0.5 [Browne and Cudeck, 1993]), and SRMR = 0.759 (acceptable value is when SRMR < 0.8 [Hu and Bentler, 1999]).

Factor analysis was used for the study's important components. Following Norman and Streiner (2008), the minimum acceptable value

Table 5
Validity and reliability analysis.

Statement	Cronbach A	Loadings	AVE	CR
R1	0.803	0.948	0.85	0.71
R2		0.844		
R3		0.979		
R4		0.900		
MA1	0.802	0.935	0.80	0.73
MA2		0.878		
MA3		0.824		
MA4		0.875		
MA5		0.955		
SA1	0.805	0.946	0.83	0.70
SA2		0.859		
SA3		0.836		
SA4		0.989		
PI1	0.796	0.777	0.82	0.97
PI2		0.738		
PI3		0.841		
PI4		0.841		
PI5		0.799		
PI6		0.799		
PI7		0.762		
PI8		0.722		
QI1	0.803	0.954	0.74	0.70
QI2		0.825		
QI3		0.897		
QI4		0.794		
QI5		0.837		
QI6		0.865		
OE1	0.797	0.879	0.85	0.83
OE2		0.950		
OE3		0.975		
OE4		0.933		
OE5		0.937		
OE6		0.865		
OE7		0.938		

is 0.4. Therefore, absolute values below 0.4 were suppressed in an effort to evaluate higher coefficients. Internal consistency was measured using Cronbach's A where the overall reliability was 0.805 (minimum value 0.7; Nunnally, 1978). The study also examined the Average Variance Extracted (AVE). In all cases AVE was higher than 0.5 indicating that the research has an adequate convergent validity level (Kim, 2014; Lee et al., 2013). Moreover, all constructs generated a composite reliability (CR) of 0.7 or above, (minimum acceptable value: 0.7; Huang et al., 2013). The factor loadings, Cronbach A, AVE, and CR are presented in Table 5.

The model explaining the study's endogenous variables is illustrated in Fig. 1. The overall R^2 value was 0.386. Age, as a grouping variable appears to have a much stronger influence than income on most of the research constructs (with the exception of ‘marketing and advertising’).

As the findings highlight, regression analysis is limited to the consideration of a single pathway, i.e. the linear influence of grouping variables (age; income) on the five constructs and the joint influence of these constructs (risks; marketing and advertising; social aspects; price and quality issues) on overall experience. As a result, parametric analysis cannot fully encapsulate the range of alternative combinations and influences that are able to lead to the same outcome. This is, however, a permanent and inseparable element of decision-making complexity. For example, the first fsQCA solution ($f_a * f_i * \sim f_r * \sim f_m * \sim f_s * f_p * f_q$), while including both grouping variables and price and quality issues, does not include any of the other three examined conditions required by the linear analysis (SEM). In addition, the grouping variables (age; income) are absent from the third sufficient configuration ($\sim f_a * \sim f_j * f_r * f_m * f_s * \sim f_p * \sim f_q$), while in SEM the formulation of overall experience appears to be considerably dependent on those two aspects. Furthermore, SEM suggests that marketing and advertising

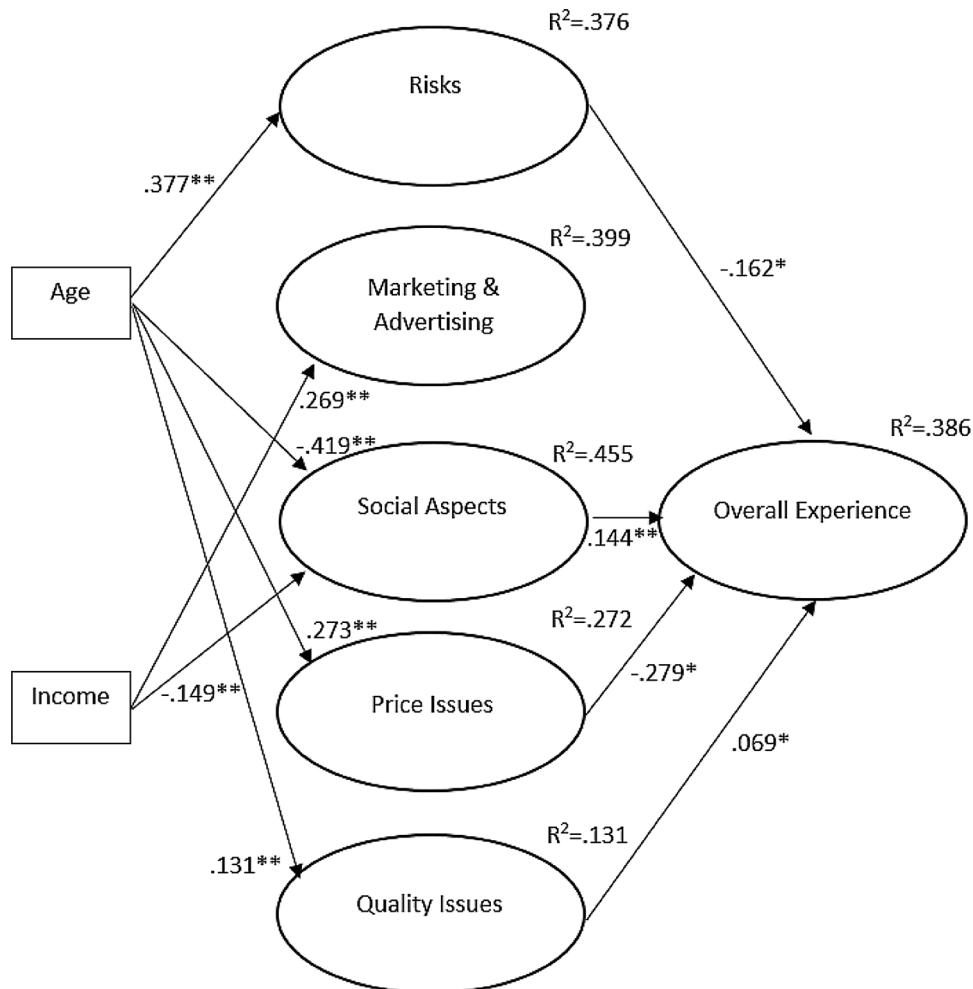


Fig. 1. Formulation of sharing economy experience.

*Coefficient is significant at 0.05 level.

**Coefficient is significant at 0.01 level.

have no impact on overall experience. On the other hand, this condition is included in the third solution generated by fsQCA. It is also important to highlight that all three sufficient configurations have a higher row coverage (over 0.4) than the overall R^2 (0.386), which is also characterized by high consistency (over 0.8).

The study also implemented Cramer's V tests (Table 6). Cramer's V varies from 0 (no association) to 1 (complete association) (Burns and Burns, 2008). The research findings suggest that a qualifying statistical significance does not exist in all tests, since $\text{Sig.} > 0.05$ for in quality issues ($V = 0.166$; $\text{Sig.} = 0.555$). As a result, fsQCA appears to be more efficient than Cramer's V when examining the overall experience of P2P holidaymakers, since it better presents the influence of the constructs under examination.

7. Managerial implications

The research focuses on the overall experience of consumers who selected P2P accommodation for their vacation. At its heart is the evaluation of fsQCA as a means of examining complex conditions. The findings reveal three sufficiently complex solutions dealing with: (i) the price-quality nexus (ii) the risk perspective, and (iii) social interaction. The outputs of the study can assist traditional accommodation providers. By employing a similar study to traditional accommodation holidaymakers and comparing the results of the current research, the hotel owners/managers will be able to further understand the decision-making complexity of consumers, and the differences, disparities and similarities of perspectives between traditional and sharing economy tourists. This will provide them the tools to further comprehend this emerging market and appropriately reorientate their products and services, helping them to cope with the challenges of the sharing economy. Concerning P2P accommodation, the research provides evidence with regard to understanding the complexity of conditions that formulate holidaymakers' overall experience, and the creation of competitive advantage for their businesses. Moreover, destinations can benefit from the research findings since they showcase the complex reshaping of holidaymakers' decision-making and the reorientation of purchasing patterns from traditional establishments to P2P accommodation, also affecting destination image and marketing.

Concerning the formulation of overall experience, fsQCA appears to be a method able to assist in the clarification of complex evaluations by

Table 6
Cramer's V tests.

	χ^2	V	Sig.
Overall Experience*Risks	396.005	0.249	0.000
Overall Experience*Marketing & Advertising	412.536	0.211	0.000
Overall Experience*Social Aspects	495.613	0.231	0.000
Overall Experience*Price Issues	688.530	0.220	0.000
Overall Experience*Quality Issues	295.985	0.166	0.555

holidaymakers and define the pathways that could lead to the same outcome, despite the associated risks and drawbacks that might derive due to its current limited implementation in the related field. The ability of this analysis to generate multiple solutions that take into account the different options and selection criteria considered by consumers could provide hoteliers with insights into this rapidly changing business environment that enable them to make better decisions. The study also illustrates the superiority of asymmetric analysis when compared to the dominant conventional linear methods (regression; Cramer's V). The results highlight the importance of risks and quality issues (both appear in two out of three complex configurations), and indicate that when the examined attributes are appropriately combined they can lead accommodation providers to make good decisions, even when some of the studied aspects are missing. These aspects are of paramount importance to the tourism and hospitality industry since complexity and uncertainty in the sector are likely to increase, due to the associated risks (Williams and Baláz, 2015), and to the rapidly changing patterns of consumer decision-making and perception of their vacation experience (Spielmann et al., 2012). Therefore, the provision of better quality products and services based on the competitiveness that can be achieved through the price-quality nexus, the sufficient management of consumers' perceived risks, and the encouragement of higher levels of interactivity between holidaymakers and locals should be prioritised by both destinations and accommodation providers.

The ever-changing environment of modern business and destinations, and the complexity generated by consumer decision-making patterns, heavily influence the evaluation of the overall tourist experience. The exponential transformation of the current business environment has led to a change in dynamics across the global tourism and hospitality spectrum (Papatheodorou and Pappas, 2017). fsQCA has the ability to improve our understanding of decision-making by both tourists and stakeholders. The enterprising ability of the latter to adequately employ environmental scanning and identify the relevant signals is crucial to their survival (Paraskevas and Altinay, 2013). Moreover, it is important that both traditional and P2P accommodation providers identify the complex formulation patterns of overall tourist experience, and ultimately, the extent of holidaymakers' satisfaction with their visit to the destination. This could result in the strengthening of competitive advantage, and better designed marketing and advertising activities for both hospitality stakeholders and the destination, leading not only to larger tourist flows and higher repeat visit rates, but also a substantial improvement in the destination image.

8. Conclusion

The study examined the make-up of the overall experience of holidaymakers who selected P2P accommodation for their vacation. The theoretical contribution of the study lies in its interpretation of the complex formulation of perceived experience in the sharing economy. In the methodological domain, the research contributes through its implementation of fsQCA, which is considered to be an innovative technique for the examination of complex conditions in the wider tourism spectrum. Furthermore, the results showcase the suitability of fsQCA for the evaluation of nonlinear aspects, also revealing that the dominant parametric methods (regression; Cramer's V) can only partially explain the relationships that exist. It also progresses from fit to predictive validity for the examined model, something that only a handful of studies employ in the service sector.

Despite the study's contribution to the theoretical and methodological domains, several limitations need to be highlighted. The main limitation concerns the actual strength of the study, since fsQCA has not been extensively tested in the tourism and hospitality domain, or the service sector in general (Pappas and Papatheodorou, 2017). Therefore, its full potential has yet to be realized, under conditions which will allow the further evaluation of tourism and hospitality complexity. The second limitation deals with the examination of more simple conditions

(also concerning different socio-demographic characteristics such as travel and P2P accommodation booking frequency), since their inclusion may generate different outcomes. Thus, caution should be exercised when generalizing the findings. Another limitation derives from the characteristics of the examined destination (Athens), since the outcomes may differ in other destinations offering P2P accommodation. They might also differ if the study is repeated during different time periods (i.e. Christmas; legal holidays; low tourist season) at the same destination. Finally, the study only examines the perspectives of sharing economy holidaymakers. A comparison between these subjects and visitors selecting traditional establishments could enhance our comprehension of overall experience formulation and the factors that determine the selection between traditional and P2P accommodation rentals.

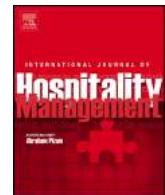
The generation of sufficient complex configurations through the use of fsQCA could be combined with the implementation of different analysis modes such as conjoint analysis. Furthermore, by employing fsQCA we can further understand the rapidly changing dynamics in tourism and hospitality, the complexity of factors influencing the perceived visitor experience, the development of the sharing economy, and consumer decision-making. This highlights the need for a more extensive evaluation of fsQCA as a tool in tourism and hospitality research.

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Measuring the experience of hospitality: Scale development and validation



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ARTICLE INFO

Article history:

Received 19 April 2017

Received in revised form 6 July 2017

Accepted 17 July 2017

Available online 13 September 2017

Keywords:

Experience

Hospitality

Service

Scale development

Scale validation

ABSTRACT

This paper identifies what customers experience as hospitality and subsequently presents a novel and compact assessment scale for measuring customers' experience of hospitality at any kind of service organization. The Experience of Hospitality Scale (EH-Scale) takes a broader perspective compared to existing scales, which predominantly measure hospitable behavior of service employees and are specifically developed for organizations in the hospitality industry. A thorough approach containing two qualitative and two quantitative studies resulted in the thirteen-item EH-Scale. The scale measures three experiential factors of hospitality: the experience of *inviting* (open, inviting, freedom), the experience of *care* (servitude, empathy and acknowledgement), and the experience of *comfort* (feeling at ease, relaxed and comfortable).

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1. Introduction

Since the economy has increasingly moved from a service economy to an experience economy (Pine and Gilmore, 1999), the focus of service organizations is no longer on what they deliver but on how they deliver their services. The growing attention to hospitality as means to distinguish themselves from other organizations fits within this development. The attention paid to hospitality not only applies to the hospitality businesses, such as hotels, restaurants and leisure, but is also becoming a relevant topic in fields as diverse as healthcare and financial services. However, organizations need tools to help them improve the hospitality they offer to their customers.

Academic attention for hospitality has also been growing. In recent decades, the amount of literature and the number of disciplines in which hospitality has been studied has increased enormously. However, despite the substantial amount of published papers, the concept of hospitality remains ill-defined (Brotherton and Wood, 2008; Lashley et al., 2007; Lynch et al., 2011; Ottenbacher et al., 2009; Tascli and Semrad, 2016). As Ottenbacher et al. (2009) state, 'hospitality is a relatively new research area' and there is a 'lack of definitional consensus on the term hospitality' (p.263). However, improved insight in the concept is essential to

further explore, define, and apply hospitality (Brotherton, 1999; Lynch et al., 2011; Ottenbacher et al., 2009).

The sparse research that does explore the meaning of the concept during the service encounter mostly examines hospitality from the viewpoint of the host, focusing on the appearance and behavior of employees (Ariffin and Maghzi, 2012; Blain and Lashley, 2014; Derrida, 1999; King, 1995; Nailon, 1982; O'Sullivan, 2004; Pfeifer, 1983; Reynolds, 2010; Ritzer, 2007; Tascli and Semrad, 2016; Telfer, 2000). Although a meaningful approach, it is limiting in two ways. Firstly, a necessary first step to improve an organization's hospitality is to understand what *customers* experience as hospitable during a service encounter. As the business and managerial sector has thus far dominated the literature on hospitality (Lynch et al., 2011), the need for immediately applicable knowledge on hospitality may be the reason that this first step of empirical investigation on what hospitality means to customers has so far been neglected. Secondly, the literature on customer experience shows that a service experience is not only based on the customer's interaction with service staff, but also on the environment in which the service encounter takes place (e.g. Baker et al., 2002; Berry et al., 2006; Bitner, 1992). In defining the experience of hospitality, the focus should therefore not be limited to the experience of employee behavior, but also incorporate the experience of the service environment.

Although there are validated instruments to measure customers' evaluation of service encounters for constructs such as *service quality* (scales based on SERVQUAL developed by Parasuraman et al., 1988), *customer satisfaction* (such as the ACSI-scale developed by Angelova and Zekiri (2011) and scales that

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Table 1

List of experience-related words associated with the experience of hospitality.

Attention ^{c,d}	Friendly ^{c,d,e,g,m,n}	Safety ^{f,o}
Care ^{a,d,o}	Generous ^{c,d,e,f,h,i,n}	Security ^{e,f,g,k,m}
Comfort ^{a,b,d,e,g,k,m}	Helpful ^{a,b,n}	Understanding needs ^{a,h,j,m,p}
Courteous ^{e,m,n}	Open ^{e,n}	Warmth ^{a,c,d,e,m}
Desire to please ^{a,b,i,o}	Pleasure/happy ^{b,c,d,h,n}	Welcoming ^{a,c,d,e,m,n}
Entertainment ^{e,f}	Polite ^{c,d,n}	
Feel important/special ^{a,b,m}	Respectful ^{a,n}	

Note. Only words that are mentioned in more than one article are included in the table.

^aAriffin and Maghzi (2012).

^bBlain and Lashley (2014).

^cBrotherton (2005).

^dBrotherton and Wood (2008).

^eBurgess (1982).

^fHemmington (2007).

^gHepple et al. (1990).

^hKing (1995).

ⁱLashley (2000).

^jMatzko (1996).

^kNailon (1982).

^lO'Gorman (2000).

^mSim et al. (2006).

ⁿTasci and Semrad (2016).

^oTelfer (2000).

^pTideman (1983).

elaborated on Oliver (1997) and *customer experience* (such as Brunner-Sperdin et al., 2012; Klaus and Maklan, 2012; Knutson and Beck, 2004), there is still no well-grounded instrument to measure the *experience of hospitality* in service environments.

2. Aims and research questions

The aim of this paper is twofold. The first aim is to clarify the concept of the experience of hospitality. What do people experience when they experience hospitality? What dimensions of hospitality can be distinguished? Subsequently, the second and main aim is to develop a scale to measure the experience of hospitality in service environments. We wish to develop a straightforward scale that is applicable in any service environment and incorporates not only hospitable behavior of service employees, but also includes the experience of hospitality offered by the organization as a whole, also incorporating the physical service environment. For the scale development a rigorous multi-method approach is taken: a combination of an extensive literature study, two exploratory qualitative studies and two confirmatory quantitative studies.

3. Literature review

Tapping into the sparse studies on the meaning of hospitality, it firstly appears that the terminology authors use to describe (aspects of) hospitality is ambiguous. Authors such as Tideman (1983) and Pfeifer (1983) define hospitality as the basic provision of products such as food, drink, shelter, and hygiene amenities for travelers who are away from home. However, Smith (1994) and Ariffin and Maghzi (2012) use hospitality to refer to the attitudes and behavior of service employees. Others also refer to the attitudes and behavior of employees, but label this as 'hospitability' (Blain and Lashley, 2014; Tasci and Semrad, 2016; Telfer, 2000).

Hospitality and hospitability are both used to describe what a host offers to his or her guests. However, instead of focusing on this provision of hospitality, the present research focuses on the reception of hospitality by recipients. Therefore, the term 'experience of hospitality' will be used, referring to the experience of staff behavior as well as the experience of the physical service environment including its facilities. Note that the 'experience of hospitality' is different from 'hospitality experience', which refers to an experi-

ence in an organization in the hospitality industry, such as a bar, restaurant or hotel (for example Hemmington, 2007; Lugosi, 2014).

An initial systematic literature search on the meaning of hospitality to customers yielded a few articles that examined the concept, mostly in the context of hotels (Ariffin and Maghzi, 2012; Blain and Lashley, 2014; Brotherton, 2005; Brotherton and Wood, 2008; Hepple et al., 1990; Sim et al., 2006; Tasci and Semrad, 2016). Hepple et al. (1990) performed a study on hospitality in a hospital environment. Patients were asked to rank hospitality factors in the order in which they considered them to be important. The authors found that hospital patients rated friendly staff and smooth procedures as most relevant for experiencing hospitality. Brotherton (2005) and Brotherton and Wood (2008) explored hotel guest perceptions of the physical as well as the service aspects of hospitality. Words guests mostly associated with hospitable service delivery behavior were: welcoming, friendly, polite, pleasant and warm. Associations with the physical aspects of hospitality were: comfort and cleanliness. Sim et al. (2006) investigated hospitality as the 'behavior factor' of satisfaction in hotels. In their research they refer to employees greeting people with courtesy, being friendly, polite, cheerful, meeting customer needs, being patient, taking time, communicating well, letting customers feel important, secure and 'treated like a king or queen', and creating a mood of comfort and relaxation.

Ariffin and Maghzi (2012), Blain and Lashley (2014), and Tasci and Semrad (2016) investigated the meaning of hospitability by developing scales for measuring hospitable attitudes and behavior in the hospitality sector. Ariffin and Maghzi (2012) developed a questionnaire to measure hospitability in hotels. They distinguish five dimensions: personalization, warm welcoming, special relationship, straight from the heart and comfort. The scale developed by Blain and Lashley (2014) contains three dimensions: the desire to put customers before yourself, to make them happy, and to make them feel special. Recently, Tasci and Semrad (2016) asked people to rate the importance of several characteristics for employees of destinations, hotels and restaurants for being hospitable. This resulted in a three-factor scale of hospitability: heart-warming (welcoming, courteous, respectful and kind), heart-assuring (trustworthy, honest, reliable), and heart-soothing (generous, sociable) and open.

Beyond the limited empirical research on this topic, at a more descriptive level the literature on hospitality also provides indica-

Table 2

Overview of the phases in the development of the EH-Scale.

Phase	Stage	Methodology	Sample	Data collection	Type of Analysis	Results
1: Exploratory						
	Search for definitions of experience of hospitality	Qualitative study, Literature review	–	–	Content analysis	Initial list of words related to the experience of hospitality
	Study 1: search for dimensions and items	Qualitative study, Delphi technique	8 service experts from hotels, restaurants, healthcare, business (2), amusement, travel, and design	Face-to-face (rounds 1 & 3) and telephone (round 2)	Content analysis	7 dimensions of hospitality: welcome, at ease, empathy, servitude, acknowledgement, autonomy & surprise
	Study 2: search for dimensions and items	Qualitative study, Critical Incidents & storytelling	89 customers of 6 organizations: hotel, hospital, funeral company, railway company, financial institution, concert hall	Face-to-face	Content analysis	9 dimensions of hospitality: welcome, at ease, servitude, empathy, acknowledgement, autonomy, surprise, entertainment, efficiency
2: Confirmative						
	Pilot test EH-Scale	Quantitative study, Survey	15 hospitality experts, 18 facility staff (cleaning and restaurant)	Face-to-face and e-mail		Improvement of questions of the concept EH-Scale
	Field study 1: Item screening & factor structure	Quantitative study, Survey	848 service customers of 3 organizations: catering, hospital, business	Face-to-face, online version questionnaire	PCA, EFA	Validation of dimensions, and condensed version of the EH-Scale
	Field study 2: Validation factor structure	Quantitative study, Survey	255 service customers of 4 organizations: catering, hotel, local government, concert hall	Face-to-face, paper version questionnaire	CFA & regression analysis	Validation of dimensions, and condensed version of the EH-Scale

tions on what customers will probably experience as hospitality (Burgess, 1982; Hemmington, 2007; King, 1995; Lashley, 2000; Matzko, 1996; Nailon, 1982; O'Gorman, 2007; Sim et al., 2006; Telfer, 2000; Tideman, 1983). Table 1 provides a list of words that authors use to refer to the meaning of hospitality and hospitability to customers. Burgess (1982, p. 50) describes hospitality as 'the social relationship fostered by the warm, friendly, welcoming, courteous, open, generous behavior of the host, creating the hospitable social environment'. Others use similar words to describe hospitality (e.g. Brotherton, 2005; Brotherton and Wood, 2008; Sim et al., 2006; Tasci and Semrad, 2016). Authors also refer to feeling comfortable, safe or secure (Burgess, 1982; Hepple et al., 1990; Nailon, 1982; Sim et al., 2006). Furthermore, some authors use 'understanding of the guest' or 'desire to please guests' to describe hospitality (e.g. Ariffin and Maghzi, 2012; Lashley, 2000; Blain and Lashley, 2014; Matzko, 1996; Telfer, 2000). For example, Telfer (2000) describes hospitable behavior as 'genuine needs to please and care for the guests' and Lashley (2000) argues that hospitality involves 'the desire to please'. Also, entertainment is mentioned as characteristic of hospitality by using words such as entertainment, pleasure and happiness (e.g. King, 1995; Burgess, 1989; Hemmington, 2007).

The development of a generic instrument to measure the experience of hospitality in service environments starts by examining whether these experience-related words of

hospitality indeed reflect how service providers view hospitality but also how customers experience it.

4. Phase 1: exploration of the concept, content validity and item generation

The development of the Experience of Hospitality Scale (EH-Scale) consisted of an explorative and a confirmative phase, each consisting of several studies.

An overview of the process is shown in Table 2. The objective of phase one in the development of the EH-Scale was to define the concept of the experience of hospitality and to generate items.

This phase consisted of two qualitative studies: one exploring the meaning of experience of hospitality from the viewpoint of professionals offering hospitality, and a second study exploring it from a customer's perspective. Phase two includes the purification of the scale and the validation of the factor structure.

4.1. Study 1: delphi study with service experts

In this qualitative study, service experts on customer experience shared their expertise and opinions on the experience of hospitality.

4.1.1. Method

4.1.1.1. Participants. Eight internationally oriented experts (seven Dutch, one American; two women; aged 30–60) from a wide range of service organizations were recruited: business, healthcare, hotels, restaurants, travel, amusement and design. The organizations furthermore varied in whether their services were characterized as hedonic or utilitarian (Wakefield and Blodgett, 1996). Amusement is typically hedonic as it fulfills pleasure needs; business and healthcare can be characterized as utilitarian, because people's visits are obligatory. Hotels, restaurants, travel and design can be either hedonic or utilitarian, depending on people's mindset (business or leisure).

4.1.1.2. Research design. A Delphi method was used: an interactive method in which experts "discuss" a complex problem (Linstone and Turoff, 1975; Okoli and Pawlowski, 2004; Rowe and Wright, 2001; Wunderlich et al., 2013). Through a structured iterative communication process individual experts answered questions in three rounds with the aim of seeking consensus.

4.1.1.3. Procedure. In the first round, respondents were interviewed face-to-face for about one hour. Participants were invited to describe hospitable experiences and to share their thoughts on the meaning of their experience of hospitality. In the second round, a telephone interview, the experts provided feedback on the results

of the 1st round. During the third round, they discussed in a panel session a number of final topics to reach group consensus.

4.1.1.4. Analysis. The transcriptions of the interviews were analyzed with help of the F4Analyse software package for qualitative data analysis using inductive thematic analysis (Braun and Clarke, 2006). Firstly, phrases that referred to characteristics of hospitality were labeled (open coding). Secondly, these labels were grouped into a number of overarching dimensions (axial coding). To improve the inter-rater reliability, a second assessor independently coded two of the interviews, which resulted in minor changes to the original coding scheme.

4.1.2. Results

Through an iterative process of analyzing the interviews (round 1 of the Delphi) and modifications based on the feedback of the experts (rounds 2 and 3 of the Delphi), the analysis resulted in the subdivision of the experience of hospitality into seven experiential dimensions.

The dimension *welcome* concerns the feeling of welcome, a warm reception and an approachable atmosphere. Feeling *at ease* appears to be another experiential dimension of hospitality. Feeling safe and relaxed, the reduction of stress, feeling at home, at ease and feeling confident are part of this dimension. *Empathy* shows up as a third experiential dimension and refers to the experience that the organization understands what guests want and need. A fourth experiential dimension, labeled *servitude*, accounts for the feeling that the organization and its employees genuinely want to serve you. A fifth experiential dimension, *acknowledgement*, refers to the experience of personal contact, acknowledgement, and the feeling that customers are important and are taken seriously. The sixth experiential dimension of hospitality is *autonomy*: the level of control over what happens seems to be part of the experience of hospitality. *Surprise* is the final experiential dimension of hospitality. According to the experts, an experience can be characterized as hospitable when there is at least one element that really 'moves' you or exceeds your expectations.

The experts furthermore shared the opinion that in all types of service environments all experiential dimensions play a role, but the relative importance of the dimensions was expected to depend on both the type of service organization and the type of customers.

4.2. Study 2: customers' view of hospitality

Aside from knowledge from service experts dealing with the provision of hospitality (study 1), hospitality was investigated from the point of view of the people who receive it. Customers of six types of service environments shared their experiences of and opinions on hospitality.

4.2.1. Method

4.2.1.1. Participants. Eighty-nine Dutch customers of a hotel ($n=18$), a hospital ($n=14$), a funeral company ($n=20$), a railway company ($n=12$), a bank ($n=12$), and a concert hall ($n=13$) participated in the study. In line with study 1, the organizations belonged to various service sectors and varied in utilitarian versus hedonic characteristics (Wakefield and Blodgett, 1996).

4.2.1.2. Research design. The respondents were interviewed face-to-face by using two different projective techniques, aiming to uncover unconscious feelings, which many customers find difficult to articulate (Donoghue, 2000): Critical Incident Technique and the technique of storytelling. Critical Incident Technique, originally developed by Flanagan (1954), was used to gather examples of both hospitable and inhospitable experiences (Grempler, 2004),

whereas storytelling (e.g. Koll et al., 2010) was used to identify ideal scenarios of hospitality.

4.2.1.3. Procedure. Participants were first asked to describe hospitable and/or inhospitable experiences within the context of the particular service provider (Critical Incidents). Then they were asked to create an imaginary ideal scenario in that particular context.

4.2.1.4. Analysis. Thematic data analysis was carried out to uncover the experiential dimensions of hospitality. For the analysis, the transcribed data of the Critical Incidents and the ideal scenario were taken together. The coding scheme consisting of the seven dimensions from study 1 was the starting point for the analysis.

4.2.2. Results

In contrast to the experts participating in study 1, who mentioned *surprise* as a characteristic of a hospitable experience, customers in study 2 hardly mentioned this element in relation to hospitality. Sometimes customers mentioned positive experiences where something exceeded their expectations, but the link with hospitality was less clear.

The dimensions *welcome*, *at ease*, *empathy*, *acknowledgement*, *servitude* and *autonomy* resulting from study 1 were also relevant in study 2.

Furthermore, study 2 revealed two additional experiential dimensions of hospitality. Firstly, *efficiency* in service delivery was associated with hospitality, namely smooth procedures and the ease of arranging what customers want. Although customers of all six service organizations mentioned aspects concerning efficiency, particularly customers of the hotel, the railway company and the bank referred to this dimension. This dimension is in line with other research on hospitality that mentions smooth procedures as an essential part of hospitality (Hepple et al., 1990).

Secondly, *Entertainment*, though described in the literature as one of the elements of hospitality (Telfer, 2000; King, 1995; Burgess, 1982 and Hemmington, 2007) but not mentioned in study 1, did appear in study 2, albeit with a somewhat different interpretation. Participants talked about entertainment not in the sense of having fun and pleasure. Instead, they referred to diversion or pastime, such as providing magazines to read or toys for children, and offering something to drink.

As study 1 and study 2 took place during the same time period, the results of study could be inserted in the Delphi study. In rounds 2 and 3 the experts were asked to reflect specifically on the elements they did not mention in round one. They reached consensus that surprise, efficiency and entertainment may probably not be separate dimensions of a hospitality experience, but instead are antecedents of the perception of one or more of the six other experiential dimensions of hospitality (welcome, at ease, empathy, servitude, acknowledgement, and autonomy). This conclusion is in line with Berry et al. (2006), who stated that efficient procedures and entertainment are in fact functional clues to the service environment, not experiential dimensions that occur inside people's minds. Surprise may be a result of exceeding expectations; instead of being a separate dimension it can result in a 'wow experience' in one of the six experiential dimensions.

In line with the expectations from study 1, study 2 showed that all experiential dimensions were relevant in every service context, but their relative prevalence differed. The *welcome* and *servitude* dimensions were substantially referred to for all of the six service organizations. However, for the other dimensions the percentages of phrases that apply to them vary from organization to organization. For instance, at the concert hall the *welcome* dimension was the most referred to phrase (25% of the phrases), for the railway company the *at ease* dimension was the most mentioned (25%

Table 3

Experiential dimensions of hospitality (with corresponding attributes) found in two qualitative studies.

Welcome	At ease	Acknowledgement
Open	Safe	Contact
Inviting	Secure	Feeling important
Welcome	At home	Appreciation
Warm	At ease	Interest
Approachable	Comfortable	Respect
Courteous	Relaxed	Taken seriously
Friendly	Knowing what's coming	Taking time
Empathy	Servitude	Autonomy
Understanding (general)	Helpful	Being in control
Understanding needs	Available	Having influence
Involvement	Relief of tasks & worries	Having choice
Support	Effort to take care	Independence
Same wavelength	Sincere	Freedom
	Treated like a king/queen	
Entertainment	Efficiency	Surprise
Distraction	Efficient	Unexpected (positively)
Pleasure	Easy	Exceeding expectations
Entertainment	Fluent	Surprising

Note: The attributes have been translated from Dutch.

of the phrases), in the hotel the *acknowledgement* dimension was most prevalent, and customers of the funeral company most often gave examples of hospitable experiences referring to the *autonomy* dimension.

4.3. Conclusions

Study 1 and study 2 resulted in a better understanding of the concept of experiencing hospitality. In a service environment, experiencing hospitality is suggested to take place through a mixture of the nine experiential dimensions of hospitality: *welcome*, *at ease*, *empathy*, *servitude*, *acknowledgement*, *autonomy*, *surprise*, *efficiency* and *entertainment*, each with corresponding attributes.

This is to a great extent in line with the existing literature. The *welcome* dimension as part of experiencing hospitality is in accordance with description of Brotherton (2005), Hemmington (2007), Ariffin and Maghzi (2012), Blain and Lashley (2014) and Tasçi and Semrad (2016). The *servitude* dimension resembles the heart-soothing factor of hospitableness of Tasçi and Semrad (2016) and description of others (Brotherton, 2005; Hemmington, 2007; Blain & Lashley). The *at ease* dimension is identified by Hemmington (2007) and looks like the heart-assuring factor of hospitableness (Tasçi and Semrad, 2016). The *acknowledgement* dimension is in line with Ariffin and Maghzi (2012), who describe personalization and a special relationship as hospitable. Finally, Hemmington (2007) describes 'lots of little surprises' as parts of hospitality, which matches the *surprise* dimension in the Delphi study. *Empathy* is in line with 'understanding the guest' as described by Matzko (1996), King (1995) and Tideman (1983). However, the *autonomy* dimension suggested in the present study seems to be new.

The prevalence of the various dimensions of the experience of hospitality is expected to vary depending on the type of service context as well as the type of customer. For surprise, entertainment and efficiency, it remains unclear whether those are separate experiential dimensions or antecedents of the other dimensions.

Table 3 summarizes the results of both qualitative studies by presenting the nine experiential dimensions of the experience of hospitality together with their corresponding attributes. The attributes served as input for a first (extensive) version of the EH-Scale, which was validated during phase 2.

5. Phase 2: scale purification and validation

For the purification and validation of the Experience of Hospitality Scale (EH-Scale), two quantitative studies were performed. The first stage (field study 1) focused on: (1) screening the items to reduce the initial pool to a more manageable size using Principal Component Analysis (PCA); and (2) exploring the underlying structure of the data using Exploratory Factor Analysis (EFA). The second stage (field study 2) involved validation of the factor structure of the condensed scale by using Confirmatory Factor Analysis (CFA) on a new dataset.

5.1. First stage: item screening and factor structure (field study 1)

Firstly, a comprehensive version of the EH-Scale was designed based on the attributes of the dimensions of phase one as shown in Table 3. For each attribute a statement was created. Subsequently, the scale was pretested among 15 hospitality experts and 18 facility staff (cleaning and restaurant) to examine the readability, comprehensibility, wording, ambiguity, and order effects of the questionnaire. Based on the feedback from the respondents, the wording of several questions was improved, as well as the ordering of the questions. After the pre-test, the instrument consisted of 47 statements on the attributes presented in Table 3, together with the 3 statements of the ACSI American Customer Satisfaction Model (Angelova and Zekiri, 2011), 2 items on behavioral intention, and demographic variables, such as age, gender, educational background and cultural background.

5.1.1. Data collection

Data for the initial refinement of the 52-item questionnaire were gathered from three samples resulting in a combined sample of 848 visitors to three organizations: a catering company ($n=433$), a hospital ($n=353$) and a business fair ($n=62$). The organizations differed in the type of service offered (mass versus individual) and type of visit (hedonic versus utilitarian, described by Wakefield and Blodgett, 2004).

The questionnaire was administered on the spot, during the first months of 2016. Visitors were approached at the end of their visit and were asked to participate in a study on customer experience by filling out the questionnaire on a tablet. Participants were asked to indicate the extent to which they agreed with the 52 statements on a continuous Likert scale (from totally disagree to totally agree) and to answer questions on demographics (age, gender, educational background).

5.1.2. Scale purification

For the analysis, the procedure described by Matsunaga (2010) was followed. The combined sample from the three organizations was randomly split in half resulting in two separate datasets: one to conduct the PCA and one to conduct the EFA. For the initial item reduction the PCA was conducted on dataset 1 ($n=417$). As the factors were expected to be correlated, the Promax oblique rotation method was used. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was suitable for PCA ($KMO=0.97$). Statistical criteria for item retention were a primary factor loading above 0.6 and a second highest factor loading below 0.3 (Henson and Roberts, 2006; Matsunaga, 2010; Park et al., 2002). Items with lower factor loadings were deleted one by one, resulting in a remaining set of 26 items spread over three factors, together explaining 68.7% of the variance.

Secondly, to explore the underlying factor structure (Matsunaga, 2010), this 26-item scale was submitted to an EFA (Principal Axis Factoring and Promax rotation) on dataset 2 ($n=434$). Based on the Kaiser Guttman criterion (eigenvalues > 1.0), scree test and Parallel analysis (Hayton et al., 2004) both a

Table 4Factor Analysis (EFA, promax rotation, n=434) and communalities (h^2).

Item	Dimension study 1&2	h^2	Factor loadings		
			Inviting	Care	Comfort
Experiencing openness	Welcome	0.78	.93	-0.02	-0.04
Feeling invited	Welcome	0.57	.68	0.05	0.05
Experiencing freedom	Autonomy	0.58	.62	0.04	0.16
Experiencing involvement	Empathy	0.78	-0.07	.92	0.01
Experiencing support	Empathy	0.66	0.07	.83	-0.09
Treated as a king/queen	Servitude	0.71	0.08	.84	-0.07
Experiencing relief	Servitude	0.55	-0.00	.75	-0.01
Experiencing effort	Servitude	0.74	0.09	.80	0.00
Experiencing interest	Acknowledgement	0.73	-0.07	.79	0.15
Feeling important	Acknowledgement	0.73	-0.04	.73	0.19
Feeling comfortable	At ease	0.80	-0.01	0.01	.90
Feeling at ease	At ease	0.73	0.00	0.06	.81
Feeling relaxed	At ease	0.69	0.06	0.04	.76
Feeling independent	Autonomy	0.58	0.01	-0.01	.76
Having choice	Autonomy	0.56	0.04	-0.03	.76
Eigenvalue			1.07	8.62	1.50
% of variance			7.10	57.50	9.97
Cumulative% of variance			74.57	57.50	67.47
Internal Consistency (Cronbach's α)			$\alpha = 0.84$	$\alpha = 0.94$	$\alpha = 0.91$

Notes: Items with high factor loadings are bold. Items have been translated from Dutch. For the complete (translated) survey questions see Appendix 1.

Table 5

Results Confirmatory Factor Analysis (CFA).

Factor	Factor loading ^a	Composite reliability (CR)	Average variance extracted (AVE)	Maximum shared variance (MSV)	Average shared variance (ASV)
Inviting		0.81	0.60	0.38	0.34
- Feeling invited	0.83				
- Experiencing openness	0.88				
- Experiencing freedom	0.57				
Care		0.93	0.64	0.35	0.33
- Experiencing support	0.74				
- Experiencing involvement	0.83				
- Treated as a king/queen	0.81				
- Experiencing effort	0.83				
- Experiencing relief	0.79				
- Experiencing interest	0.85				
- Feeling important	0.75				
Comfort		0.89	0.75	0.38	0.36
- Feeling at ease	0.89				
- Feeling comfortable	0.92				
- Feeling relaxed	0.77				

^a All factor loadings are significant ($p < 0.001$).

two-factor and a three-factor solution were explored. Based on the interpretability of the factors and theoretical expectations, the three-factor solution seemed most suitable. Based on the 0.6/3 rule for item retention, another eleven items were deleted from the scale. The results are presented in Table 4. The three factors, labeled as *inviting*, *care*, and *comfort*, together explained 74.6% of the variance. Communalities, defined as the proportion of a variable's variance that is explained by the three factors combined, are all above 0.3. Furthermore, Cronbach's alphas exceed the minimum of 0.7, as recommended by Nunnally and Bernstein (1994) and Kline (1999), suggesting that the scales are reliable.

Notes: Items with high factor loadings are bold. Items have been translated from Dutch. For the complete (translated) survey questions see Appendix A.

As can be seen in Table 4, the experiential dimensions that resulted from study 1 and study 2 group together to form three experiential factors of the experience of hospitality. Variables of the *welcome* dimension and one variable of the *autonomy* dimension make up the *inviting* experiential factor. Items from the *empathy*, *servitude* and *acknowledgement* dimensions group together into the *care* factor, and variables from the *at ease* dimension and some vari-

ables of the *autonomy* dimension make up the *comfort* factor. Items of the *efficiency*, *entertainment* and *surprise* dimensions dropped out during the factor analysis.

5.2. Second stage: confirmation of factor structure (field study 2)

For the validation of the three-factor model that resulted from the PCA and EFA, a CFA was conducted on a totally new dataset using the software package IBM SPSS AMOS 23. 255 Visitors of six organizations participated in field study 2: a restaurant at a large international home furniture chain ($n = 42$), a concert hall ($n = 61$), a town hall of a medium large city ($n = 83$) two hotels ($n = 46$) and a Dutch homeware retail chain ($n = 12$). The 15-item EH-Scale was administered on the spot. Visitors were approached at the end of their visit and were asked to participate in a study on customer experience by filling in a paper version of the EH-Scale.

For the evaluation of the model, a multi-criteria strategy was followed (Hu and Bentler, 1999). However, the CFA in first instance did not meet all criteria. To improve the fit of the model, two items with low loadings were removed one by one (the items of 'feeling independent' and 'having choice') resulting in a model that resulted in

Table 6
Average variance extracted (AVE) and correlation matrix.

	Inviting	Care	Comfort
Inviting	0.60 ^a		
Care	0.55	0.64 ^a	
Comfort	0.61	0.59	0.75 ^a

^a Average variance extracted. Numbers below the AVE line are the correlations between the constructs.

adequate model fit. Loading coefficients of the 13 items ranged from 0.57 to 0.92. While the chi-square fit index was statistically significant ($\chi^2 = 142.56$; $df = 62$, $p < 0.01$), the values of Goodness-of-Fit index (GFI), Adjusted Goodness-of-Fit index (AGFI), Comparative Fit Index (CFI) and Root Mean Square Residual (RMSEA) were 0.92, 0.89, 0.96 and 0.07 respectively. Based on Matsunaga (2010) and Marsh et al. (2004) the criteria of GFI > 0.90, AGFI > 0.85, CFI > .90 and RMSEA < 0.08 were met, indicating an adequate fit of the model. Table 5 shows the results of the CFA.

Internal consistency for the three factors was examined using Cronbach's alpha: $\alpha=0.78$ for the *inviting* factor, $\alpha=0.92$ for the *care* factor, and $\alpha=0.85$ for the *comfort* factor. All alphas exceed the minimum of 0.7, as recommended by Nunally and Bernstein (1994), suggesting reliable scales.

Since several qualitative and quantitative steps were followed to acquire a thorough and extensive instrument, content validity is assumed. As can be seen in Tables 5 and 6, convergent validity of the measurement model was evidenced by significant loading coefficients of 0.57–.92 ($p < 0.001$) (Kline, 2005), and composite reliability values all greater than the recommended 0.7 (Nunally and Bernstein, 1994). Furthermore, the average variance extracted values (AVE, Fornell and Larcker, 1981) were for all the three factors above the cut-off value of 0.50 (Bagozzi and Yi, 1988).

Evidence for discriminant validity was provided by two tests: (1) factor correlations (displayed in Table 6) are lower than the threshold of 0.85 (Kline, 2005), indicating discriminant validity; and (2) the maximum shared variance (MSV), average shared variance (ASV), and average variance extracted (AVE) for each factor (see Table 5) suggest discriminant validity because MSV < AVE and ASV < AVE (Gaskin, 2012; Hair et al., 2010; Fornell and Larcker, 1981).

Finally, to examine criterion-related validity, standard multiple regression analyses were carried out on the whole database ($n = 1093$), indicating the explanatory power of the three factors on the overall experience of hospitality, overall satisfaction and behavioral intention. The overall experience of hospitality was measured by three items (Cronbach's $\alpha = 0.88$), overall satisfaction was measured by the three-item ACSI scale, (Cronbach's $\alpha = 0.84$) and behavioral intention was measured by the revisit intention and recommendation to others (Cronbach's $\alpha = 0.88$). For the exact items see Appendix A. The results of the regression analysis are shown in Table 7.

The analysis revealed that the three factors of the EH-Scale had a statistically significant effect on the overall experience of hospitality, overall satisfaction and behavioral intention ($p < 0.001$). The three factors together explained 64% of the variance of the over-

Table 8
Results regression analysis catering and hospital.

Factors	Catering company			Hospital		
	Experience of Hospitality		Beta	Experience of Hospitality		Beta
	B	Std. Error		B	Std. Error	
Inviting	0.59	0.04	0.54	0.39	0.05	0.42
Care	0.13	0.03	0.16	0.23	0.05	0.27
Comfort	0.18	0.05	0.18	0.13	0.04	0.17
Adjusted R ²	0.56					

*For all three outcome variables, the factors had a significant effect ($p < 0.001$).

all experience of hospitality, indicating a satisfactory model fit. The *inviting* factor had the largest contribution, followed by *care* and *comfort*. *Inviting* therefore seems the most predictive factor for a positive experience of hospitality. Results further provided evidence that although the other outcome measures of satisfaction and behavioral intention are related to the experience of hospitality, they seem to be separate constructs. The three factors of the experience of hospitality predicted 46% and 58% of the variance of overall satisfaction and behavioral intention respectively, indicating a less adequate model fit. Moreover, the relative contributions of the three factors differ: for satisfaction the contributions of the three factors are about equal, and for behavioral intentions the *comfort* factor contributed most.

Since the experience of hospitality was measured in several service contexts, a regression analysis was also performed separately on the data of the two service organizations that had the largest datasets: the catering company ($n = 433$) and the hospital ($n = 353$). Table 8 shows that the three factors of the experience of hospitality in both service environments significantly predict the overall experience of hospitality. Although in both organizations the inviting factor contributes most, at the catering company the contributions of care and comfort are about equal, while in the hospital the care factor seems the second most predictive factor followed by comfort. This supports the hypothesis that resulted from study 1 and study 2, namely that the importance of the various factors of the experience of hospitality may vary depending on the service context. In hospitals, the experience of care is more important for the experience of hospitality than in catering.

6. Conclusion

The present research contributes to the gap in the knowledge on the concept of hospitality from the customer's perspective. The construct of the experience of hospitality is conceptualized and operationalized, resulting in a compact scale that measures the experience of hospitality in service environments.

The exploratory phase – including a literature review, expert opinions, and the customer's experiences of hospitality – resulted in a conceptualization of the experience of hospitality by distinguishing nine experiential dimensions: *welcome*, *at ease*, *empathy*, *servitude*, *acknowledgement*, *autonomy*, *surprise*, *efficiency* and *entertainment*. As was hypothesized after the exploratory phase, *surprise*, *efficiency* and *entertainment* were not expected to be expe-

Table 7
Results of regression analysis of the EH-Scale on the overall experience of hospitality, overall satisfaction, and behavioral intention.

Factors	Experience of Hospitality			Overall satisfaction (ACSI)			Experience of Hospitality		
	B	Std. Error	Beta	B	Std. Error	Beta	B	Std. Error	Beta
Inviting	0.56	0.03	0.53	0.34	0.05	0.29	0.34	0.05	0.29
Care	0.19	0.02	0.23	0.18	0.04	0.16	0.17	0.04	0.16
Comfort	0.14	0.03	0.14	0.21	0.04	0.43	0.51	0.04	0.43
Adjusted R ²	0.64			0.46					

*For all three outcome variables, the factors had a significant effect ($p < 0.001$).

rential dimensions, but rather antecedents of the perception of one or more of the six other experiential dimensions of hospitality. The results of the confirmative phase support this idea, as the items measuring *surprise*, *efficiency* and *entertainment* did not survive the factor analysis, as they neither loaded onto the three factors, nor appeared as a separate factor. The explorative phase resulted in 47 attributes as input for the construction of the EH-Scale.

During the confirmative phase, analysis of the data of the two field studies reduced the items, resulting in a 13-item scale in which the remaining six experiential dimensions grouped together into three factors of the experience of hospitality: *inviting*, *care* and *comfort*. The *inviting* factor shows the largest predictive value for the overall experience of hospitality.

7. Discussion

7.1. Theoretical and practical implications

This paper has both theoretical and practical implications. By presenting the EH-Scale, the present article contributes to the theoretical understanding and measurement of hospitality in a service context from the customer's point of view. Going beyond the instruments developed by Ariffin and Maghzi (2012), Blain and Lashley (2014), and by Tasci and Semrad (2016) this instrument takes a broader perspective by focusing not only on the characteristics of the interaction with staff, but instead looks for aspects on a more abstract level of the organization in order to also include the perceived hospitability of the environment, facilities and procedures faced during the service encounter.

The purpose of the present series of four studies was to develop an instrument to assess the experience of hospitality that is applicable in every service context. Although it was not the main objective of the present research, the results also suggest that all factors of the experience of hospitality are relevant in every type of service and for every type of customer, but the relative importance of the factors may vary.

The research provides the service industry insight in what people experience as hospitality. Furthermore, organizations now have access to the EH-Scale, a compact assessment tool applicable in any organization to measure how customers experience the hospitality that is offered. Insight in the experience of *inviting*, *care* and *comfort* will help organizations in creating the hospitality they want to provide to their guests.

7.2. Limitations and suggestions for future research

As Tasci and Semrad (2016) have already remarked, concepts such as hospitability and the experience of hospitality are difficult to measure because of the intangibility of emotionally laden constructs, and because of the influence of cultural, personal and situational factors. However, despite such challenges researchers have attempted to capture this type of construct in instruments (Ariffin and Maghzi, 2012; Blain and Lashley, 2014; Tasci and Semrad, 2016). The EH-Scale aims to measure such an intangible construct too.

Limitations on the use of such scales are that, although people are instructed not to think too long and rely on their first impressions, people unavoidably have to think explicitly about aspects of the service delivery that they normally process unconsciously. Moreover, although the wording of the questions was carefully chosen and tested, the formulation of the questions may influence the outcome. Perhaps in the future methods will be developed to overcome these problems; for example, by using advanced neuroimaging techniques to recognize emotions. However, thus far such techniques are not advanced enough to be able to distinguish

between subtle differences such as the experience of *inviting*, *care* and *comfort*.

Furthermore, the present EH-Scale was developed based on what Dutch people experience as hospitable and cannot just be generalized to other nationalities. Further research needs to be done to investigate contextual, individual and cultural variations in the experience of hospitality.

In conclusion, the present research is an endeavor to capture and measure the phenomenon of the experience of hospitality in service environments. Yet the development of the scale is but the beginning of our understanding of the topic. Moreover, the opportunity to measure the experience of hospitality enables researchers to examine the role of particular service attributes, which will contribute to our knowledge of the role of both behavioral and environmental service attributes in customers' experience of hospitality. What service attributes influence customers' experiences of *inviting*, *care* and *comfort*? In what way do these attributes influence how customers of service environments experience those factors of a hospitable experience? Answers to these questions will eventually provide service industries not only with insight in the experience of their customers, but also with refined tools to help improve the hospitality they offer.

Appendix A. Items of the Experience of Hospitality Scale (after validation).

Inviting	1. Organization X feels inviting. 2. Organization X feels open. 3. During my visit I experience freedom.
Care	1. Organization X provides support to me. 2. Organization X is involved in me. 3. I feel as I am treated like a king/queen. 4. Organization X does its best to take care of me. 5. Organization X relieves me of tasks or worries. 6. Organization X is interested in me. 7. I feel important at organization X.
Comfort	1. I feel at ease at organization X. 2. I feel comfortable at organization X. 3. I feel relaxed at organization X.
Overall Experience of Hospitality	1. Overall, I experience organization X as hospitable. 2. The employees are hospitable to me. 3. All areas in the building that I visited seem hospitable to me.
Overall Satisfaction ^a	1. What is your overall satisfaction with organization X? 2. To what extent has the services of organization X met your expectations? 3. How close are the services provided by organization X compared to ideal services?
Behavioral intention ^b	1. If I could choose again, I would visit this organization again. 2. I would recommend organization X to others.

Note. The items are translated from Dutch. The original Dutch version of the EH-Scale is available on request.

^aitems from the ACSI-model (Angelova and Zekiri, 2011).

^bItems based on Pullman and Gross (2004).

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THE SALIENT ROLE OF MEDIA RICHNESS, HOST-GUEST RELATIONSHIP, AND GUEST SATISFACTION IN FOSTERING AIRBNB GUESTS' REPURCHASE INTENTION

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ABSTRACT

This study aims to assess the direct and indirect effects of media richness and the host-guest relationship on guests' Airbnb repurchase intention. It also examines the mediating role of guest satisfaction and the moderating role of the sharing economy ethos. Data was collected via an online survey among consumers who had already experienced using Airbnb accommodation service. It yielded 261 complete and usable questionnaires. Structural Equation Modeling – Partial Least Square (PLS-SEM) approach has been used to analyse the data. The result of this study supported all hypothesised direct and indirect relationships. However, the moderating effect of the sharing economy ethos was not supported.

Keywords: Media richness; Host–guest relationship; Repurchase intention; Sharing economy ethos; Guest satisfaction

1. Introduction

In recent years, sharing economy platforms have proliferated, particularly in the travel and tourism industry (Ert et al., 2016; Kakar et al., 2018). This differs from the traditional business model in that it relies heavily on the internet platform, emphasises non-ownership of assets, promotes the concept of collaborative consumption, utilises non-conventional workforce as service providers, offers customised products and services and exploits idle resources (Guttentag et al, 2017; Mao & Lyu, 2017). One of the most compelling examples of the sharing economy is Airbnb, an online rental marketplace that provides short-term accommodation to guests as an alternative to hotels (Xie & Mao, 2017). In addition, it allows "travelers to live like locals and be able to share their experience on social media" (Yung, 2014, p. 5).

Since its inception, in 2008, Airbnb has expanded tremendously, with over 5 million listings in 191 countries (Folger, 2019). It is reported that Airbnb dramatically impacts the local community's economy (Xie & Mao, 2017). This is because Airbnb travellers stay longer at their destination and spend more money near the accommodation (Nieuwland & van Melik, 2020). Owing to its effect on the traditional lodging industry, it is regarded as a disruptive innovation (Guttentag, 2015). Furthermore, it has the potential to induce changes in travel behaviour (Tussyadiah & Pesonen, 2016). However, the literature on Airbnb is still nascent (Guttentag et al., 2017; Liang et al., 2017; Tiamiyu et al., 2020a), and, thus, a better understanding of guest repurchase intention can offer valuable marketing insights for Airbnb, its hosts and competitors.

Researchers (see Olsen, 2007; Otim & Grover, 2006; Quoquab et al., 2016) have argued that retaining repeat customers is crucial for all industries since it ensures the successful growth of the business, brings substantial revenue, reduces transaction cost and spreads positive word of mouth, which is also true of Airbnb. For example, Tussyadiah (2016) proposed that the repeat purchase intention might help Airbnb to grow sustainably. Furthermore, repeat purchases play a crucial role in Airbnb since these existing customers can easily switch back to hotels (traditional service providers) (Mao & Lyu, 2017). Most importantly, Airbnb accommodation can help meet a variety of customers' needs compared with hotels, including lower prices, meaningful social experiences and sustainable travel. However, what determines guest repurchase intention to use Airbnb accommodation may differ from those associated

with a hotel stay (Tussyadiah, 2016; Tiamiyu et al., 2020b). Thus, it is crucial to find context-specific drivers of the repurchase intention regarding Airbnb.

Factors that affect consumers' intention to adopt Airbnb accommodation have been identified as social benefits (Tussyadiah, 2016) perceived value (Mao & Lyu, 2017), home atmosphere and social interactions (Tussyadiah, 2015), unique experience (Mao & Lyu, 2017), authenticity (Guttentag et al., 2017), novelty and home benefits (Guttentag, 2016), perceived risk (Mao & Lyu, 2017), distrust (Tussyadiah & Pesonen, 2016), low price (Liang et al., 2018), and price sensitivity and word of mouth (Aruan & Felicia, 2019). Nonetheless, there is a lack of research that considers media richness, host-guest relationship and guest satisfaction. Grounded in social exchange theory, this study considers these factors as the main drivers of guest repurchase intention of Airbnb. Thus, the ***first research objective*** is to examine the direct effect of media richness, host-guest relationship and guest satisfaction on repurchase intention.

The subjective nature of guest satisfaction, particularly in the hospitality environment, makes it difficult to determine its antecedents (Douglas & Connor, 2003). Understanding these antecedents is very important, especially for players in this industry (Jaffe et al., 2017). Only a few studies have tested the variables that affect guests' satisfaction with Airbnb, such as monetary benefits, enjoyment, amenities, and its attributes in terms of facility, location, and welcoming appeal (Guttentag et al., 2017). Recent research has advocated developing sophisticated theoretical explanations of the factors that relate to consumers' satisfaction with Airbnb; however, there is a lack of research that considers media richness and host-guest relationships pertaining to guest satisfaction with Airbnb. Based on stimulus–organism–response model (S–O–R), this study aims to examine the effect of these antecedents on guest satisfaction. Accordingly, the ***second research objective*** is to predict the direct effect of media richness and host-guest relationship on guest satisfaction.

In the existing literature, customer satisfaction is considered as the mediator between 'service quality and loyalty' (Quoquab et al., 2016), 'service quality and switching' (Quoquab et al., 2018) as well as between 'information quality and purchase intention' (Chen & Chang, 2018). However, it is yet to be examined as a mediator in the host-guest relationship, media richness, and repurchase intention. Considering this and grounded in the S–O–R model, the ***third research objective*** is to examine the mediating role of guest satisfaction between host-guest relationships, media richness, and repurchase intention.

It has been found that satisfied consumers do not always exhibit repeat purchase behaviour (Bennett & Rundle-Thiele, 2004; Reichheld, 1994), and this is perhaps because of the changing nature of the behavioural aspect and consumption pattern worldwide (Bendapudi & Berry, 1997). Today's consumers are more innovative and tend to search for new things, which led them to switch their existing service providers (Cowart et al., 2008). Thus, this study considers the sharing economy ethos as a moderator to strengthen the relationship between guest satisfaction and guest repurchase intention. Hence, the ***fourth research objective*** is to examine the moderating role of the sharing economy ethos on the link between guest satisfaction and repurchase intention.

This study contributes to the systematic development of the theoretical foundation related to sharing economy. Particularly, this is a pioneering study that examines guest satisfaction, host-guest relationship and media richness as major motivators of reusing Airbnb. This can enrich the literature pertaining to consumer studies about the crucial role of psychological factors (e.g., guest satisfaction) and contextual factors (e.g., media richness and host-guest relationship) in motivating consumer purchase/repurchase intention/behaviour in the Airbnb context. ***In addition***, it is a relatively new study that considers the mediator role of guest satisfaction between the host-guest relationships, media richness and guest repurchase intention of Airbnb. From a theoretical perspective, a mediator helps to explain why a relationship between exogenous and endogenous constructs exists. In this study, guest satisfaction is operating as a mediator that receives information "inputs" from host-guest relationships and media richness and translating them into an "output" which is the guest repurchase intention of Airbnb; which helps to reveal the true relationship between the independents and dependent variables in the Airbnb context. Most importantly, this is a comparatively new study that considers the moderating role of the sharing economy ethos between guest satisfaction and his/her repurchase intention of Airbnb. A moderator can change the strength or even the direction of the relationship between two constructs in the model (Hair et al., 2017). In this study, sharing economy ethos is expected to enhance and strengthen the relationship between guest satisfaction and guest repurchase intention of Airbnb. From a theoretical perspective, this may help to solve the gap between attitude (guest satisfaction) and behaviour (guest booking intention). In practical terms, marketers can better strategize their marketing effort to target and attract new and existing Airbnb users by understanding the potential factors that drive consumers' Airbnb repurchase intention. The findings are also of potential use to other tourism organisations in helping them understand consumers' preferences about their repurchase intention and guiding them in employing suitable measures to keep their customers loyal to achieve sustainability.

The rest of the article is organised as follows. A brief discussion is provided about Airbnb, followed by a discussion of the theoretical underpinning. The study hypotheses are then developed, and the conceptual framework is presented. Next, the methodology is explained, and the results and findings are discussed. Lastly, discussions, implications, limitations, and future research directions are highlighted.

2. Background Literature

2.1. Sharing Economy and Airbnb

The development of the internet has enhanced and hastened the appearance of sharing economies, converting economic surpluses into easily navigated platforms to match the supply of and demand for various products and services on an international scale (Chen & Chang, 2018). The sharing economy, known as the peer-to-peer economy, has gained considerable popularity during the past decade (Bardhi & Eckhardt, 2012; Chen & Chang, 2018). It refers to the redistribution of unused resources to those who need them, simultaneously providing benefits to the owners of these resources (Felson & Spaeth, 1978). For example, individuals can offer their properties, such as rooms and vehicles, for short-term rentals instead of leaving them unused (Tussyadiah & Pesonen, 2016). The sharing economy differentiates itself from the traditional business model in its non-ownership of assets and access to idle resources (Kim, 2019). Several economic and social benefits are associated with sharing platforms, such as reduced cost, increased interpersonal interaction and gaining sustainable and environmentally friendly options (Lutz & Newlands, 2018).

Among the platforms that offer matching services for customers and suppliers is Airbnb, a peer-to-peer online marketplace that brings together property owners with guests looking for a place to stay (The Economist, 2013). In recent years, Airbnb and other peer-to-peer short-term rental services have grown dramatically in the travel and tourism industry (Ertz et al., 2017), and its value has exceeded 30 billion US dollars since 2008 (Thomas, 2017). It allows ordinary people to rent out their residences as tourist accommodation via the Airbnb website (Guttentag, 2015). Airbnb thus represents a transformative innovation within the tourism accommodation industry (Sthapit & Jiménez-Barreto, 2019). It has become one of the most prominent businesses in the sharing economy (Levendis & Dicle, 2016), fuelled by the growth of Web 2.0, which provides an opportunity for user-generated content, sharing and collaboration (Mohammad et al., 2020). Airbnb differentiates itself from the traditional service provider (hotel) by offering access to idle and unused spaces and a ‘feeling at home’ and an ‘atypical place to stay’ (Liu & Mattila, 2017). In addition, Airbnb aims to be more environmentally friendly by encouraging the effective use of existing resources (Liu & Mattila, 2017). A study conducted by Airbnb (2019) found that Airbnb accommodation consumes 63% less energy and 12% less water and produces 32% less waste than do traditional hotels in North America.

The growing popularity of Airbnb has drawn significant research attention to the factors driving the choice of Airbnb (Guttentag et al., 2017; So et al., 2018; Tiamiyu et al., 2020b). However, not much effort has gone into understanding how to retain repeat purchase customers, which this study attempts to address. Consequently, this study suggested an integrated model that synthesizes the S-O-R model and social exchange theory as the major determinants of Airbnb repurchase intention. To date, attention has focused mainly on (re)purchase intention formation in the hotel and tourism industry (Teng et al., 2015; Hwang et al., 2018; Jin et al., 2019). However, the commercial home-sharing service is different from the traditional accommodation service provided by hotels (Ruan, 2020). In addition, little focus has been on the tourism-related factors associated with online peer-to-peer repurchasing behaviours such as media richness, host-guest relationship and guest satisfaction.

2.2. Theoretical Underpinning

Mehrabian and Russell (1974) developed stimulus–organism–response (S–O–R) theory to investigate the environmental influences (S) acting on the customer’s internal state of mind (O) that trigger the subsequent response. S–O–R asserts the external cue (stimuli) effect on the internal organism that leads to approach or avoidance behaviour (Su and Swanson, 2017). *Stimulation* is an external influence that affects people’s psychological state (emotionally/cognitively) and thus motivates them to respond through intrinsic or extrinsic responses (Namkung & Jang, 2010). Intrinsic responses are usually individual attitudes, and extrinsic responses tend to be close or avoidance behavior (Eroglu et al., 2003).

The researcher has adopted this model from different disciplines to understand consumers’ purchase and repurchase intention. For example, McKinney (2004) used this model to investigate how the e-commerce environment (stimuli) affects customers’ engagement (organism) and, eventually, his or her intention to purchase (response). Similarly, Quoquab et al. (2020a) employed this model to examine the effect of the halal logo as a stimulus to consumers’ perceived reputation and trust (organism) and, eventually, its effect on consumers’ loyalty (response). Overall, stimuli are factors that can induce consumers to look for more information about the product and service and significantly affect the ensuing behaviour (Richard, 2005). As such, and guided by this theory, the present study considers media richness and the host-guest relationship as external factors (stimulus) that may affect guests’

psychological state of satisfaction (organism) positively/negatively, which in turn can increase/decrease their repurchase intention.

3. Hypothesis Development

3.1. Guest Satisfaction and Repurchase Intention

Repeat purchase has been considered one of the most central themes in the current marketing literature (Quoquab et al., 2017). Its vital role is well recognised in the tourism, hospitality and leisure industries (see Veal, 2017; Yoo & Bai, 2013). Specifically, it helps the tourism management recognise whether they have accomplished the desired result (e.g. revisiting) (Moore et al., 2015). Similarly, Alegre and Cladera (2006) argued that repurchase intention is desired because of the sustainability of the tourism industry. Similarly, Huang and Hsu (2009) revealed that securing repeat visitation is regarded as an essential factor in sustaining the competitiveness of tourism destinations. Following Liang et al.'s (2017, p.77) conceptualisation, this study defines repurchase intention in the context of Airbnb as 'Airbnb consumers' self-reported likelihood of repeat purchasing accommodation on www.Airbnb.com'.

Satisfaction is regarded as the antecedent of tourists' revisit intention (Bigne et al., 2001; Um et al., 2006). Although different authors have defined satisfaction differently, Oliver's (1997) seminal work on satisfaction has provided a much broader and widely accepted definition of the construct. According to Oliver (1997, p.13), satisfaction is the 'consumer's fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under or over-fulfillment'. Based on this definition, this study considers guest satisfaction as 'guests' post-purchase evaluation of Airbnb accommodations service offering'.

The relationship between guest satisfaction and his or her intention to repurchase Airbnb can be explained by the S-O-R theory (Mehrabian & Russell, 1974). According to this theory, a person's psychological status (satisfaction/dissatisfaction) can affect his or her action/reaction. Specifically, when individuals have positive thoughts, feelings and emotions towards the Airbnb host, their behavioural intention to repurchase will be positive. Moreover, the social exchange theory (Homans, 1960) can support this relationship. Particularly, if a guest is happy and satisfied with the services provided by Airbnb, he/she will feel morally obligated to reciprocate by showing positive attitude (commitment, involvement, etc.) and behaviour (loyalty revisiting, etc.) This is in agreement with the theoretical work of Oliver (1997), who argued that individuals form a repurchase intention if they feel satisfied with the perceived performance of the service provider. Nevertheless, a limited number of studies have investigated the link between guest satisfaction and Airbnb repurchase intention in the Malaysian context. Considering this gap, the present study developed the following hypothesis:

H1: Guest satisfaction positively affects repurchase intention.

3.2. Host–Guest Relationship and Repurchase Intention

Host–guest relationship (HGR) is a comparatively new concept that emerged owing to the unique nature of Airbnb since it is considered as a form of 'sharing' services (Shi et al., 2019). Such a unique character allows all parties involved to co-create the value (Vargo et al., 2008) in which the Airbnb host and the guest jointly produce mutually valued outcomes (Wang & Jeong, 2018). The forms of host-guest interactions can include communicating and sharing information, fun and interests while staying (Guttentag et al., 2018). The interaction process significantly influences consumers' satisfaction and their subsequent behaviour (Finsterwalder & Kuppelwieser, 2011). In addition, Tussyadiah and Zach (2017) found that social interactions with hosts make guests feel welcome. Similarly, Ertz et al. (2017) argued that social communication is critical in motivating individuals' attitudes and behaviours. In the same vein, Pappas (2019) demonstrated that social relationships can affect the experience of Airbnb tourists.

HGR can be viewed from the perspective of a smooth exchange of information between tourists and the host during a home-sharing stay (Shi et al., 2019). According to Wang and Jeong (2018), HGR is an integral part of the process, starting from the traveller's search for information to transaction completion or even to their departure. Shi et al. (2019) argued that tourists evaluate destination attributes, including the natural environment, accommodation, host-interaction and the like. In a similar vein, Shi et al. (2019) suggested that in the home-sharing context, verbal communication between tourists and hosts was likely to enhance tourists' cultural experiences. Thus, it is suggested that consumers' behaviour is likely to change once HGR is established (Lampinen & Cheshire, 2016). On the basis of this explanation, this study assumes that HGR will positively affect tourists' repurchase intention. This is in line with Mittal et al.'s (1999) argument, i.e. high levels of relationship quality can result in high levels of purchase intention. Besides, this is consistent with social exchange theory (SET) (Homans, 1960). According to this theory, if Airbnb guests perceive the Airbnb hosts positively, enhancing the HGR by being friendly, helpful, supportive, honest and trustworthy, he or she will feel that they have solid and close relationships with their hosts and thus feel morally obligated to respond by revisiting Airbnb. This discussion motivates the following hypothesis:

H2: Host–guest relationship positively affects repurchase intention.

3.3. Host–Guest Relationship and Guest Satisfaction

Consumer satisfaction is consumers' overall evaluation of a product or service, which derives from comparing consumers' pre-purchase expectations and perceived service quality (Oliver, 1980, 1997). Consumers modify and update their overall attitude towards services offered based on their satisfaction with this instance of use, and this consequently leads to an intention to continue/discontinue the services (Yen & Lu, 2008). Data from a qualitative study found that some of the interviewees did not experience a mutually beneficial relationship, leading to a poor perception among the guests of the Airbnb service (Sthapit & Jiménez-Barreto, 2019). This shows the importance of maintaining a good HGR to create guest satisfaction and influence their repurchase intention. This argument is congruent with Tussyadiah and Zach's (2017) findings, i.e., social interaction and communication between host and guest can positively affect guests' attitude and behaviour.

Theoretical, the S–O–R model perceives the guest–host relationship as crucial stimulus (S) that can enhance visitor satisfaction (O) and eventually boost his or her intention to purchase/repurchase the Airbnb accommodation. Moreover, the social exchange theory, which explains the formation and maintenance of the interpersonal relationship between two parties (i.e., host and guest) in terms of the reciprocation procedures, can support this link. Specifically, when guests recognize the Airbnb hosts as helpful, caring, sympathetic, and kind, they will develop strong relationships with their hosts, making them feel morally obliged to reciprocate by demonstrating a positive attitude and behaviour. This is constant with Robbins and Judge (2019) findings, i.e. strong association exist between the quality of workplace relationship and employee job satisfaction. However, despite acknowledging the importance of HGR in the Airbnb literature, the relationship tween HGR and customer satisfaction is yet to be tested. Thus, the following hypothesis is developed:

H3: Host–guest relationship positively affects guest satisfaction.

3.4. Media Richness and Repurchase Intention

Individuals make decisions after collecting information from different media that vary in richness (Maity et al., 2018). Some sources are rich in terms of video and audio components, while others consist only of text. Consumer behaviour studies reveal that individuals are inclined to demonstrate diverse behaviours depending on which media is used (Korgaonkar et al., 2006). Media richness theory (Daft & Lengel, 1986) assumes that these different behaviours might be explained by consumers' perception of media richness. The richness of information transferred over a period of time depends on the ability of the medium to convey various types of feedback quickly and on time (Carlson et al., 1998; Hoekstra et al., 2015). Media richness refers to a capacity of communication approach to transmit cues and provide feedback (Lengel & Daft, 1988). Face-to-face is the richest medium, followed by videoconference, telephone conversation, voice messaging, electronic mail and websites (Rice, 1992).

Richer information inspires a high level of consumers' trust (Lu et al., 2014). In addition, the richness of the medium reduces the ambiguity of a message, and experience with the medium improves the ease with which users communicate and understand messages (Carlson & Zmud, 1999, p. 155). Additionally, the media richness of online stores was able to explain consumers' intentions to use such stores (Brunelle, 2009). As such, websites should seek to convey information through rich media formats (Chen & Chang, 2018; Detlor et al., 2003). In the context of Airbnb, the potential guest can communicate with the host in order to explain or to negotiate additional necessities. On confirming the booking, the system shares the host's contact detail with the guest. Thus, following Chen and Chang's (2018) conceptualisation, this study defines media richness for Airbnb as 'the ease and speed with which potential guests can communicate with the hosts'.

Clearly, the media plays a vital role in attracting tourists to purchase their accommodation via Airbnb (Mao & Lyu, 2017). The effective integration of social media presence and advertising creates a sense of media richness, which can encourage purchase intention (Chen & Chang, 2018). For instance, past studies found that consumers seeking information via electronic word of mouth affect tourists' re-purchase intention (Liang et al., 2017; Mao & Lyu, 2017). Similarly, Lu et al. (2014) confirmed that websites with 3D views of a fitness centre were more successful in creating a student's intention to visit the gym than a website with static 2D images. This is in line with media richness theory that used to describe a communication medium's ability to reproduce the information sent over it. It was defined by Daft and Lengel (1986) as the ability of information to change understanding within a certain time interval. According to this theory, rich media on websites have the potential to stimulate action in the physical world (Daft & Lengel, 1986). In the Airbnb context, online guests cannot touch goods or services, and online hosts seek to provide clear, complete and transparent information to reduce the consumer's perceived risk while increasing his or her purchase intention. Guided by this theory, this study argues that media richness is likely to exert a positive effect on customer re-purchase intention. On the basis of this argument, the following hypothesis is developed:

H4: Media richness positively affects repurchase intention.

3.5. Media Richness and Guest Satisfaction

Guests' satisfaction depends on the online seller's ability to provide comprehensive, clear and transparent information about the accommodation booking. This is because Airbnb differs from the conventional hotel booking system. Rich media can therefore reduce the perceived risk of the potential guest and create trust. Thus, media richness is being considered as a salient driver of guest satisfaction (Lu et al., 2012). This link can be supported by S–O–R theory, in which external stimulus (media richness) can affect guest satisfaction and eventually motivate him or her to develop an intention to repurchase Airbnb. Accordingly, the following hypothesis is developed:

H5: Media richness positively affects guest satisfaction.

3.6. Guest Satisfaction as a Mediator

Consumer satisfaction is consumers' overall evaluation of a product or service, which derives from consumers' judgment of perceived performance and which, in turn, is likely to affect consumers' repurchase intention (Oliver 1980, 1997). This argument underlies the idea of considering guest satisfaction as the mediator between host-guest relationships, media richness and repurchase intention. The S–O–R model can support the mediating effect of guest satisfaction. Particularly, media richness and host-guest relationships act as a stimulus that affects guest satisfaction (organism), which in turn affects guest repurchase intention of Airbnb accommodation (response). Guided by theoretical support and logical argument, the following hypotheses are developed:

H6: Guest satisfaction mediates the relationship between HGR and repurchase intention.

H7: Guest satisfaction mediates the relationship between media richness and repurchase intention.

3.7. Sharing Economy Ethos as a Moderator

Guttentag et al. (2017) first coined the concept of the 'sharing economy ethos' (SEE), considering the sharing economy ethos as one of the factors motivating the choice of Airbnb. In their view, it reflected the understanding of collaborative consumption and represented the combination of 'money to locals', 'environmentally friendly', and 'philosophy of Airbnb'. Similarly, Tussyadiah (2015) perceived the sharing economy from the collaborative consumption perspective and identified three dominant motives for collaborative consumption: 'sustainability (social and environmental aspects)', 'community (sharing economy spirit)', and 'economic benefit (money for locals)'. Following this conceptualisation, this study defined SEE as guests' perception of Airbnb philosophy, intention to behave environmentally and respect for the local community's right to their earnings.

Although companies measure consumers' satisfaction in the hope of keeping their consumers loyal, it is not clear why there are satisfied consumers who defect and dissatisfied consumers who do not (Bendapudi & Berry, 1997). In support of this view, Bennett and Rundle-Thiele (2004) found that satisfaction does not always result in repeat purchase behaviour. According to them, it is a common scenario in the banking sector, where consumer satisfaction and repeat purchase are not positively related. Again, on the basis of empirical evidence, Reichheld (1994) has found that in most businesses a majority of satisfied consumers usually defect. These contradictory findings call for further research to consider a third variable that can strengthen the satisfaction – repeat purchase relationship. In this study, SEE is considered as a moderator of the link between guest satisfaction and repurchase intention. In other words, it is assumed that the satisfied guest is likely to exhibit repurchase intention when they hold a strong SEE. This assumption agrees with Guttentag et al.'s (2017) opinion, i.e., SEE is crucial motivator for guests to choose Airbnb. Particularly, if guests believe that the money that they spent will go to locals, staying with Airbnb is environmentally friendly, and belief in the philosophy of Airbnb, they will be more inspired to visit Airbnb. Accordingly, it can be assumed that the strength of the relationship between a satisfied guest and his/her intention to visit/revisit Airbnb is likely to increase if the guest holds a strong SEE. Consequently, the following hypotheses is developed:

H8: Sharing economy ethos moderates the relationship between guest satisfaction and repurchase intention.

3.8. Conceptual Framework

The proposed relationships among the study variables are delineated in Figure 1.

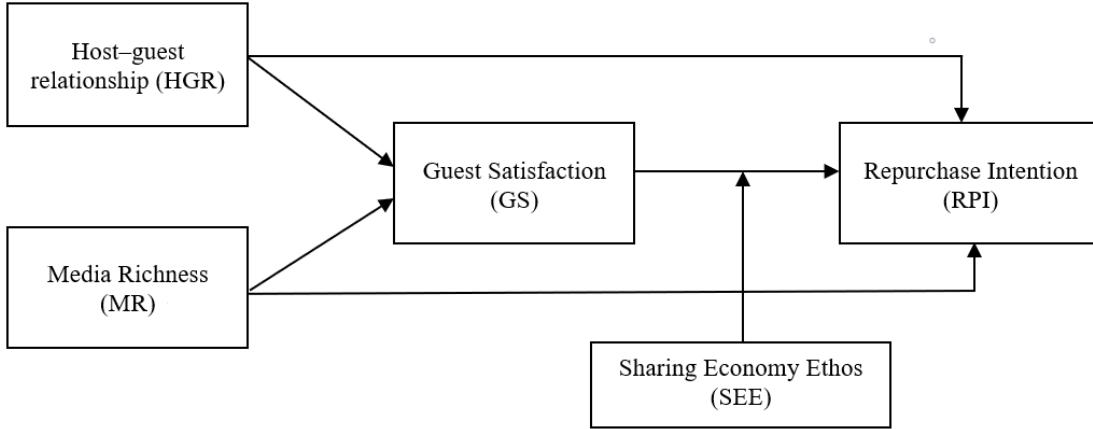


Figure 1: Conceptual Framework

4. Methodology

4.1. Data Collection

An online survey questionnaire was employed to gather the data from target respondents. It is an authentic instrument for collecting data relating to participants' attitude and behaviour (Evans and Mathur, 2005) and is widely used in the hospitality literature (Yang et al., 2018). Airbnb consumers aged 18 years or older who reside in Malaysia and who had booked and stayed in Airbnb accommodation at least once within the past twelve months were eligible for this study. The age criterion of having to be at least 18 years old was based on the consideration that consumers in this age group have purchasing power, commonly identified as having the ability to decide on important purchasing, and have an independent preference (Quoquab et al., 2018). Furthermore, the twelve-month time frame was considered because it was assumed that the consumers would be able to recall their past experiences in order to be able to answer the survey questionnaire. Questionnaires were distributed via email and WhatsApp in order to reach more respondents. According to Sutikno et al. (2016), individuals prefer WhatsApp communication for its accessibility and extensive engagement between users and the user-created WhatsApp groups. Respondents received an electronic link directing them to a Google Form that contained the survey questionnaire. The survey yielded 261 completed and usable questionnaires to run the analysis.

4.2. Sampling and Sample Size

A non-probability sampling technique, more specifically a judgmental sampling technique, was used to gather data. According to Calder et al. (1981), when theoretical generalisability is desired over population generalisability, using non-probability sampling is acceptable. Furthermore, there was no readily available sampling frame containing information on individuals who had stayed in Airbnb accommodations within the preceding twelve months and who were 18 years or older.

Cohen (1988) suggested using power analysis to calculate the minimum sample size. This would require consideration of three particular factors: significance level, effect size and desired power. The desired power was required to be higher than 0.80, the statistical level of significance (α) to be less than 0.05 and the effect size to be fixed at 0.15 or above. This study used G*Power software to calculate the minimum sample size required on the basis of power analysis (Faul et al., 2007), suggesting that 140 respondents would be sufficient. Thus, a sample of 261 respondents was considered acceptable.

4.3. Measurement

The study variables were measured on a five-point Likert scale, ranging from (1) strongly disagree to (5) strongly agree. As shown in the Appendix, the three item-scale used to measure repurchase intention was adapted from Mao and Lyu (2017), whereas the five-item scale used to measure media richness was borrowed from Chen and Chang (2018). On the other hand, the host–guest relationship and guest satisfaction scales were borrowed from Wang and Jeong (2018). Additionally, the sharing economy ethos scale was borrowed from Guttentag et al. (2017). All these three scales consisted of three items. The operational definitions of the study constructs are displayed in Table 1.

Table 1: Definitions of the Constructs

No.	Construct	Definition
1.	Repurchase intention (RPI)	Airbnb consumers' self-reported likelihood of repeat purchasing accommodation on www.Airbnb.com (Liang et al., 2017).
2.	Guest satisfaction (GS)	Guests' post-purchase evaluation of Airbnb accommodation service offering (Liang et al., 2018).
3.	Sharing economy ethos (SEE)	Guests' perception towards Airbnb philosophy, intention to behave environmentally friendly and to respect the right of the local community to their earnings (Guttentag et al., 2017).
4.	Host–guest relationship (HGR)	Smooth exchange of information between tourists and the host during a home-sharing stay (Shi et al., 2019).
5.	Media richness (MR)	The ease and speed with which potential guests can communicate with the hosts (Chen and Chang, 2018).

4.4. Common Method Variance (CMV)

Common method variance refers to the systematic error that can occur owing to issues embedded in the scale that was used to measure a specific construct (Podsakoff et al., 2003). For example, if items that measure specific constructs are not clear, or very technical, or sensitive, systematic error can increase significantly. To minimise the effect of this issue, the questionnaire was content-validated through five lecturers from a prominent business school and face-validated through 15 MBA and PhD students at the same school (Cavana et al., 2001). In addition, Harman single-factor test was used to examine the presence of this issue (Podsakoff et al., 2003). To perform this test, principal component analysis without rotation was employed. The analysis showed that the first factor explained less than 50 percent of the total variance; it can thus be concluded that CMV is not an issue in this study. Furthermore, Kock (2015) suggested that the full collinearity can be tested to examine the presence of CMV. The results revealed that variance inflation factor (VIF) values for all variables were less than 3.3, confirming that CMV was not an issue in this study (Hair et al., 2017).

4.5. Respondents' Profile

The respondents' demographic profile is shown in Table 2. Most of the respondents were female (61.30%), most of whom were between 21 and 30 years old (61.69%). Furthermore, the analysis revealed that 57.47% of the respondents were Malaya, followed by Chinese (21.46%) and Indian (19.54%). In terms of educational background, most held a diploma (42.53%) and a bachelor's degree (41.38%). Participants' incomes ranged between RM2001 and RM 3000 (36.4%).

Table 2: Demographic Profile of the Respondents

Demographic characteristics	Category	Frequency	Percentage (%)
Age	17–20 years	3	1.15%
	21–30 years	161	61.69%
	31–40 years	77	29.50%
	41–50 years	4	1.53%
	51 and above	16	6.13%
Gender	Female	160	61.30%
	Male	101	38.70%
Ethnicity	Malay	150	57.47%
	Chinese	56	21.46%
	Indian	51	19.54%
	Others	4	1.53%
Educational Background	Primary school certificate	1	0.38%
	Secondary school certificate	24	9.20%
	Diploma/Technical school certificate	111	42.53%
	Bachelor's degree or equivalent	108	41.38%
	Master's degree	15	5.75%
	Doctoral degree	1	0.38%

	Others	1	0.38%
Monthly Income	Below RM 2000	37	14.18%
	RM 2001–3000	95	36.40%
	RM 3001–4000	88	33.72%
	RM 4001–5000	17	6.51%
	Above RM 5000	24	9.20%
Profession	Managerial	37	14.18%
	Administration	84	32.18%
	Operational	55	21.07%
	Entrepreneur	45	17.24%
	Academician	9	3.45%
	Student	11	4.21%
	Others	20	7.66%

5. Data Analysis

To analyse the hypothetical model of this study, the Partial Least Squares (PLS) technique using the SmartPLS 3.2.8 software (Ringle et al., 2015) was utilised. This was because SmartPLS can handle complicated models that have direct and indirect relationships (Hair et al., 2017). It can also predict the dependent construct and maximise its variance (Chin, 1998). Furthermore, it is suited to situations where little is known about structural model relationships (Henseler et al., 2009). Following Anderson and Gerbing's (1988) suggestion, the study tested the measurement model to confirm its reliability and validity and then tested the structural model to examine the significance of path coefficients.

5.1. Assessing Overall Model Fit

The overall model goodness of fit should be the starting point to assess the model (Muller et al., 2018). The model fit indicates the extent to which there is a discrepancy between the correlation matrix of the empirical model and the theoretical model (Henseler et al., 2016). In the context of PLS, the standardised root mean-square residual (SRMR) (Hu & Bentler, 1998) can be used to examine the model fit. A value of 0.080 and less for SRMR indicates an acceptable fit (Hu & Bentler, 1999). PLS algorithm was performed to generate an SRMR value for the saturated model. The result revealed that the SRMR value was less than 0.08, satisfying the requirements for goodness of fit (Hu & Bentler, 1999).

5.2. Measurement Model

The measurement model represents the relationship between the latent construct and its relevant indicators (Jamil et al., 2019). The measurement model must be valid and reliable before testing the structural model (Quoquab et al., 2020b). The assessment of a measurement model is based on indicator reliability (IR), composite reliability (CR), Cronbach alpha (CA), Dijkstra-Henseler's reliability (pA), convergent validity (CV) and discriminant validity (DV) (Cepeda-Carrion et al., 2019; Quoquab et al., 2020c). To establish indicator reliability, the standardised outer loading must be greater than 0.701 (Hair et al., 2017). To confirm the internal consistency reliability, the values of CR, CA and pA must be greater than 0.70 (Muller et al., 2018; Nunnally & Bernstein, 1994). To ascertain convergent validity, average variance extracted (AVE) must exceed the threshold value of 0.50 (Bagozzi & Yi, 1988). Finally, to establish discriminant validity, the square root of AVE must be greater than the correlation with all other factors in the model (Fornell & Lacker, 1981), and the heterotrait-monotrait ratio of common factor correlations (HTMT) should be less than 0.85 (Henseler et al., 2015).

As presented in Table 3, the factor loadings were all higher than 0.70; the values of CR, CA and pA were all greater than 0.7; and the AVEs for all latent variables were higher than 0.50. It can thus be concluded that the measurement model was reliable and valid. As illustrated in Tables 4 and 5, the values of the square root of AVE for all constructs were higher than the corresponding rows and columns, and the values of HTMT for all constructs were less than HTMT_{0.85}, confirming the discriminant validity.

Table 3: Reliability and Convergent Validity

Latent variables	Indicators	Loadings>0.701	CA>0.70	pA>0.70	CR>0.70	AVE>0.50
GS	GS1	0.847	0.805	0.809	0.885	0.719
	GS2	0.827				
	GS3	0.870				
HGR	HGR1	0.861	0.796	0.798	0.881	0.711
	HGR2	0.848				
	HGR3	0.819				
MR	MR1	0.863	0.924	0.925	0.943	0.767
	MR2	0.900				
	MR3	0.902				
	MR4	0.893				
	MR5	0.818				
RPI	RPI1	0.834	0.754	0.809	0.849	0.653
	RPI2	0.751				
	RPI3	0.836				
SEE	SEE1	0.868	0.840	0.841	0.904	0.758
	SEE2	0.894				
	SEE3	0.849				

Table 4: Fornell–Larcker Criterion

	RPI	GS	HGR	MR	SEE
RPI	0.804				
GS	0.450	0.848			
HGR	0.357	0.532	0.843		
MR	0.519	0.451	0.476	0.876	
SEE	0.373	0.400	0.438	0.354	0.871

Note. Diagonal values signify the square root of AVE, while off-diagonal values represent the correlation.

Table 5: HTMT Method

	RPI	GS	HGR	MR	SEE
RPI					
GS	0.547				
HGR	0.416	0.663			
MR	0.545	0.522	0.553		
SEE	0.395	0.482	0.534	0.400	

5.3. Structural Model

As suggested by Hair et al. (2017), collinearity should be the first step in the assessment of the structural model. The variance inflation factor (VIF) as a measure of collinearity should be less than 5 for all exogenous constructs (Hair et al., 2017). In this study, VIF values ranged from 1.29 to 1.54 (Table 6) for all exogenous constructs, indicating the absence of collinearity. Next, the coefficient of determination (R^2), which provides insight into a model's in-sample predictive power should be examined (Becker et al., 2013; Quoquab et al., 2021). R^2 values of 0.26, 0.13 and 0.02 are considered great, moderate and weak, respectively (Cohen, 1988). In this study, the R^2 values for GS (0.334) and RPI (0.347) indicate a substantial model (Figure 2, Table 6). In addition, the size, sign and significance of the path coefficient should be examined using the bootstrapping procedure with 5000 resample, as suggested by Hair et al. (2017). It was found that GS ($\beta=0.261$, $t=3.233$, $p<0.01$), HGR ($\beta=0.072$, $t=1.861$, $p<0.05$) and MR ($\beta=0.379$, $t=5.523$, $p<0.01$) had a positive effect on RPI. This provides support for H1, H2 and H4. Furthermore, the result of the analysis illustrated that HGR ($\beta=0.411$, $t=5.969$, $p<0.01$) and MR ($\beta=0.225$, $t=3.669$, $p<0.01$) had a positive relationship with GS, confirming H3 and H5 (Table 6).

Next, the practical relevance of significant effect should be investigated by considering the effect sizes of the relationships between the constructs (Benitez et al., 2020). The effect size is a measure of the magnitude of an effect that is independent of sample size. The f^2 values of 0.35, 0.15 and 0.02 indicate large, medium and weak effect sizes, respectively (Cohen, 1988). In this study, the F^2 values for the hypothesised relationships range from 0.041 to 0.196

(weak to medium) (Table 6). Finally, Q2 was evaluated by running the blindfolding procedure in SmartPLS. If the Q2 value is higher than 0, the model has predictive relevance for endogenous variables that are measured reflectively (Fornell & Cha, 1994). Hair et al. (2017) argued, furthermore, that the Q2 values of 0.02, 0.15 and 0.35 imply that an exogenous variable has a small, medium or large predictive relevance. In this study, RPI and GS have medium predictive relevance with Q2 values of 0.175 for RPI and 0.222 for GS (Table 6).

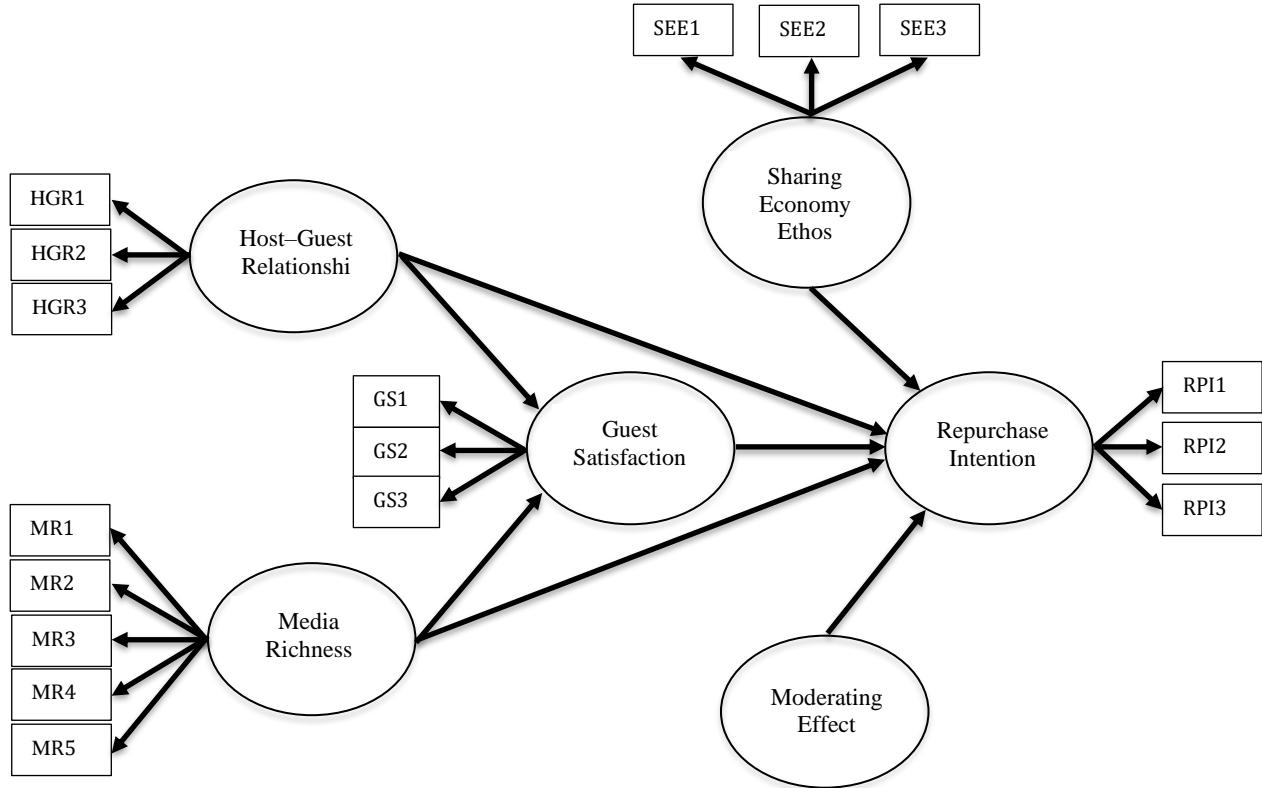


Figure 2: Structural Model

Table 6: Hypotheses Testing (Direct)

Hypotheses	Relationship	Paths coefficients	Standard error	t-values	R2	Q2	F2	VIF
H1	GS → RPI	0.261	0.081	3.233	0.347	0.175	0.067	1.50
H2	HGR → RPI	0.134	0.072	1.861			0.041	1.54
H4	MR → RPI	0.379	0.069	5.523			0.153	1.39
H3	HGR → GS	0.411	0.069	5.969	0.334	0.222	0.196	1.29
H5	MR → GS	0.255	0.069	3.669			0.075	1.29

In order to test the mediating effect, this study followed the procedures suggested by Preacher and Hayes (2008), which required bootstrapping the indirect effect with a 5000 resample. The results revealed that the indirect effect ($\beta_1=0.107$) was statistically significant, with a t value of 2.603, $P<0.05$, 95% Boot CI: [LL=0.020, UL=0.136]. It can thus be concluded that the mediation effect of GS between HGR and RPI is significant, confirming H6. Furthermore, the indirect effect of GS ($\beta_2=0.067$) between HGR and RPI was statistically significant with a t value of 2.205, $p<0.05$, 95% Boot CI: [LL=0.038, UL=0.197], thus supporting H7 (Table 7).

To examine the moderating effect of SEE, this study used the two-stage approach, recommended by Henseler and Fassott (2010). Contrary to expectation, the moderating effect of SEE on the relationship between GS and RPI was not significant ($\beta=-0.051$, $t=1.275$, $p>0.05$), and thus H8 is rejected (Table 7).

Table 7: Hypotheses Testing (Indirect Relationships)

Hypotheses	Relationship	Std B	SE	t-values	95%CI	Decision
H6	MR -> GS -> RPI	0.067	0.030	2.205	0.020–0.136	Supported
H7	HGR -> GS -> RPI	0.107	0.041	2.603	0.038–0.197	Supported
H8	Moderating effect> RPI	0.051	0.04	1.275	-.185–0.160	Not Supported

6. Discussion

The results indicate that the host-guest relationship, media richness, and guest satisfaction all exert a positive and significant effect on repurchase intention. It can thus be concluded that these variables are essential for encouraging repurchase intention among the customers of Airbnb Malaysia. Specifically, the findings demonstrated a positive relationship between guest satisfaction and repurchase intention ($B=0.261$). This result is in agreement with past studies (see Cohen et al., 2014; Jang & Fenf, 2007), which suggests that happy and satisfied customers are more likely to have a good intention to repurchase the Airbnb service. In addition, the outcome of this study revealed a strong positive relationship between host-guest relationship and guest satisfaction ($B=0.411$) and repurchase intention (0.134), respectively. These findings indicate that guests who can interact with their host and develop a constructive and sustainable relationship with them are more likely to be satisfied with their Airbnb experience and have a good intention to repurchase this service. These results are in line with past studies (see Shi et al., 2019; Dolnicar & Otter, 2003) that found positive association among these variables. The findings of this study stress the importance of both guest satisfaction and host-guest relationship in enhancing Malaysian customers' intention to repurchase the Airbnb service.

As hypothesised, media richness is strongly associated with guest satisfaction ($B= 0.225$), indicating that customer satisfaction can be enhanced if an Airbnb seller provides sufficient, precise and on-time information about the accommodation booking. This result is in agreement with past studies that found that the richness and availability of information can boost customer trust and improve his or her satisfaction (Lu et al., 2014). Furthermore, the results of this study confirmed the strong positive relationship between media richness and repurchase intention ($B=0.379$), demonstrating the crucial role of information clarity, availability, accuracy and timeliness in motivating customers to repurchase the Airbnb services. This result is consistent with the findings of Mao and Lyu (2017) and Liang et al. (2017).

Interestingly, the mediating effect of guest satisfaction was supported through the host-guest relationship and repurchase intention link as well as through the media richness and repurchase intention link. These results are in line with the S-O-R model. Particularly, guest satisfaction can be enhanced when good service quality is received from Airbnb sellers in terms of authentic, transparent, adequate and faster information about the accommodation. They will eventually develop a positive intention to repurchase the Airbnb services. Furthermore, media richness is a vital stimulus that enhances guest satisfaction (psychological states) and ultimately improves their intention to repurchase (outcome).

Contrary to expectation, the moderating role of the sharing economy ethos between guest satisfaction and repurchase intention was not supported. This finding suggests that, for Malaysian Airbnb consumers, satisfaction plays a more critical role than the sharing economy ethos. In other words, travellers tend to repurchase Airbnb accommodation without being motivated by the Airbnb philosophy or by considerations of the benefit of the local community but, instead, are driven by their own pleasant experience associated with their past stay. Another plausible explanation for this insignificant relationship is that, in this study, there is a strong and significant relationship between guest satisfaction and guest intention ($\beta=0.621$). Baron and Kenny (1986) argued that the moderator variable works better in a weak relationship between the predictor and the criterion. Therefore, including the sharing economy ethos as a moderator does not significantly affect the relationship between guest attitude and his/her behaviour. The third possible explanation for the insignificant moderating effect is that the sharing economy ethos is a strong moderator of attitudinal outcomes rather than behavioural outcomes. In addition, it is likely that the sharing economy ethos is a strong moderator in a different research context.

7. Theoretical Contributions and Managerial Implications

7.1. Theoretical Contributions

This study contributes meaningfully to the Airbnb literature by applying the host-guest relationship, media richness and guest satisfaction to drive guest repurchase intention, which is comparatively new in the literature. The outcome of this study confirms the importance of these antecedents as a critical driver of consumer repurchase intention in the Airbnb industry. This result contributes to the hospitality literature by examining the psychological

aspects (guest satisfaction) and contextual aspects (host-guest relationship and media richness) associated with Airbnb. In addition, this pioneer study considers the mediating effect of guest satisfaction in the link between media richness, host-guest relationship and repurchase intention. The results of this study clarified the vital role of guest satisfaction in transforming information received from media riches and guest-host relationships into consumers' intention to purchase/repurchase of Airbnb services. Furthermore, it stresses the crucial role of attitudinal variables as a mediating variable that can connect the stimulus (causes) with the outcome (consumer action and reaction); future studies can consider other attitudinal variables as mediators. To add on, this is a new study that considers the sharing economy ethos as a moderator of the link between guest satisfaction and their Airbnb accommodation repurchase intention. Although the sharing economy ethos as moderator was not supported by the data used in this study owing to the strong relationship between guest satisfaction and his/her intention to repurchase the Airbnb in the Malaysian context, this work opens the door for future research to consider it as a moderator in a different research context. Besides, the study successfully integrated three theories i.e., the S-O-R model, social exchange theory and media richness theory, to explain all relationships. This integration can advance the understanding of consumer studies that aim to predict guest satisfaction and repurchase intention in the hospitality industry. The outcome of this study also highlights the usefulness of these theories in explaining and predicting guest behaviour in East Asian culture. Besides, this study confirmed the psychometric properties (e.g., validity and reliability) of all constructs used, and, thus, future studies pertaining to consumer research can adopt these measurements.

7.2. Practical Implications

The study is expected to assist the Airbnb host in Malaysia in understanding what matters to the guests to make them satisfied, loyal, and ready for continued visits in the future. Furthermore, the results would be able to guide the host of Airbnb in ascertaining the intention of guests to revisit and, most importantly, to recommend Airbnb to others. The continuous support of guests is essential to ensure the sustainability of the Airbnb business. Thus, Airbnb and its hosts should tailor their services to meeting tourists' needs and focus on the factors that directly or indirectly affect tourists' repurchase intention. Towards this end, the following practical implications are noted.

Data from this study suggests that both media richness and host-guest relationships play an essential role in forming guest satisfaction and tourists' repurchase intention. The Airbnb hosts should try to maintain a good relationship with their guests and allow them to exchange information during a home-sharing stay to ensure customer satisfaction with their accommodation services and encourage them to repurchase the service in the future. Maintaining a good host-guest relationship can serve as a sustainable competitive advantage for this industry. Practically speaking, Airbnb hosts can establish a strong relationship with their guests by offering them personalised services, such as providing information about local transportation, food and beverages, local events, and tourist places. Airbnb hosts can also accompany the guests while visiting to make them feel at home. Building a good relationship with guests is vital to increase customers' satisfaction and produce loyal customers.

Media richness also has a significant direct and indirect effect on guest satisfaction and repurchase intention. This requires that the hosts provide adequate information on their websites to make the guests feel happy. Since Airbnb does not follow the conventional business model of the hotel industry, it is crucial for the hosts to make customers feel psychologically comfortable by providing ample information about their accommodation on offer as well as the benefits and facilities that guests can obtain on their trip. When information is imperfect and insufficiently available to produce a potential purchasing decision, guests tend to observe previous customers' purchasing behaviour and emulate others' actions (Ye et al., 2013). Therefore, Airbnb and its hosts are advised to find third-party channels such as eTravel, Amazon, and eBay to reveal past sales records for residences listed on their websites. In addition, Airbnb website developers should enhance guests' perceptions of the usefulness and reliability of websites by providing accurate, reliable and updated information to enhance customers' positive attitudes towards the Airbnb website.

Another important implication is that not all tourists hold a high SEE. Furthermore, tourists exhibit repurchase intention towards Airbnb accommodations only if they are satisfied with their experience and are not driven by SEE. Thus, Airbnb hosts should strive to create guest satisfaction in order to ensure repeat purchase behaviour. Airbnb hosts should also seek to obtain and maintain excellent user feedback to enhance potential consumers' trust and attract more consumers to their accommodations via Airbnb.

8. Limitations and Future Research Directions

Although the study sheds light on the drivers of repurchase intention of Airbnb consumers, it is not without limitations, which, nevertheless, can serve as future research directions for other researchers in the field. **First**, the study utilised a cross-sectional survey; future studies can consider longitudinal design to understand consumers' behavioural patterns better. **Second**, the study did not differentiate between business travellers and leisure travellers, which future studies can focus on. **Third**, the study utilised a quantitative methodology, whereas future studies can consider a mixed methodology to gain a deeper and broader understanding of the phenomenon. **Finally**, the factors

considered in the study as the drivers of repurchase intention are by no means the only variables to predict guests' Airbnb repurchase intention. Other psychological, social and environmental factors can be considered in the model to understand the issue from a different perspective.

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Appendix. Questionnaire

Constructs	Items
Re-purchase Intention (RBI)	1. I am willing to purchase accommodation from Airbnb again.
	2. I plan to purchase accommodation from Airbnb again when traveling.
	3. I would love to book accommodation from Airbnb again in the near future.
Guest Satisfaction (GS)	1. Overall, I am satisfied with Airbnb.
	2. Using Airbnb always fulfills my expectations.
	3. Airbnb is the best option for accommodation.
Host-guest relationship (HGR)	1. The host is nice and friendly.
	2. The host is helpful.
	3. Overall, I have a good relationship with the host.
Sharing Economy Ethos (SEE)	1. I wanted the money I spent to go to locals.
	2. Staying with Airbnb is environmentally friendly.
	3. I prefer the philosophy of Airbnb.
Media Richness (MR)	1. I expect I could get a quick response from this landlord.
	2. Airbnb provides various means of communicating with the landlord.
	3. I think I can establish a good relationship with the landlord through Airbnb.
	4. I think direct messaging enhances the efficiency of communicating with the landlord.
	5. If I have further requirements, Airbnb can help me negotiate with the landlord

TOURIST SATISFACTION

A Cognitive-Affective Model

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Abstract: This study aims to contribute to the advancement of knowledge in the consumer psychology of tourism by carrying out an exploration of the cognitive and affective psychological processes which an individual goes through during the pre-experience and post-experience stages. Thus, a model explaining the interrelationships between psychological variables of the tourist is developed. The research was conducted with 807 individuals visiting a destination in Spain. The results show that preconceived image of the destination influences expectations and tourist loyalty. Additionally, there is support for the impact of expectations and emotions on satisfaction, which has a significant influence on behavioral intentions. Finally, several academic and managerial implications are outlined. **Keywords:** satisfaction, image, cognitions, emotions, loyalty. © 2008 Published by Elsevier Ltd.

INTRODUCTION

Knowledge of consumer psychology is extremely important in determining the success of destinations. Recently, the need to examine the psychological process which an individual goes through during the pre-experience and post-experience stages is acknowledged in the psychology and tourism framework (Swarbrooke and Horner 2001). In this sense, an in-depth exploration of psychological concepts such as attitudes, decision making processes, emotions, experience and satisfaction or loyalty is necessary for understanding the consumer psychology of tourism, hospitality and leisure (Crouch, Perdue, Timmermans and Uysal 2004). Many of these variables integrate the so-called satisfaction process, which is one of the most interesting themes in psychology and consumer behavior.

Since satisfaction was introduced as a field of study, a considerable number of studies have focused on this concept. This is because it is conceived as the key to business success in today's competitive landscape (Morgan, Attaway and Griffin 1996). Past research has analyzed both the nature of this judgment (Giese and Cote 2000) and its antecedents and consequences (Mano and Oliver 1993; Oliver 1980;

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Spreng and Chiou 2002). Recently, the cognitive-affective nature has been acknowledged in literature (Jun, Hyun, Gentry and Song 2001; Van Dolen, De Ruyter and Lemmink 2004). In addition, it has recently been proposed that not only the cognitions –such as expectations and disconfirmation–, but also emotions can play an important role in satisfaction formation (Oliver 1993; Wirtz, Mattila and Tan 2000; Yu and Dean 2001).

In tourism satisfaction has also been examined in travel agencies, accommodation, destinations and tours (Baker and Crompton 2000; Bigné, Sánchez and Sánchez 2001; Joppe, Martin and Waalen 2001; Kozak 2001; Lee, Lee and Lee 2005; Rodríguez del Bosque, San Martín and Collado 2006; Yoon and Uysal 2005). However, more effort is needed to investigate the tourist satisfaction process. More concretely, an analysis of the variables and their interrelationships in this process is required for a better understanding of the consumer psychology of tourism. Similarly, destination image has been extensively analyzed because it is considered a key variable in individual behavior. Image is conceived as a representation of the tourist destination in the individual's mind. The nature and formation of this concept, as well as its influence on the choice process has been explored (Baloglu and McCleary 1999; Echtner and Ritchie 1993; Gallarza, Gil and Calderón 2002; Woodside and Lysonski 1989). Unfortunately, little theoretical and empirical research has been done on its influence during the different stages of the satisfaction process.

The study of tourist satisfaction is a critical issue not only for academics and managers, but also for individuals themselves (and their societies). According to previous studies, life satisfaction is related to the individual's satisfaction with health, work, family, or leisure (Fernández-Ballesteros, Zamarrón and Ruiz 2001). Satisfaction with tourist experiences contributes significantly to life satisfaction (Neal, Sirgy and Uysal 1999), which is one of the central concepts of individual well-being (Oishi 2006). Two main approaches to defining well-being are used: the hedonic and eudaimonic views (Ryan and Deci 2001). The hedonic well-being is the momentary pleasure achieved through the satisfaction of subjective needs, i.e. short-term satisfaction. The eudaimonic well-being refers to self-realization through the satisfaction of deeply held needs or values, i.e. long-term satisfaction. Tourist experiences may contribute to both states, hedonic (for example, by satisfying the need to relax after a holiday stay) and eudaimonic (by satisfying the basic needs of competence and relatedness through experiences over time). Finally, well-being is one of the most important ways to assess the quality of life of societies (Diener, Oishi and Lucas 2003).

In this context, based on the theoretical foundations on psychology and behavior, this research aims to contribute to the advancement of knowledge in the consumer psychology of tourism by developing a theoretical model that explains the interrelationships between attitudes, prior beliefs, post-experience assessments and behavioral intentions of the tourist. In this sense, the intention of this study is to explore in depth the cognitive and affective psychological processes which an

individual goes through during the pre-experience and post-experience stages, as well as the influence of the preconceived image of a destination on different variables of the tourist satisfaction process.

CONCEPTUAL FRAME AND TOURIST SATISFACTION MODEL

Several competing paradigms in social sciences are used to explain consumer behavior in tourism. The cognitive and emotional views are two of the most important approaches to explaining decision making and behavior processes (Decrop 1999). Traditionally, the individual is considered a rational being, i.e. a cognitive information processor (Heider 1958). Here, the key elements are the mental representations of objects such as knowledge or beliefs, i.e. cognitions. Individuals would process external information of the tourist experience in order to form their own beliefs and judgments. The emotional approach on the contrary is based on the assumption that feelings are an important component of the experience since destinations are considered to include, for example, sensory pleasures, daydreams and enjoyment (Decrop 1999).

Satisfaction is also studied in line with the above paradigms. In particular, there are significant differences in the conceptualization of this variable (Giese and Cote 2000). Most previous studies have used a cognitive approach, defining consumer satisfaction as a post consumption evaluation that a chosen alternative at least meets or exceeds expectations (Engel, Blackwell and Miniard 1993). However, other studies consider it an emotional response derived from a consumption experience (Spreng, MacKenzie and Olshavsky 1996). Recently, the cognitive-affective nature is recognized in literature (Bowen and Clarke 2002; Jun et al 2001; Van Dolen et al 2004; Wirtz and Bateson 1999). According to this most recent view, satisfaction is defined in this research as an individual's cognitive-affective state derived from a tourist experience.

In addition, research explores both antecedents and consequences of this concept. According to a cognitive approach, satisfaction is the consumer's response to the congruence between performance and comparison standard (Oliver 1980). In this view, the expectancy disconfirmation model is the most applied (Wirtz et al 2000). In this model, two cognitive judgments play an important role in satisfaction formation, predictive expectations and disconfirmation. Disconfirmation is the major determinant of this concept, whereas expectations are the comparison standard in the consumer's evaluation (Oliver 1997). A cognitive-affective view has been recently proposed, where satisfaction is influenced by the individual's cognitive judgments and emotions derived from the consumption experience (Bigné, Andreu and Gnoth 2005; Jun et al 2001; Mano and Oliver 1993; Oliver 1994; Phillips and Baumgartner 2002). Finally, loyalty or commitment with respect to a brand is conceived as the main consequence of satisfaction (Brady and Robertson 2001; Selnes 1993; Yu and Dean 2001).

Based on the most recent studies of psychology and behavior, a cognitive-affective model is developed in this research to examine the interrelationships among the psychological variables that take place in the tourist satisfaction process. This model has been inspired by the combined cognitive and affective model developed by Oliver (1993). According to the model by Oliver, satisfaction is influenced by cognitive evaluations such as expectations and disconfirmation. In addition, positive and negative emotions would independently contribute to satisfaction. Similarly, Oliver (1989) establishes that emotions deriving from evaluations will determine the individual's overall response in the consumption process. This cognitive-affective approach is of great value for application in this study since emotional responses are essential components of the destination experiences (Bigné et al 2005; Ryan 1995). The importance of emotions in the consumer behavior models has increased significantly during the last few years (Loken 2006). In particular, it should be emphasized that the cognitive system and emotional states play an important role in satisfaction formation. The higher mental processes of understanding and evaluation would be performed by the cognitive system, whereas emotions would be related to the individual's feelings towards the service (Van Dolen et al 2004).

Conceptualizing the Consumer Satisfaction Process

This process is formed by the state of satisfaction, the antecedents that contribute to its formation and the outcomes/consequences of this psychological state. Thus, this hypotheses section is divided into three parts. First a review of the cognitive and affective drivers of tourist satisfaction is made. In particular the relationships between cognitions and emotions are explored. Second loyalty towards the destination is examined as the main consequence of satisfaction. Third the influence of preconceived image of the place during the different stages of the mentioned process is also analyzed (pre, during and post-destination experience).

First a review of the variables that play a significant role in satisfaction formation is carried out. Expectations are defined as the individual's beliefs about how a product is likely to perform in the future (Oliver 1987). The role of these beliefs is not only analyzed as a comparison standard in consumer evaluations, suggested in the disconfirmation paradigm, but also as a direct antecedent of satisfaction (Szymanski and Henard 2001). The direct effect of expectations on this variable can be explained by the Assimilation Theory (Sherif and Hovland 1961). Individuals suffer a psychological conflict when they perceive discrepancies between performance and prior beliefs. Subsequently, consumers tend to adjust perception to their expectations in order to minimize or remove that tension (Oliver 1997). Thus, the assimilation effect can be described as a tendency to process new consumption experiences in terms of existing beliefs. Under these circumstances, satisfaction will be led by expectations (Churchill and

Surprenant 1982; Oliver and Burke 1999; Pieters, Koelemeijer and Roest 1995). In tourism, Rodríguez del Bosque, San Martín and Collado (2006) prove that expectations are a driver of satisfaction in a context of travel agencies. In the present research, it is assumed that tourists will reduce the psychological conflict and will validate their decisions to visit the place by adjusting the perception to their beliefs when discrepancies between both concepts are recognized. Then, the first hypothesis would be:

H₁: The higher the tourist expectations, the higher the satisfaction with the destination

Disconfirmation of expectations has received a lot of attention as an antecedent of satisfaction. It is the individual's post-experience cognition that the product performed better or worse than expected (Oliver 1980). Actually, two situations are likely when the consumer compares product performance with beliefs. If performance is above expectations, positive disconfirmation is expected to occur. In the contrary case, negative disconfirmation occurs (Oliver 1997). The effect of disconfirmation on satisfaction is supported by the Contrast Theory (Hovland, Harvey and Sherif 1957). After an experience in which the perceived performance and the beliefs are different, consumers will exaggerate their evaluations due to the surprise or contrast that is originated. When performance is above expectation, i.e. positive disconfirmation, individuals will evaluate more positively the experience of what they would do under objective circumstances, and vice versa. Thus, satisfaction will be led by disconfirmation (Morgan, Attaway and Griffin 1996; Oliver 1993; Yi 1990). The impact of disconfirmation of expectations on this variable is also acknowledged in tourism research (Bigné and Andreu 2004b; Bigné et al 2005; Chon and Olsen 1991), although more empirical research about this relationship is needed. Therefore, the second hypothesis would be:

H₂: The higher the positive disconfirmation of tourist expectations, the higher the level of satisfaction with the destination

The relationship between expectations and disconfirmation is explored in the model. In past research, it is acknowledged that expectations have an indirect effect on satisfaction through disconfirmation. Under these circumstances, prior beliefs are only conceived as a comparison standard in the disconfirmation judgment (Szymanski and Henard 2001). The higher the individual's expectations, the less positive the disconfirmation during the consumption process (Churchill and Surprenant 1982; Spreng, MacKenzie and Olshavsky 1996; Yi 1993). According to the above reasoning, a negative relationship between expectations and disconfirmation can be anticipated in this research. Consequently, the following hypothesis is proposed:

- H₃: *The higher the tourist expectations, the less positive the disconfirmation of expectations*

Emotions are necessary to understand consumer psychology (Dubé and Menon 2000; Yu and Dean 2001). Emotions, expressed in terms of feeling towards the service (Decrop 1999), may be important in tourism because the experimental component (Dubé-Rioux 1990) and ambiguity (Jayanti 1996) of the experience are extraordinary. Thus, emotions have recently received a lot of attention in research (Bigné and Andreu 2004a; Bigné et al 2005; Lee et al 2005; Trauer and Ryan 2005). With regard to the formation of emotions, Theories of Appraisal establish that individuals' emotions are influenced by their evaluations and interpretations of an event. Emotions occur as a result of the cognitive appraisal of a person-environment situation (Lazarus 1991). In the context of consumption, emotions may be affected by the individual's beliefs and evaluations of a product (Oliver and Westbrook 1993). Among other cognitions, several studies establish that emotions are influenced by disconfirmation (Dubé and Menon 2000; Santos and Boote 2003; Wirtz and Bateson 1999). In tourism, individuals may experience positive and negative emotions during the same stay because they have multiple interactions with the resources of the place. Therefore, an examination of both the positive and negative emotions is required in order to gain a better understanding of tourists' feelings. Following the Theories of Appraisal, disconfirmation could significantly contribute to the formation of these positive and negative emotions. This leads to the next hypotheses:

- H₄: *The more positive the disconfirmation of tourist expectations, the more frequent the positive emotions*
 H₅: *The more positive the disconfirmation of tourist expectations, the less frequent the negative emotions*

On the other hand, emotions evoked during the consumption process are proposed to leave affective traces in memory. These traces are available for individuals to access and integrate into their satisfaction states (Cohen and Areni 1991). As a result, consumer emotions could mediate the impact of cognitive judgments on satisfaction (Oliver 1989). The direct relationship between emotions and satisfaction has been found in previous studies (Jun et al 2001; Morgan et al 1996; Phillips and Baumgartner 2002; Van Dolen et al 2004; Wirtz and Bateson 1999; Wirtz et al 2000). In research conducted with tourists during the 2002 World Cup, Lee et al (2005) support this relationship. Therefore, the following hypotheses are proposed:

- H₆: *The more frequent the positive emotions during the tourist experience, the higher the level of satisfaction*
 H₇: *The less frequent the negative emotions during the tourist experience, the higher the level of satisfaction*

Finally, an exploration of satisfaction is needed to predict and understand the individual's responses after the consumption experience. In this respect, the relationship between satisfaction and loyalty has been previously explored (Baker and Crompton 2000; Brady and Robertson 2001; Selnes 1993; Yu and Dean 2001). Two basic expressions of loyalty are identified: the willingness to repurchase and word-of-mouth communication (Andreassen and Lindestad 1998; Selnes 1993). The first one is defined as the likelihood that consumers will buy the offering again (Szymanski and Henard 2001), while the second is not only an indicator of the individual's intention to continue the relationship with the company, but also a reliable source of information for potential buyers (Maxham III 2001). The study of loyalty in tourism is a more recent phenomenon. Intention to revisit the destination in the future and willingness to recommend it to other people is positively affected by satisfaction (Bigné et al 2005; Bigné et al 2001; Kozak and Rimmington 2000; Lee et al 2005; Yoon and Uysal 2005). Thus, the eighth hypothesis is proposed:

H_8 : *The higher the level of tourist satisfaction, the stronger the loyalty to the destination*

The Role of Image in the Satisfaction Process

Image is defined as an individual's mental representation of knowledge, feelings, and global impressions about a destination (Baloglu and McCleary 1999). Three basic components of image are identified: cognitive, affective and holistic. Perceptions of the attributes of the tourist site are included in the first two components. Traditionally, destination image is based on the beliefs and knowledge of the properties of the place, i.e. the cognitive component (Baloglu 1999). Recently, it has been proposed that image is also formed based on the affective evaluations or feelings (Kim and Richardson 2003; Pike and Ryan 2004). Finally, in addition to these aspects, image should be made up of more holistic impressions of the destination (Echtner and Ritchie 1993).

The importance of this concept is acknowledged since it affects tourist behavior (Bigné et al 2001). It is established that the more positive the mental representation of a place, the higher the likelihood of choosing it (Telisman-Kosuta 1994). Unfortunately, little research has been done on the influence that preconceived image of a destination has on the tourist satisfaction process. The role of this variable in the formation of expectations, satisfaction and loyalty is explored in this research. First, image is defined as a real expectations communicator (Grönroos 1990). In this way, a positive relationship between image and consumer beliefs is found in several service industries (Clow, Kurtz, Ozment and Ong 1997). In tourism, a mental representation of the destination helps individuals to anticipate their experiences (Jenkins 1999). In other words, image moulds the expectations that

people have before the visit (Bigné et al 2001). Rodríguez del Bosque et al (2006) prove that image is an expectations-generating factor of a future encounter with the tourist service. This leads to the following hypothesis:

H₉: *The more positive the preconceived image of a destination, the higher the tourist expectations*

Second, the evaluation of services is complex, basically due to its intangibility. In these cases, satisfaction with the service encounter would be significantly affected by the prior image the user has of the company (Andreassen and Lindestad 1998; Kristensen, Martensen and Gronholdt 1999). This influence is higher in high-risk situations as perceived by the consumer (Gürhan-Canli and Batra 2004). Intangibility and risk are two features associated with tourist experience (Bowen and Clarke 2002). The difficulty for individuals to evaluate their experiences, as well as the confidence in their images of the place (Joppe et al 2001), could justify the view that image is a driver of satisfaction. This is supported by Bigné et al (2001). In addition to the effect of prior beliefs on tourist satisfaction (H1), it is interesting to analyze the influence of image on satisfaction. Significant differences between image and expectations would justify this position. In contrast to expectations, image is a long-run overall evaluation, a more stable psychological concept and tends to have more stability over time (Crompton and Lamb 1986). Thus, the next hypothesis is:

H₁₀: *The more positive the preconceived image of a destination, the higher the level of satisfaction after the experience*

Third, the relationship between image and consumer loyalty is explored. The positive relationship between both variables is acknowledged in the European Customer Satisfaction Index (ECSI Technical Committe 1998). However, empirical evidence is contradictory. Several studies recognize this relationship (Andreassen and Lindestad 1998; Kristensen, Martensen and Gronholdt 1999), while others do not support it (Bloemer, De Ruyter and Peeters 1998). In tourism research, a positive relationship between image and intentions to return in the future is supported (Bigné et al 2001; Court and Lupton 1997). In the present study, loyalty is judged not only on a satisfaction state (encounter-specific), but also on a preconceived image (primarily long-term). Individuals with a positive image of the destination might continue their interactions in the future (and their recommendations to other people) regardless of the level of satisfaction during a specific experience, and vice versa. Under these circumstances, image should be considered a powerful instrument for generating loyalty. The eleventh hypothesis is proposed in order to enhance the understanding of this relationship (the model shown in Figure 1 summarizes the hypotheses):

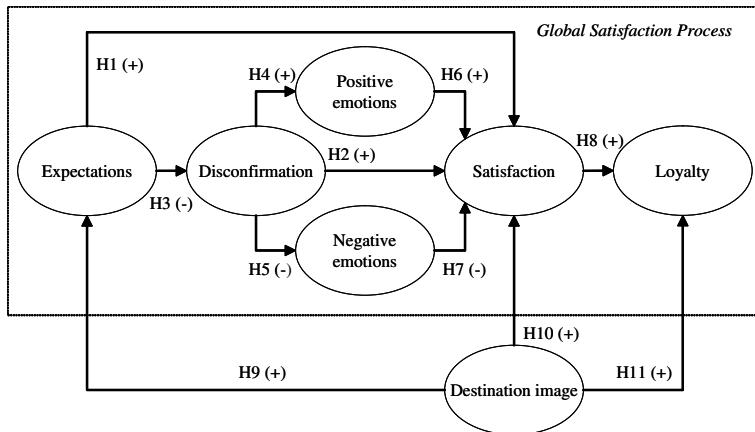


Figure 1. A Proposed Research Model

H₁₁: *The more positive the preconceived image of a destination, the higher the level of loyalty to the destination*

Study Methods

This study focuses on understanding the tourist satisfaction process through a new, more valuable approach. A special emphasis is placed on two critical aspects the cognitive and affective drivers of satisfaction and the role of image during the different stages of the process (i.e. pre, during and post-experience). A combination of qualitative and quantitative research was carried out to explore the interrelationships among variables in this process. In the qualitative phase, four in-depth interviews were carried out with experts from public institutions for promotion and destination management, travel agencies and hotels. In addition, two focus groups were set up, one with travel agents and another with tourists. The main objective of the qualitative research was to fully explore the salient attributes of the destination under investigation. This is important since the characteristics of a place can play a significant role in exploring psychological variables.

These qualitative methods were developed before the quantitative fieldwork. The in-depth interviews and focus groups were structured based on past research on social research methods (Newman 2004). In the qualitative sampling strategy, several experts from the main sectors of the tourism industry and tourists of different groups of gender, age and occupation were selected to reflect the variety within the phenomenon being examined. This phase consisted of semi-structured interviews since they are the most commonly used method in qualitative research (Bryman 2006). A scheme guide was employed to collect the opinions of participants. Finally, an inductive analysis and a subjective interpretation were conducted on the contents which were

collected through the use of these methods. In particular, the most salient attributes in terms of strengths (such as landscapes or atmosphere) and weaknesses (such as infrastructures or cultural activities) of the destination, as well as the emotions or feelings most associated with the place (such as impressed or enchanted) were identified during the focus groups. These emotions and image attributes were used in quantitative research. The demographic profile of tourists and the most adequate attractions for data collection were outlined in the interviews with experts.

Research Instrument

A survey instrument which included all the variables of interest was developed to investigate the hypotheses. Expectations should be measured for each salient attribute of the product, as well as for the overall experience (Oliver and Burke 1999). In this study, they were measured for the essential dimensions of the destination, i.e. natural scenery, quality of life, cultural heritage, tourism infrastructures, leisure activities (Murphy, Pritchard and Smith 2000) and for the overall experience. This variable was captured during the stay of individuals at the tourist site. It can be assumed that people are capable of recalling what they thought about the salient dimensions of the place. Nevertheless, following the recommendations from Oliver (1997), the expectation section of the survey appeared before the post-experience variables section in order to avoid experience and recalled expectations being confounded. Respondents were asked to indicate their levels of expectation on each item on a 7-point scale (1 = very low; 7 = very high).

The subjective disconfirmation approach was used to measure disconfirmation of expectations. An individual's subjective evaluation of the difference between perception and beliefs is captured in this method. In this respect, disconfirmation was measured with a 7-point scale in which tourists evaluate if their experiences during the stay were much worse/much better than what they had expected for each item. The items were the same as the ones used in the expectations measurement, a very usual practice in past research (Oliver and Burke 1999; Spreng and Chiou 2002; Spreng, MacKenzie and Olshavsky 1996).

Emotions were measured with unipolar scales because individuals may have positive and negative emotions during the same stay. Positive emotions (pleased, enchanted, impressed and surprised) and negative emotions (bored, displeased, disappointed and angry) with different intensity levels are proposed from previous studies (Jun et al 2001; Richins 1997). The frequency of emotions (and not the intensity) was measured. According to Oliver (1997), this method is advisable when various experiences have to be measured over a time period. Therefore, measuring the frequency of an emotional state is more interesting than capturing its intensity, which could vary between an experience and another. Thus, respondents were asked to indicate the frequency of their emotions on a 7-point scale (1 = never or almost never; 7 = always or almost always).

Satisfaction was measured through a multi-item scale. An adaptation of the universal scale of Oliver (1997) was used to measure this concept, an approach also adopted in other studies (Bigné and Andreu 2004a; Bigné et al 2005; Van Dolen et al 2004). In this study, the essential components of satisfaction, i.e. affective, cognitive and fulfillment, were captured through item 1 ("I have really enjoyed"), item 2 ("My choice was a wise one") and item 3 ("It is exactly what I needed") respectively. A fourth item measuring overall satisfaction was presented. Individuals were asked to indicate their levels of agreement on each item on a 7-point scale (1 = strongly disagree; 7 = strongly agree).

An attitudinal approach was used to measure loyalty or commitment to the destination. Individuals' attitude towards the tourist site is captured, measuring their intentions to return to the place in the future ("I will try to return..." and "I think I will revisit..."), as well as their intentions or willingness to recommend it to others ("I will encourage relatives and friends..." and "I would recommend..."). These intentions are two sub-dimensions of loyalty, similar to the criteria used in other studies (Bigné and Andreu 2004a; Bigné et al 2005; Yoon and Uysal 2005). The measure used the 7-point scale.

Finally, image was measured through a structured methodology. It allows capturing the common component of this concept through several attributes that are incorporated into a standardized instrument (Jenkins 1999). The image attributes' choice process is based on literature review and qualitative research. The same criterion as with the expectations section (also a pre-experience variable) was used in this section. The cognitive and affective evaluations were captured in the image measurement that the individual has of the destination before visiting it. With regard to the cognitive attributes, an 18-item scale with a different position in the functional-psychological continuum of destination image was extracted from previous studies (Echtner and Ritchie 1991; Gallarza et al 2002). Individuals were asked to indicate their levels of agreement on each item on a 7-point scale. In addition, a semantic-differential scale consisting of 4 items (Table 1) was used to capture the affective component (Baloglu and Brinberg 1997; Kim and Richardson 2003). These scales are usually used to rate the image attributes (Jenkins 1999). Once a questionnaire was developed, it was sent to experts on these topics. After their comments were integrated, a pretest was conducted with tourists ($n = 22$). Only some minor changes were made to improve the understanding of several original item-statements.

Quantitative research was carried out in the north of Spain in Cantabria. It has world-famous attractions (for example, the Altamira Caves). The opportunity to research the cognitive-affective nature of satisfaction at a tourist site is great since destinations are considered a source of pleasure, enjoyment and other emotional states. Emotions are basic components of the experience, although the attributes of the destination may condition the study of these emotional responses. On the other hand, the opportunity to conduct empirical research in Spain is great because it is one of the countries that lead tourism in the inter-

Table 1. Image Attributes

Destination Image	Items
Cognitive Image	Variety of fauna and flora Beautiful landscapes Beautiful natural parks Pleasant weather Attractive beaches Hospitable people Many opportunities for the adventurous Peaceful place Place to rest A lot of cultural attractions Interesting cultural activities Nice to learn about local customs Rich and varied gastronomy Easy accessibility Shopping facilities Quality accommodation Good value for money Safe place
Affective Image	Sleepy-arousing Distressing-relaxing Gloomy-exciting Unpleasant-pleasant

national context. It is capable of attracting large amounts of individuals from the United States and Europe.

The target population of this study was tourists who were over 15 years old. According to Kozak (2001), the length of stay at a destination may influence the perceptions of that place and may also help collect reliable data. Only individuals who had been on holiday for at least two days were included in the survey. The sample was selected by a combination of the convenience and quota methods, distinguishing between national and international tourists. The questionnaire was personally administered to each respondent during the stay (April 2004). Pre-experience variables, i.e. image and expectations, were retrospectively measured. Eight hundred and seven valid responses were collected, representing a sampling error in the case of an infinite population of 3.52% for a confidence level of 95.5% ($p = q = 0.5$). The sociodemographic profile of the respondents is displayed in Table 2.

Study Results

Before a detailed evaluation of the data, an exploratory factor analysis was conducted with the 22 image items in order to identify the underlying dimensions in the destination image. An oblique rotation was used (SPSS 11.5. version for Windows). Only those factors with eigenvalues greater than 1.0 were extracted. In addition, items with fac-

Table 2. Profile of Respondents

Variables	%
Gender	
Male	51.2
Female	48.8
Education level	
Without studies	4.2
Primary	14.8
Secondary	31.1
University	49.9
Household size	
One person	7.1
Two people	23.5
Three people	20.6
Four people	31.2
Five people and more	12.5
Don't know/no answer	5.1
Place of origin	
National	85.6
International	14.4
Age	
16–24 years	18.7
25–44 years	49.9
45–64 years	24.4
65 years and older	7.0
Occupation	
Employed	65.4
Student	15.5
Housewife	8.9
Unemployed	3.0
Retired	7.2
Monthly Income	
0–1,430 US\$	14.7
\$1,431–2,858	35.6
\$2,859 and more	21.6
Don't know/no answer	28.1

tor loadings of at least .40 were retained. Initial analysis suggested that five of 22 items (climate, beaches, hospitality, adventure and local food) should be dropped from further analysis. Five factors were identified in the ideal solution ($KMO = .84$; Variance explained = 60.90%; α Cronbach = .83). The “Infrastructure and socioeconomic environment” factor included easy accessibility, shopping facilities, accommodation quality, good value for money and safety ($\alpha = .67$). The second factor, named “Atmosphere”, consisted of three items: peaceful/tranquil, appropriate to rest and relaxing destination ($\alpha = .78$). The “Natural environment” factor was formed by the great variety of flora

and fauna, beautiful scenery and beautiful natural parks ($\alpha = .74$). The fourth factor, named “Affective image”, included three of the four affective attributes, i.e. arousing, pleasant and exciting destination ($\alpha = .63$). The “Cultural environment” factor consisted of the variety of cultural attractions, interesting cultural activities and appealing local customs ($\alpha = .71$). Subsequently, a confirmatory factor analysis (EQS 5.7b for Windows) suggested eliminating accessibility to obtain convergent and discriminant validity. Finally, each image factor was calculated as an average of its items in the measurement model.

Multi-attribute scales of the model were validated in two stages (Anderson and Gerbing 1988). First, each scale was individually validated using exploratory and confirmatory factor analyses. In expectation and disconfirmation scales, item 5 (leisure activities) was removed since it was deforming the proposed factor structure. In addition, positive emotions were operationalized as a second order factor model consisting of the subdimensions “low arousal emotions” (pleased and enchanted) and “high arousal emotions” (impressed and surprised). At the same time, loyalty consisted of the subdimensions “intention to return” and “willingness to recommend” the place. Finally, the overall measurement quality was assessed using a confirmatory factor analysis with all the variables of the model. Non-standardized coefficients and error variances calculated in the first stage were used. The model fits well to data: $\chi^2 (335) = 789.70$ ($p < .001$); BBNFI = .89; BBNNFI = .92; GFI = .91; AGFI = .90; RMSEA = .05. In addition, the convergent validity, reliability for each construct and discriminant validity of the factor structure were confirmed.

Once the scales were validated, hypotheses were tested using a structural equations model in EQS 5.7 for Windows. Results are displayed in Figure 2. First, the hypothesized model fits the data: $\chi^2 (348) = 860.06$ ($p < .001$); BBNFI = .88; BBNNFI = .91; GFI = .90; AGFI = .89; RMSEA = .05. In relation to the hypotheses, expectations have a positive and significant effect on tourist satisfaction ($t = 2.75$, $p < .01$), supporting H1.

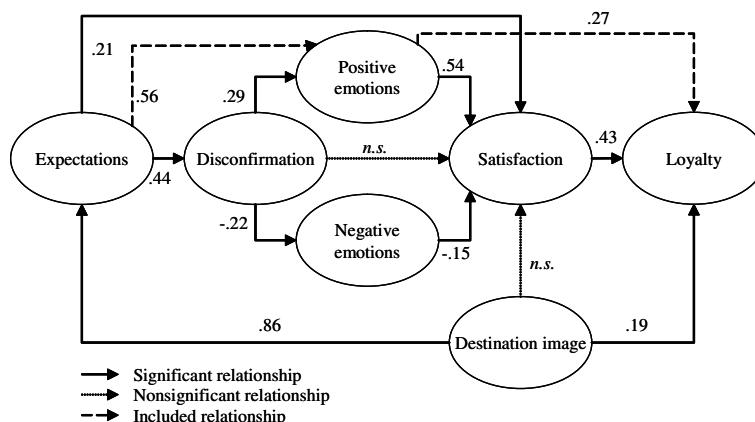


Figure 2. Estimates of Overall Model

Nevertheless, disconfirmation does not appear to significantly influence this variable, not supporting H2. Contrary to earlier studies, it is demonstrated that expectations are the dominant cognitive judgment in satisfaction formation. On the other hand, the relationship between expectations and disconfirmation is significant ($t = 10.46$, $p < .01$), but this is positive. This is due to the retrospective measurement of expectations (i.e. they were measured after the experience), a result also found by [Oliver and Burke \(1999\)](#). Thus, the experience may determine beliefs (not only disconfirmation), causing a positive correlation between both cognitive judgments. Therefore H3 is not supported, although an investigation of this relationship is needed in further research.

Besides, positive emotions ($t = 6.35$, $p < .01$) and negative emotions ($t = -5.59$, $p < .01$) are significantly influenced and in the hypothesized sense by disconfirmation, supporting H4 and H5. The effects of positive emotions (H6) and negative emotions (H7) on satisfaction are also supported ($t = 6.05$, $p < .01$, $t = -3.24$, $p < .01$, respectively). Therefore, the cognitive-affective nature of the tourist satisfaction process is proven. More concretely, emotions occur as a result of the cognitive appraisals of experience. In addition, emotions play an important role in satisfaction formation. In particular, emotional responses are fundamental components of the consumption process since individuals' enjoyment is based on their own experiences. Subsequently, satisfaction has a positive and significant effect on loyalty ($t = 5.45$, $p < .01$), supporting H8. In addition, expectations and loyalty are positively and significantly influenced by preconceived image of the place ($t = 19.87$, $p < .01$, $t = 3.75$, $p < .01$, respectively) supporting H9 and H11. Under these circumstances, not only the quality of experience but also the image are identified as key drivers of commitment to the destination. Finally, image does not appear to significantly affect satisfaction, not supporting H10. This is because expectations or specific beliefs of a future experience may mediate the impact of image on this state in individuals.

On the other hand, two new relationships are included in the model after the analysis. First, the LM Test suggested a positive and significant relationship between expectations and positive emotions ($t = 10.13$, $p < .01$). It is coherent with [Oliver and Westbrook \(1993\)](#), who establish that consumers' beliefs could influence certain affective states. A direct impact of expectations on affective responses has been proposed by [Santos and Boote \(2003\)](#). Second, the relationship between positive emotions and loyalty was found ($t = 3.56$, $p < .01$). In literature, a significant relationship between emotions and loyalty has been found ([Bigné and Andreu 2004b](#); [Nyer 1997](#); [Yu and Dean 2001](#)).

CONCLUSION

Consumer psychology is an attractive area of research in tourism social science literature. Based on research on psychology and behavior, interrelationships among psychological variables of the tourist satisfac-

tion process are to be found. This process consists of attitudes and prior beliefs, post-experience assessments and behavioral intentions. This study has also attempted to provide an examination of the role of image during this process. According to the more recent studies, a cognitive-affective approach is used in this research. This new and more complex view is useful in building a broad, theoretical perspective of consumer psychology in tourism. A combination of qualitative research and quantitative research was carried out to test the hypotheses. Overall, the results provide strong support for the hypotheses. Specifically, results indicate that: one, image has a significant role during this process; two, expectations (assimilation effect) explain satisfaction to a greater extent than disconfirmation (contrast effect); three, cognitions contribute to the formation of emotions; and four, satisfaction is influenced by emotions during the stay.

First, image influences expectations and loyalty. A favorable preconceived image of the place will have a positive effect on the individual's beliefs of a future experience. Under these circumstances, the destination will occupy a privileged position in the individual's choice process. Besides, a positive representation will reinforce the tourist's commitment to the destination. On the contrary, satisfaction is not influenced by image. Rather, expectations mediate its impact on this state. Second, expectations have a positive and significant influence on satisfaction, while disconfirmation does not. Therefore, assimilation (not contrast) is the dominant effect in satisfaction formation. Since evaluations are excessively complex due to the ambiguity of experience, individuals could rely more on their beliefs based on past experience and/or images than on disconfirmation to form their satisfaction states.

Third, emotions may be affected not only by post-experience cognitions (disconfirmation), but also by prior beliefs. In particular, the individuals' predisposition towards the experiences and feelings that the destination is capable of offering them could be more favorable when expectations are high. Thus, positive emotions would be more frequent during the stay. However, further research effort is needed to analyze the role of expectations in the formation of both positive and negative emotions. Four, positive and negative emotions play a significant role in satisfaction formation. The first ones are the main determinant of this concept. Emotions play an important role in tourism since individuals' enjoyment is based on their own experiences. In addition, the difficulty to evaluate the experience may cause individuals to have less confidence in their cognitive judgments, which would imply a very complex information processing.

These findings represent a significant advancement in the study of tourist satisfaction. Past research has focused largely on cognitive approaches with little significance attached to the emotional components. In this study, cognitions and emotions jointly participate in satisfaction formation since feelings are an important component of experience. On the other hand, most previous studies have shown that satisfaction is positively guided by disconfirmation. However, this research demonstrates that tourists tend to adjust their perception to their beliefs in order to minimize cognitive dissonance, thus justifying the assimilation

effect. With regard to the key concept of this effect, i.e. expectations, individuals may have difficulties in unambiguously forming them since tourism products are basically intangible (Pearce 2005). Thus, its applicability may be questioned. However, uncertainty is inherent to expectations regardless of the consumption context (Spreng and Page 2001). Consequently, the role of expectations in the satisfaction process may depend not so much on the level of difficulty to form them, but the degree of confidence. Tourists will be more willing to rely on their expectations when they are held with greater conviction. Finally, it has also been proved that image plays a significant role during the satisfaction process. Definitely, this new approach may be a first step to study the consumer psychology of tourism more exhaustively.

Knowledge of this process will help the planning and management. Destinations should be appropriately communicated and positioned in the target markets to transmit a positive image to people. Communication should emphasize not only the most distinctive characteristics, but also the most genuine emotions that the tourist site is able to evoke. This would improve its position in the choice processes and facilitate the individual's retention. On the other hand, since individuals tend to adjust perception to their prior beliefs, destination communication (for example, media advertising) should lead expectations slightly above the objective performance in order to achieve more positive evaluations of the experience. If expectations are appropriately communicated, tourists will be more satisfied, and consequently, more loyal after the experience. Finally, destinations should offer a mixture of emotions to enrich individuals' experience and achieve their true satisfaction and loyalty. It is possible through an appropriate combination of resources, activities and events capable to evoke, for example, feelings of pleasure or surprise among tourists.

Limitations and Further Research

The first limitation of this study is the measurement of pre-experience variables during the stay of tourists. Under these circumstances, the experience might condition image and expectations through the effect of backward assimilation (Oliver and Burke 1999). On the other hand, emotions may not be completely explained through cognitions. Emotional states may be influenced by other factors such as personality traits (Mooradian and Olver 1997) or types of experiences (Oliver 1993). Emotions may even be evoked without the need of the individual's cognitive judgments (Ratner 1989).

This study suggests additional directions for future research. First, assimilation effect could only be valid up to a certain level of expectations above which individuals will have difficulties to adjust their perception. The question would be: What is this level? This could be influenced by individual factors. Second, psychological processes integrating tourist satisfaction may be influenced by behavioral variables (for example, variety-seeking behavior) and demographic characteristics. Finally, emotional responses are measured through verbal methods. However, an

alternative view based on associations between emotions and facial and non-verbal expressions –such as smiles or sighs– is recently proposed (Russell, Bachorowski and Fernández-Dols 2003). It would be interesting to explore the links between these concepts in further observational research on satisfaction. A

Acknowledgement—The authors would like to acknowledge the assistance of Joanne L. Bills in editing this article.

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*Submitted 9 April 2006. Resubmitted 15 May 2007. Resubmitted 10 August 2007.
Resubmitted 18 December 2007. Final version 25 January 2008. Accepted 25 February 2008.
Refereed anonymously. Coordinating Editor: Philip L. Pearce*

Available online at www.sciencedirect.com



Do travelers' reviews depend on the destination? An analysis in coastal and urban peer-to-peer lodgings

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Funding information

Research Group SEJ-494, Andalusian Regional
 Government, Spain. Research Group SEJ-574,
 Andalusian Regional Government, Spain.

Abstract

Our research applies a service, feature-oriented approach to deeply explore the subjective experiences shared publicly by Airbnb guests in their reviews. Our processed data set contains 73,557 reviews of Airbnb stays in coastal and urban destinations between 2017 and 2020. A topic modeling based on the BERTopic approach is applied to detect dense clusters of reviews and identify one highly relevant and interpretable topic per cluster related to core and essential sharing services and surrounding features. Our study, therefore, allows a higher understanding of the relationships between urban versus coastal destinations and guests' preferences. Furthermore, it enables hosts to differentiate the touristic short-rentals lodgings according to customer experiences.

KEY WORDS

Airbnb, BERTopic, coastal destination, peer-to-peer lodgings, topic modeling, urban destination

1 | INTRODUCTION

Peer-to-peer accommodation platforms (from now on, P2P accommodations) encourage exchanging (e.g., renting) lodgings between "ordinary people" at competitive prices through community-based online services (Dolnicar, 2017; Zach et al., 2020). P2P accommodations provide "connections between people with significant dissimilarities (i.e., weak ties), e.g., in terms of beliefs and background" (Yoganathan et al., 2021, p. 526). P2P accommodations combine commercial value and functional, enjoyable or social experiences (Gansky, 2010; Ikkala & Lampinen, 2014). Moreover, publicly sharing such experiences through elaborated user-generated content (from now on, UGC in the form of a review) creates (or fosters) an authentic image related to the destination (and its accessibility, accommodations, attractions, amenities, or activities, among others) that influence travelers' intentions.

Our research explores Airbnb, a short-term housing rental company attracting enormous interest from scholars, government

administrations, and tourism managers (cf. Geissinger et al., 2020; Guttentag & Smith, 2017). In particular, Airbnb is (a) primarily considered as a low-cost renting option (Guttentag et al., 2018; Liang, 2015), (b) now a trendy, warm, and authentic (social) option, and (c) classified under collaborative consumption (cf. Frenken et al., 2015; see also Kraus et al., 2020). In this sense, Airbnb focuses on travelers (here, guests) who enjoy multiple interactions with the host and local people and use community-based online services to reduce failure risk by freely sharing accommodations' ratings and UGC (Martins Gonçalves et al., 2018; Sánchez-Franco & Alonso-Dos-Santos, 2021).

UGC highlights utility, affective, social or symbolic features of Airbnb lodgings, reflecting consumer experiences *in natura* without any interference from researchers (cf. Sánchez-Franco et al., 2016). Although stay-related UGC is poorly structured, focuses on a singular aspect of hospitality services or is multi-lingual, it is especially relevant in tourism and hospitality to help understand guests' valid preferences described in reviews from anonymous or unfamiliar

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sources. Centered on the generator of the content, UGC entails higher levels of elaboration and greater engagement. Additionally, the Media Systems Dependency theory proposes that consumers of the content dependent upon a medium (e.g., community-based online services) are more likely to be personally changed by that community in behavior and opinion (cf. Ball-Rokeach, 1985). Law et al. (2014) note that social media develop a significant role in tourists' decision-making given the social dimension of behavior in this hospitality context. In 2017, Statistic Brain revealed that 81% of travelers find user reviews important (Luo, 2018). Although the valence (and influence) of UGC in and on review helpfulness, consumer attitude, and behavior show diverging results (cf. Filieri et al., 2021), Sparks and Browning (2011) note that the willingness to book online is higher when (hotel) reviews are predominantly positive (Del Chiappa et al., 2015; Tsao et al., 2015).

"The influence of eWOM [here, UGC] on consumers' attitudes toward a brand and their purchase intention has been [thus] widely recognized in recent literature" (Martins Gonçalves et al., 2018, p. 807; cf. also Chevalier & Mayzlin, 2006; Godes & Mayzlin, 2004). Furthermore, "the interpretation of consumption stories or narratives is gaining more popularity within the consumer research domain" (Rahmanian, 2021, p. 47). However, "scarce research focuses on guests' expectations, predictions, goals, and desires from linguistic attributes of online textual reviews generated by customers" (Sánchez-Franco & Alonso-Dos-Santos, 2021, p. 2499). There is no conclusive evidence concerning guests' preferences—which are also traditionally examined in a biased way (cf. Mao & Lyu, 2017; Sánchez-Franco & Alonso-Dos-Santos, 2021; Tussyadiah, 2016a, 2016b; Varma et al., 2016). Furthermore, there is still a need to deepen the research debate about what guests highlight in their reviews, especially in different (touristic) environments at the country, region, or city level. "Since the type of tourists varies between cities and rural-areas, the value of attributes may vary between rural and urban destinations" (Falk et al., 2019, p. 134). For instance, Moreno-Izquierdo et al. (2019) differentiate between "sun, sea, and sand" destinations—associated with sports and adventure activities, spending time at the beach—and urban areas (centered on gastronomy, arts, visits to museums and concerts, or leisure activities, such as shopping or sports).

To sum up, our study seeks to account for the limited explanatory power and the inconsistencies between studies by applying clusterisation analysis to a sample of urban and coastal destinations. It addresses a challenging examination of natural and nonstructured UGC identifying guests' experience-related latent topics. First, the paper presents the theoretical framework relevant to this study. It analyses thematic networks about Airbnb, tourism, and environments. Second, our method section describes the data collection and cleansing process. Next, it identifies topics and offers results by considering the above reasoning. Our modeling applies the BERTopic approach (cf. Grootendorst, 2020) based on Top2Vec (Angelov, 2020). Finally, the discussion section outlines the future lines of research and theoretical and managerial implications.

2 | RESEARCH OBJECTIVES

Our study addresses the following main research objectives (RO) to detect guests' experiences in their narratives (or reviews) about Airbnb stays. Overall, this will enable us to go deeper into a growing line of research by analysing the spread of sharing lodgings in geographical scope and establish a large-scale comparison. In particular, this study proposes the following research objectives:

- RO.1. To identify guests' latent semantic structures (or topics) by analysing a bulk set of UGC after an actual stay through its pre-processing (cleansing data) and data mining processing.

Our research seeks: (1) to overcome the disadvantages of probabilistic generative topic modeling, (2) to expand previous studies based on structural scales, and (3) to apply large-scale data sources following an exploratory approach. Our study is thus more reliable and accurate than statistical results based on limited sample data.

- RO.2. To explore destination-level topics (and metatopics) of an urban versus coastal nature, and their associations through a correspondence analysis. Here no model has to be hypothesized.
- RO.3. To explore the key features that travelers describe in their narratives through P2P accommodations and describe the relationship between the most relevant topics, sentiment scores, and selected destinations.

To sum up, by identifying the main topics related to guests' preferences, hosts could enhance listings' content published in Airbnb (e.g., description, summary, or photos reflecting host and guest interaction, among others). Additionally, our study aims to validate advanced natural language processing (NLP) analysis with results attained by traditional methods (cf. Cai, 2021). In this regard, following Sánchez-Franco and Alonso-Dos-Santos (2021, p. 2499) approach, our research has to be understood as "a heuristic for theory building, applying an inductive perspective of reasoning to obtain clues that may point researchers and practitioners in a promising direction" (see Figure 1).

3 | THEORETICAL FRAMEWORK

3.1 | Airbnb and environments at the destination level

Growing research about UGC (based on personal needs and experiences of guests) is necessary to analyse how to invest and modernize hospitality infrastructures. On the one hand, in collaborative economy contexts and hospitality-specific heterogeneity, users preferentially access free and credible information provided by anonymous consumers who know a particular product or service (Martins Gonçalves et al., 2018). On the other hand, "the content published by users on the social network sites may [also] affect other

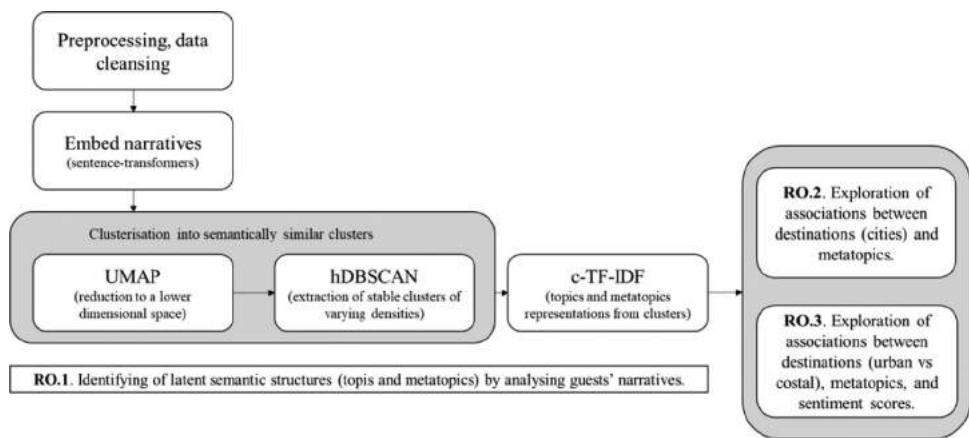


FIGURE 1 Research objectives flow

individuals' attitudes and intentions in a consumption context" (Herrero Crespo et al., 2015).

Accordingly, "social media data not only provides tourists with various traveling information on the demand side but also inspires tourism destinations to make decisions according to the tourist preferences from the supply side" (Sun et al., 2018, p. 2; see also Dickinger & Mazanec, 2008; Tsao et al., 2015; Vermeulen & Seegers, 2009). UGC "integrates a holistic tourist experience, not only with accommodations, but also all kinds of experiences and activities to carry out in the destination" (Lalicic et al., 2021, p. 11) and tends to be more empathetic and trustworthy than logic-based communications (Gretzel & Yoo, 2008). Community-based online services thus promote higher levels of elaboration (focused on the generator of the content) and greater customer engagement stemming from personal goals or values (or preferences) (cf. Brodie et al., 2011; Herrero Crespo et al., 2015). Analogous to webroomers, UGC would enhance guests' knowledge about Airbnb lodgings (features and benefits) and control decision-making (Santos & Gonçalves, 2019). Although simple signals—acting as heuristics—allow travelers to infer the unobservable cues of hospitality services (Belver-Delgado et al., 2021), scores awarded by past travelers could oversimplify quality measures by assuming that quality is a uni-dimensional measure (Archak et al., 2011; Ert et al., 2016; Lawani et al., 2019, p. 22). In contrast, NLP offers enormous capabilities of harvesting plenty of enriched UGC. It converts more valuable and credible reviews (created by non-professionals) about personal goals and values to features (or preferences), modeling semantic relationships, and showing relevant topics more efficiently than traditional text analysis (Cai, 2021).

First, most literature published to date provides promising results about the presence or absence of crucial subjective dimensions or features such as:

- Site-specific features (or structural attributes), for example, the distance from the touristy hotspots or the services and home benefits for enhancing the homely feel (e.g., household amenities and basic functionalities such as beds, wireless Internet, ample

space, and free parking, among others) (cf. Guttentag, 2015, 2016; Johnson & Neuhofer, 2017).

- Convenient location and environmental features, for example, for its comparatively low cost (cf. Guttentag, 2016; Mao & Lyu, 2017; Satama, 2014; Tussyadiah & Pesonen, 2016; Yang & Ahn, 2016) or the post-modern experiences described as authentic staying at an Airbnb lodging (cf. Guttentag et al., 2018; Liang, 2015; Mody et al., 2017; Poon & Huang, 2017), the novelty (Guttentag, 2016; Johnson & Neuhofer, 2017; Mao & Lyu, 2017), or the interaction as part of a social benefit from using Airbnb (Tussyadiah & Pesonen, 2016).

Second, recent research on destinations traditionally focuses on urban areas at the consolidation stage in the lifecycle model. It analyses the core and essential services located in such destinations that significantly affect the assessment of accommodation listings and generate higher revenues for hosts (Heo et al., 2019; Liang et al., 2017; Maxim, 2019, among others). In this regard, Moreno-Izquierdo et al. (2019) precisely note that most studies examine large urban cities and traditionally overlook moderating regional or city-specific features (Chattopadhyay & Mitra, 2019). Hasan et al. (2019, p. 218) point out that "coastal-based beach tourism is one of the least researched areas in tourism literature." Although urban destinations such as Hong Kong, New York, or London are overall mainstays on the list of international visitors, about 40% of the world's population lives on the coast or within the coastal area and partly depend on a combination of nature, sun, sea, and sand, evolving towards a service-oriented tourism-dependent economy (cf. Hasan et al., 2019; see also Sardá et al., 2009; Warton & Brander, 2017). One, therefore, expects there to be significant differences between urban and coastal destination experiences (cf. Oh et al., 2007, who examine bed-and-breakfast guests' experiences).

In particular, coastal tourism is a location-based market, and destinations compete to gain guests' preference. Tourists are attracted to coastal destinations because of a desire for escape, rest, relaxation, prestige, adventure, or social interaction. In addition, tourists enjoy exciting recreational activities indoors and outdoors

such as sport, and play in a peaceful atmosphere *along the shore* and enjoy natural resources. Coastal tourism destinations indeed fall all along an urban-rural continuum (Pahl, 1966). At one beginning of the scale, cities like New York or Chicago offer travelers social and cultural experiences. In more centered positions, destinations such as Fort Lauderdale (focused on environmental resources that attract tourists to Florida's coast, in conjunction with Miami Beach and Sarasota) or even further afield regions like Hawaii (valued for their natural beauty, flora, and fauna).

In line with previous comments, there is a gap in the literature regarding the Airbnb core or basic Airbnb features, mentioned by guests in a vast amount of UGC about their gratifying, authentic and local experiences in nonurban destinations related to indoor and outdoor activities for leisure and sightseeing. And exploring the traveler's differential topics in their P2P accommodations' narratives allows us to assess the distinctive destination image, guests' attitudes, and their intention of repeat visits. While certain factors are highlighted equally in the narratives for urban and coastal destinations, other drivers clearly distinguish the geographical destinations and correspond to guests' needs fulfilled through the destination selected, such as social-integrative-, tension-free- or affective-needs, among others. To sum up, our research explores the images of Airbnb accommodations in urban and coastal destinations based on their attributes, as discussed in guests' narratives.

3.2 | Review of studies and thematic networks about Airbnb, tourism, and environments

Assuming the gap in the literature regarding the Airbnb experiences in nonurban destinations, a science mapping here aims at displaying (and contextualizing) the structural and dynamic aspects of our theoretical framework. A network analysis related to our main research questions could confirm our research field's structure through co-word analysis. And it could identify prominent themes that are more specialized (or emerging) and, consequently, peripheral to the mainstream work. Our study, therefore, displays a strategic diagram to categorize the detected topics for a better interpretation of the results.

With query #1, 3366 refereed articles (as the highest-ranked scientific contributions) are collected by extracting from WoS (SCI-EXPANDED, SSCI, ESCI) and Scopus and filtered according to their content. Our search focuses on the keyword "Airbnb" OR "Tourism*." It includes studies focused on P2P accommodations in the title, abstract or keywords related to widespread sharing tourism phenomena. P2P accommodation topics increasingly appear in peer-reviewed journals in 2010, and a general trend in new articles is towards examining more specialized themes (cf. Belarmino & Koh, 2019). Our data set spans the period between 2010 and 2020.

WoS Query#1-analog to Scopus query: TS

= (Airbnb OR Tourism) AND TI
= (coastal × ORurban × ORrural × ORsun × ORbeach*).

Applying text-mining analysis carries out a careful data cleaning process based on our sub-epigraph "*Data cleansing process and extracting terms*." In particular, it omits terms shorter than a minimum of three characters. Our research normalizes differences between UK and US spelling. The inclusion of noisy terms in the topic modeling process could contaminate predictive performances. Our study also selects a subset of unigrams and bigrams (from now on, terms) by tf-idf metric (above the median) (cf. Sánchez-Franco et al., 2019). Our analysis finally extracts 9709 lemmatized terms.

Additionally, to create and analyse the conceptual structure of our theoretical framework, our research follows Cobo et al. (2011a, 2011b) approach. It summarizes the centrality for each community (or the strength of external ties to other topics or a theme's importance) and density for each community (or the strength of internal relations between nodes or their coherence). And finally, it displays a co-topic network or thematic map according to the quadrant in which topics are located. As one can thus observe (see Figure 2):

- **Quadrant I** (upper-right quadrant, or motor themes)

Community #1 (i.e., city, resident, urban tourism, rental, or neighborhood, among others) is associated with city-specific heterogeneity concerning, for instance, the (short-duration) rentals and their influence on neighborhoods. Combining high centrality and density community #1 is considered an increasingly developed theme and highly relevant for structuring our research field, thus gaining coherence and importance. If its density decreases, community #1 might be progressively identified as a transversal one, that is, the community could move to Quadrant IV over time.

- **Quadrant II** (upper-left quadrant, or highly developed and isolated themes)

Communities #2 (heritage, behavior, household, or livelihood, among others) and #3 (hospitality or urbanization) are represented by specific tourist services. Both communities show a high-medium density (well-focused research) but a low-medium relevance (external links), that is, not well-connected with other fields and, consequently, specialized and peripheral (Ivory Towers).

- **Quadrant III** (lower-left quadrant, or emerging or declining themes)

Community #4 (i.e., coastal tourism or coastal area) shows a relatively well-connected internal structure and is weakly connected to other nodes. It is thus located in an unstructured quadrant, with the potential of becoming a mainstream research theme (Quadrant I). However, coastal tourism has probably not had enough time to establish strong ties to other topics.

In this regard, one of the most profitable industries in coastal areas is indeed tourism (European Commission, 1999; Hall, 2001). Tourism is an important economic activity, especially in many coastal areas (European Commission, 2014), and it is considered the largest segment of the global tourism industry. Inherited coastal sand-beach tourism has thus become an emerging theme in the economy (and management) literature and might evolve towards motor themes (mainstream). The coastal research domain

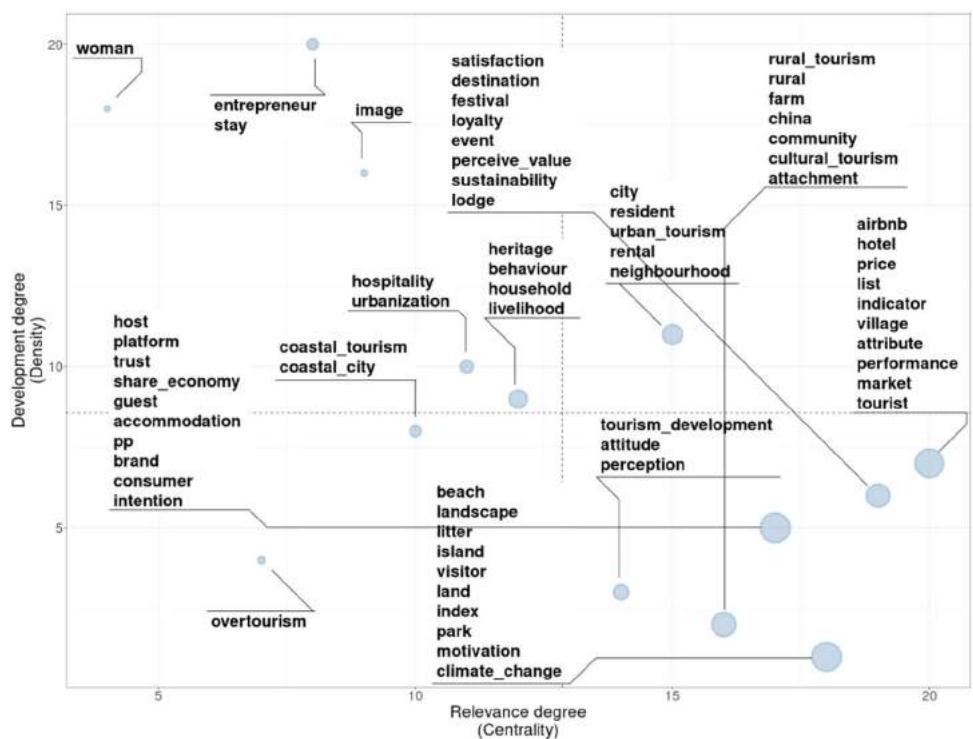


FIGURE 2 A co-topics network to compute centrality and density: 2010–2020. *Centrality, or x-axis, measures the degree of interaction of a (sub-) network with other (sub-) networks (Cobo et al., 2011a, 2011b). **Density, or y-axis, measures the internal strength of the network (Cobo et al., 2011a, 2001b). ***p = P2P. P2P, peer-to-peer accommodation

is therefore a peripheral topic—well-structured (medium average density) and shows limited bonds to other topics (medium average centrality) in the (communities) graph analysed. Consequently, it has developed into a potential challenge in the Destination Marketing Organisation (DMO). And it should be essentially associated with actual guests' preferences for P2P accommodations in different destinations, increasing its relevance and centrality.

Furthermore, peripheral topics produce new knowledge to be progressively shared among diverse core topics that fragment into new (cohesive) communities which coalesce around emerging research questions (Chubin, 1976). Thematic areas in Quadrant III act as peripheral nodes (with sparser connections) to the overall graph, for example, the over-tourism theme (community #5). They turn into emerging topics connected to important dimensions that progressively influence, for instance, "Airbnb rental platform vs. hotel research" from the perspective of the hosts, guests, or government administrations (e.g., Xie & Kwok, 2017; cf. also Guttentag & Smith, 2017).

- **Quadrant IV** (lower-right quadrant, or basic and transversal themes).

Quadrant IV evidence that the field is expanding and could become a mainstream topic over time, reflecting its conceptual development. Community #6, more centrally located in the network and comprising the keywords host, platform, trust or shared economy, is a fundamental and transversal theme (with a high average centrality and a low-medium density). It is related to involvement with the Airbnb brand, customer

trust and its influence on travelers' behavior, "specifically looking at how P2P accommodations websites have successfully monetized trust, how consumers and hosts perceive trust and the issues that arise from this type of transaction" (Balarmino & Koh, 2019, p. 3). The sharing economy and Airbnb have become a transversal interest in exploring P2P platforms because of the relationship between hosts and guests, concluding in their value proposition. Both concepts could influence the development of all the other themes.

Furthermore, community #7 (as a *bandwagon* theme) is defined as Airbnb's sharing accommodation (and is related to different concepts such as Airbnb, hotel, or price host, among others). It is an (internally) underdeveloped topic (weak coherence) with a potential to develop into being significant to the domain as a whole (mainstream). Indeed, "the research to date related to "pricing and Airbnb" does little to explain the variables that make up the price of a listing" (Gibbs et al., 2018, p. 47; cf. also Gutierrez et al., 2017; Guttentag et al., 2018; Poon & Huang, 2017; Sánchez-Franco & Alonso-Dos-Santos, 2021, among others, to conclude Airbnb's role as a disruptor for the hotel industry).

Likewise, community #8 (satisfaction, destination, festival, loyalty, event or perceived value, among others) is associated with customer relationship quality and is here determined by useful, enjoyable, social and home-like accommodation experiences from interactions with local people or authenticity (e.g., Guttentag, 2016; Johnson & Neuhofer, 2017; Mody et al., 2017; Poon & Huang, 2017; Tussyadiah & Pesonen, 2016). As Guttentag et al. (2018, p. 343) point out, "Airbnb listings are quite varied, and the potential appeals of Airbnb include both practical advantages and experiential facets that

may not generally go hand-in-hand." And, precisely, to trade-off customer satisfaction and loyalty, the preservation of local resources and consequently the local authenticity community #9 (rural tourism, farm, China, community, cultural tourism, among others) is related to rural tourism. Rural tourism entails researching residents (e.g., farm-houses), achieving sustainable development in the long run, a traditional lifestyle or quality service, or increasing competitiveness in rural areas. In this regard, community #9 is also centered on tourism development and its model is designed by, for instance, the local community that fosters rural entrepreneurship (based on financial rewards; cf. Anand et al., 2012; Wang et al., 2012) to improve service encounters during the travelers' stays.

Finally, community #10 (beach, landscape, litter, island, climate change, among others) is related to maritime areas and is defined by conservation and "a future" related to the local community. Therefore, it is a relevant theme (and influential). Although it is highly associated with sustainable development, community #10 could be considered a (weakly) coherent theme.

4 | MATERIALS AND METHODS

4.1 | Data collection

Our data set is obtained from the InsideAirbnb website (available at: <http://insideairbnb.com/>). The reviews are publicly accessible. And our research here filters out accommodations for two urban destinations (New York and Chicago) and two consolidated nature-based, sun and beach destinations (Hawaii and Fort Lauderdale). Our destinations have all the services and infrastructure necessary to accommodate the tourism industry and are relevant destinations for domestic and international visitors alike.

Likewise, our research filters out a price lower than 10 US dollars (not including cleaning fees or additional charges for guests). To preserve the amateur character of the host and facilitate comparisons, our study selects only hosts with a single listing. In addition, Airbnb listings are considered outliers when the number of guests lies outside the interval formed by the 5 and 95 percentiles. In this regard, our study removes all listings higher than six guests. Large apartments could indeed have a shocking influence on the analyses.

Additionally, our study analyses a single language, English, to maintain consistency between the texts analysed. Our research applies textcat 1.0-7 package in R for this purpose. Our data set is also truncated just before the outbreak of the COVID-19 pandemic to prevent anomalies, that is, between 2017 (March 1, 2017) and 2020 (March 1, 2020).

Our data set yields a total of 73,557 records. See Figure 3 for the spatial distribution of our Airbnb data set by region or city.

4.2 | Data cleansing process and extracting terms

Although it is not strictly mandatory under the BERTopic approach, following Sánchez-Franco et al., (2016, 2019), our research here (1)

checks the spelling of narratives and removes duplicates, (2) discards punctuation, capitalization, digits, and extra whitespaces, (3) removes a list of common stop words to filter out overly common terms and a customized list of proper nouns, (4) fixes contractions, and compound terms, (5) tokenises and lemmatizes the terms, and (6) becomes text in ASCII, and standardizes it by lowercasing. Our data set contains an average of 61.5 terms per narrative and a standard deviation of 50.1 terms. Our analysis applies dplyr 1.02, stringr 1.4.0 and quanteda 2.1.2 packages in R, and textclean 0.9.3, textstem 0.1.4, and hunspell 3.0.1 packages in R, among others, for these purposes.

To briefly describe our dictionary, our study applies the keyness metric, which emphasizes the vocabulary (9497 terms) that most differentiates reviews from one group (here, urban destination) in comparison to the other (here, coastal destination). The higher the keyness, the more "key" a term is. The chi-squared value (χ^2) is used for computing keyness metric, and is provided by the quanteda 2.1.2 package in R software. Figures 4a,b display the χ^2 values in the x-axis (with $p < 0.001$) for each (key-)term. "Subway," "train," or "neighborhood" (followed by apartment, public transport, bus, walk, or bar) are the main features in urban destinations, being the terms with the highest χ^2 values, and being mentioned 6441, 3320, and 7482 times (term frequency), respectively. Likewise, as our research comments above, the main urban attractions are based on cultural heritage (such as visiting museums and concerts or leisure activities such as sports). On the other hand, the importance of "pool," "view," "snorkel," or "beach chair" or "cottage" for coastal destinations is clearly shown by its first positions, which are mentioned 6160, 4958, 1743 and 1267 and 1175 times, followed by "sunset," "beach towel," "swim," or "surfboard." Diverse terms such as tropical, grill, paradise or barbecue represent exotic gastronomy and local authenticity and are related to lunch beach or condo amenities such as patio or backyard (see Figures 4a,b).

Moreover, our study estimates the similarity between our Document-Term matrix (DTM) and a numeric vector with weights formed by a set of positive or negative terms (here, AFINN sentiment lexicon) based on an embedding matrix (containing the v element from a singular value decomposition on DTM). The results are provided by the udpipe 0.8.4-1 package in R software and shown in Figures 5a,b. Overall, the terms most associated with positive terms are mainly related to location and neighborhood amenities. This result is because travelers assess highly (and frequently) features of the surroundings or neighborhood "ambience." For instance, "an Airbnb apartment is close to the transportation system in an urban destination," or "an Airbnb apartment is in an authentic neighborhood close to shops, touristic attractions, and local experiences such as beach food." On the contrary, terms more related to negative terms are about in-apartment amenities, cleanliness and comfort, and hosts' (social) interactions related to check-in or "homely feelings"—without exception according to the tourist destination.

Finally, while the description of terms has some appealing clues to identify terms that are discriminative for documents in the collection, "the approach brings a relatively small reduction in description length and reveals little in the way of inter- or intra-document

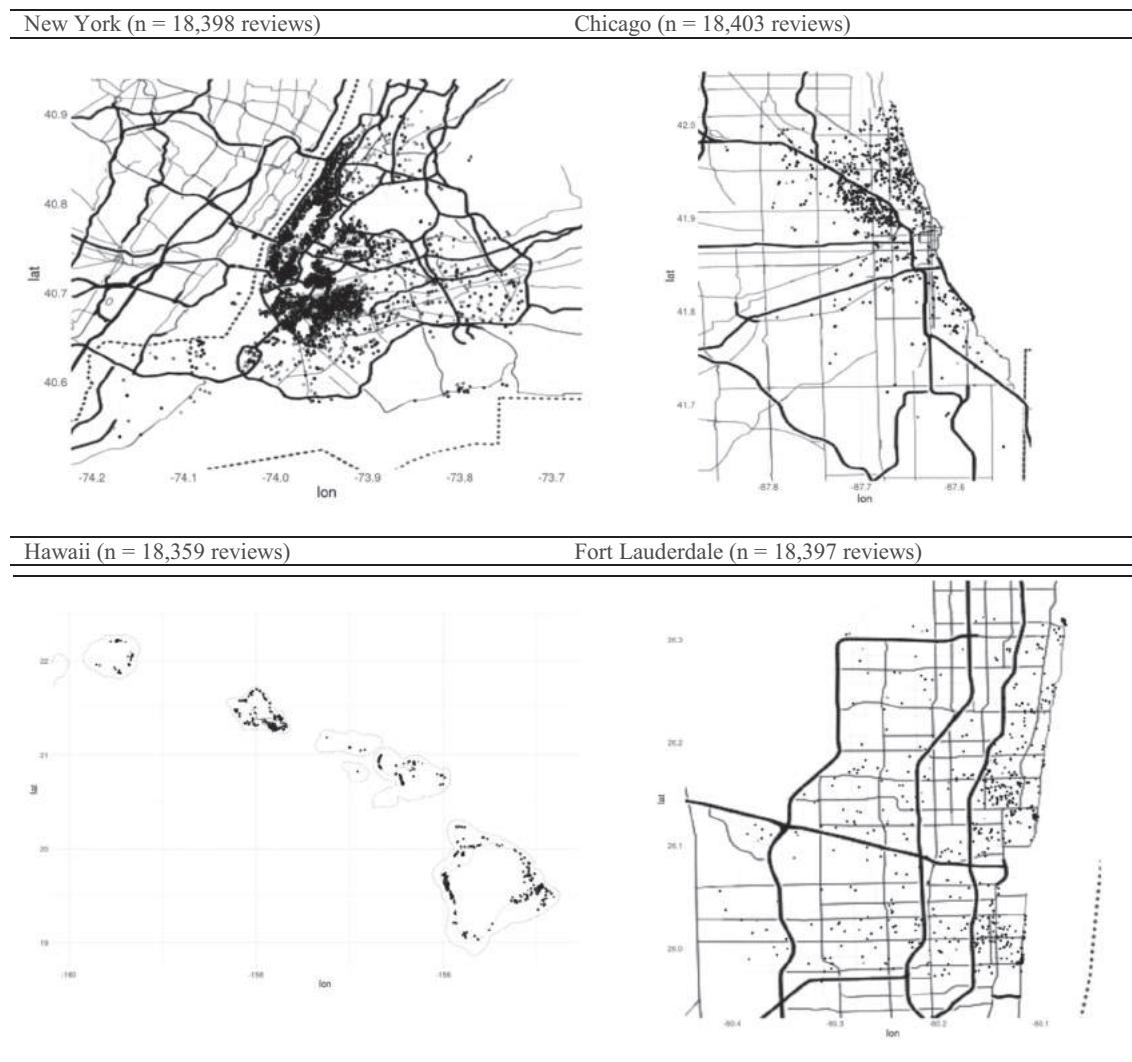


FIGURE 3 Spatial distribution of Airbnb lodgings data set by region or city

statistical structure" (Blei et al., 2003, p. 994). Therefore, the discovery of distinct latent semantic structures (or topics) and their similarities are additionally necessary.

5 | DATA MINING

Our research applies a text-mining algorithm to extract dense semantic structures (or topics) from a continuous semantic space. Overall:

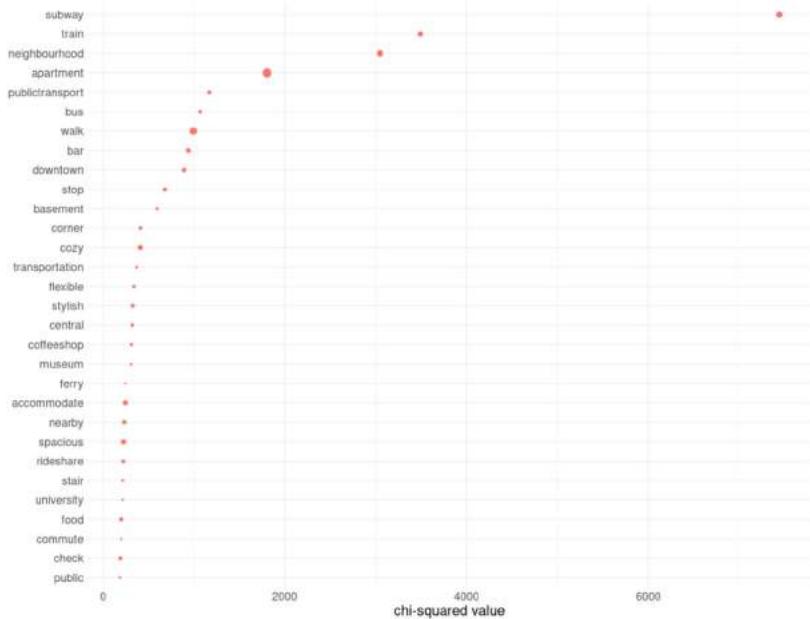
- Our study compares the terms' importance between identified clusters of document vectors, which are more informative and representative than latent dirichlet allocation (LDA) or probabilistic latent semantic analysis (PLSA) outputs. Additionally, LDA and PLSA could not fit into short texts appropriately due to severe data sparsity.
- Our analysis rejects using a bag-of-words representation of narratives and considers the ordering and semantic relationships between terms.

- Compared to LDA or PLSA, our fine-tuning approach fits a small number of parameters.

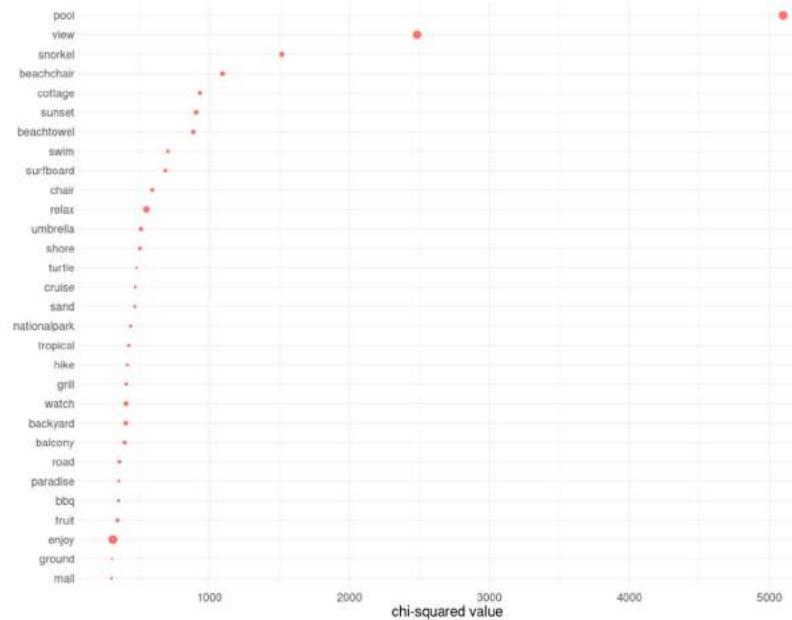
In particular, following BERTopic's approach (Grootendorst, 2020) based on Top2Vec (Angelov, 2020), our research firstly transforms our corpus into 768-dimensional vectors leveraging a pre-trained sentence transformer model optimized for semantic textual similarity (Reimers & Gurevych, 2019; cf. sentence-transformers package in Python 3.8).

Second, a Uniform Manifold Approximation and Projection for Dimension Reduction (UMAP; cf. McInnes et al., 2018) is applied to our vectors to create a lower-dimensional embedding of document vectors through the umap-learn 0.5.1 package in Python 3.8 (McInnes et al., 2018). UMAP performs significantly better than t-SNE at maintaining both the data local and global structures. Our proposal reduces the vectors to 20-dimensions (from now on, 20d-UMAP) and measures distances between data points by cosine-similarity. Experimentation and related literature here recommend 15-nearest neighbors to emphasize local structures. And the effective minimum distance between embedded points is set at 0.01. Next, to find such dense documents areas, the

(a) Urban destination



(b) Coastal destination



† Point size: term frequency.

FIGURE 4 Text analytics based on keyness metric

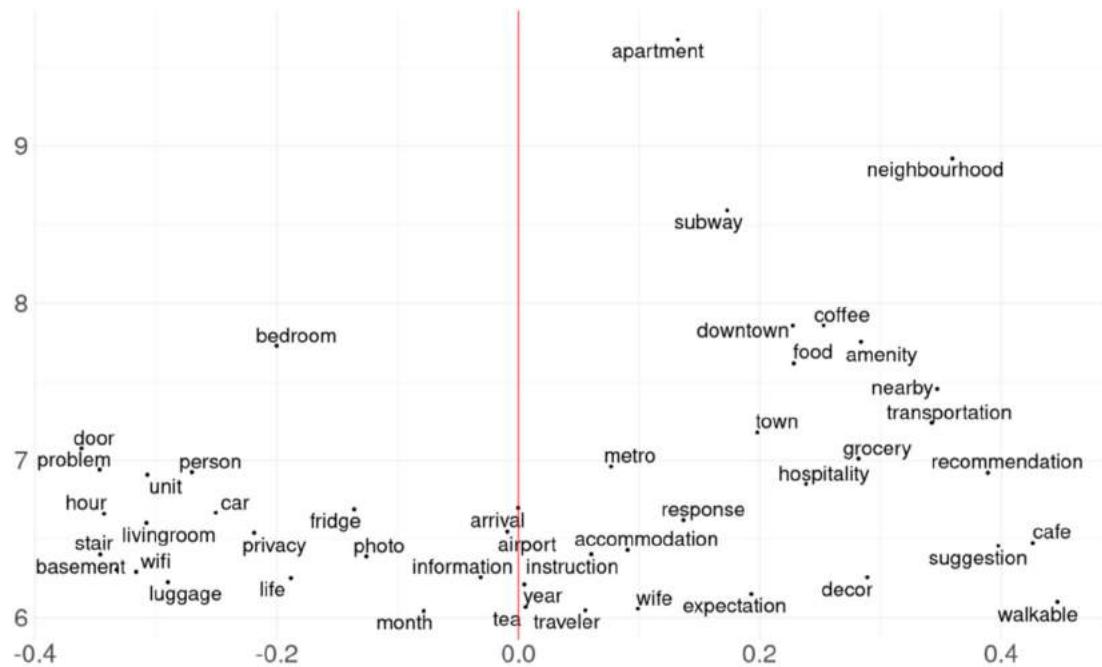
20d-UMAP embedding is clustered with Hierarchical Density-Based Spatial Clustering of Applications with Noise algorithm (from now on, hDBSCAN; Campello et al., 2013; McInnes & Healy, 2017). hDBSCAN extends DBSCAN and extracts stable clusters of varying densities (with arbitrary shapes and sizes and noisy points). The minimum size of clusters is set at 200. Likewise, the number of samples or density threshold (i.e., the minimum number of samples required before an area can be

considered dense and a point to be considered a core point is set at 25). Our analysis employs the hdbscan 0.8.27 package in Python 3.8.

Thirdly, one topic vector per cluster is identified in the following steps:

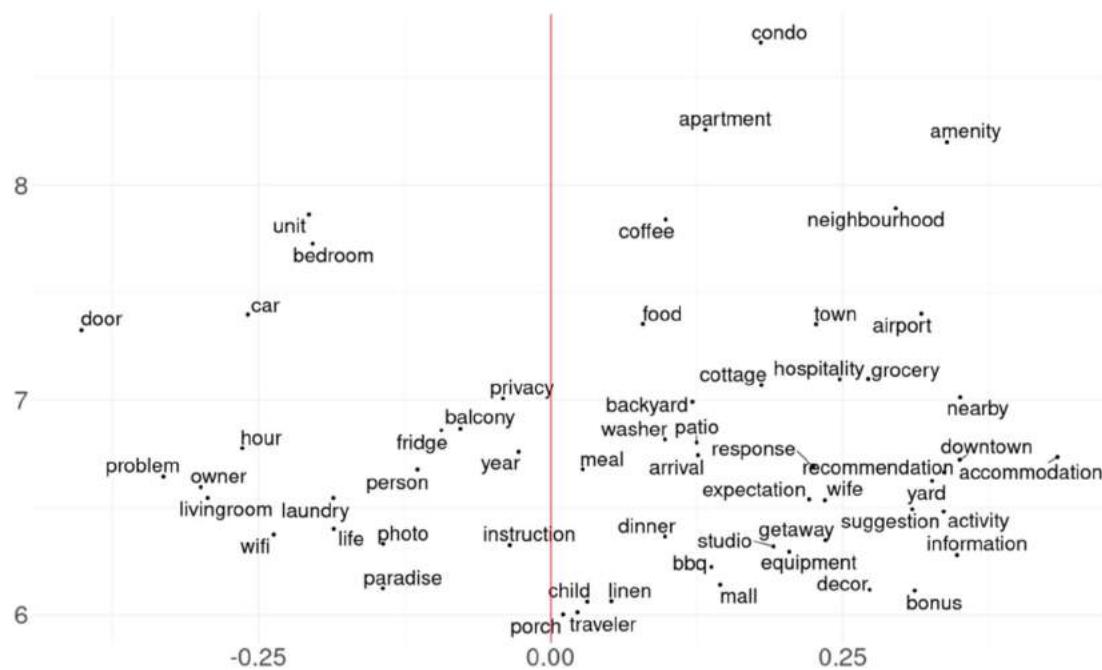
- Our analysis converts the documents in each cluster into a single document per cluster.

(a) Urban destination



+x-axis: polarity / y-axis: logarithmic frequency.

(b) Coastal destination



+x-axis: polarity / y-axis: logarithmic frequency.

FIGURE 5 Text analytics based on semantic similarity. List of terms with the highest logarithmic frequency

- Our study compares the importance scores for terms within a cluster by a class-based TF-IDF approach (from now on, c-TF-IDF, with c being the identified clusters). The higher the c-TF-IDF score, the more representative it is of its topic.
- Our study also compares the c-TF-IDF vectors between topics, merges the most similar ones, and finally re-calculates the c-TF-IDF vectors. As a result, our research reduces the number of topics from 34 topics (named from 0 to 33) to 14 compact (and semantic) metatopics (named from A to N).

Finally, our approach builds a bi-dimensional space to easily visualize the continuous representation of metatopics, applying 2d-UMAP approximation (see Figure 6). Additionally, Figures 7a,b display the most representative terms -in each topic (Figure 7) and metatopic (Figure 7)- based on their c-TF-IDF scores, and allow to compare topic (or metatopic) representations to each other.

6 | RESULTS

Figure 8 precisely displays the condensed clustering tree extracted from hDBSCAN, where λ represents the weight of the edges. The topic 0 (metatopic A) initially breaks the complex condensed clustering tree, and it is related to travel companions. The next branch from the condensed clustering tree identifies topic 2 (or

metatopic B) related to the transportation system (e.g., bus, downtown, subway, walk for transport or train), and topic 4 (or metatopic C). Topic 4 is mainly about the journey from a tourist's residence until arriving at their destination (e.g., flight, airport or cruise as the beginning of the Airbnb experience). Finally, most of the following significant branches from the clustering tree are related to metatopics, mainly about convenient location, apartment surroundings, experiential features, outdoor facilities, or in-household benefits.

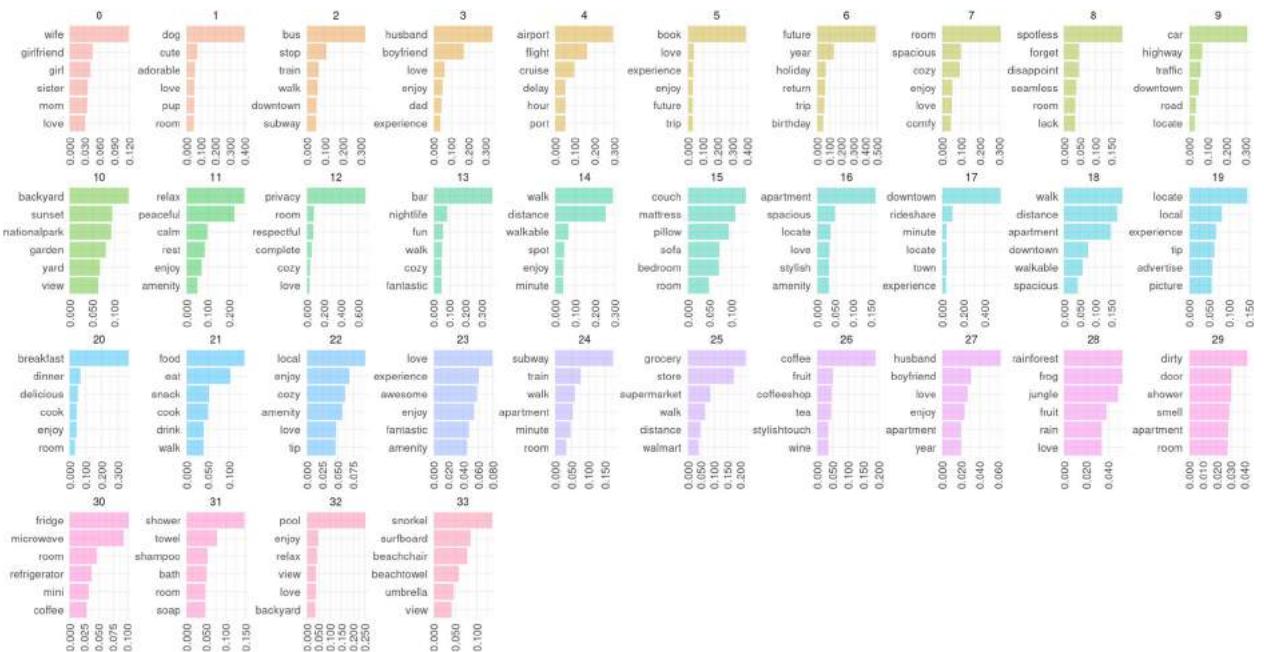
Second, our results identify the topics that accumulate the highest number of reviews. Topic 24 (6587 reviews), included in metatopic J, represents around 15%. It is about ease of access to a transportation hub or "walkability" in destinations. Metatopic B includes topic 2 (1024 reviews, i.e., 2.40%). Both topics are stronger among those in urban destinations such as New York or Chicago. Metatopic I includes Topic 23 (4192 reviews, i.e., 9.83%), and it is semantically close to guests' non-economic satisfaction (e.g., love, experience, or awesome), that is, customers rely on their entire (and gratifying) experience when forming intentions and making revisit decisions. Topic 16 (3314 reviews, i.e., 7.77%) in metatopic G mainly concerns overall apartment features and location. Topic 32 (2512 reviews, i.e., 5.89%), included in metatopic N, is semantically close to topic 33 (1875 reviews, i.e., 4.39%). Topics 32 and 33 are related to coastal views from the shore or boardwalk and peaceful experiences in coastal destinations.



FIGURE 6 Metatopics by merging the most similar ones and visualized by reducing embeddings to two-dimensional space

(a)

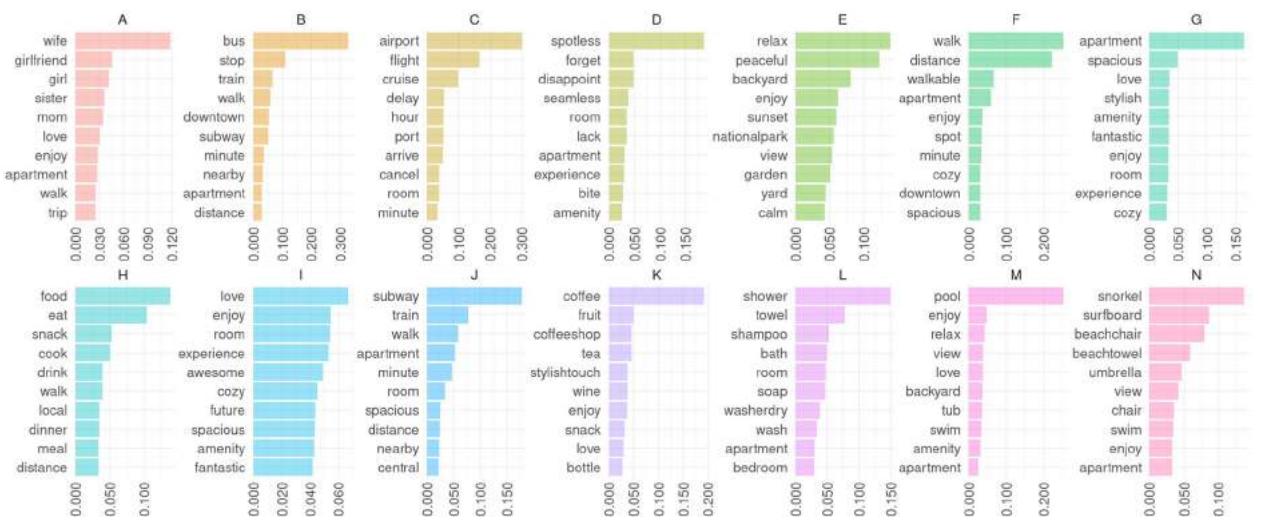
Topics.



[†] x-axis: tf-idf values.

(b)

Metatopics .



† x-axis: tf-idf values.

FIGURE 7 Top terms per cluster based on their c-TF-IDF scores

Third, beyond adjectives that guests have used and their intensity (e.g., amazing or loved, among others) and metatopics previously mentioned, our study comments the metatopics. In particular,

- Metatopic A (topic 0) is related to travel companions.
 - Metatopic B (topic 2 above public transportation such as train, subway, or bus system) is semantically related to metatopic C (topic 4 above transport hubs such as airport or port).

- Metatopic D, consisting of topic 8, is related to cleanliness or comfort and in-household amenities.
 - Metatopic E, consisting of topics 10, 11, and 12, is preferably related to a peaceful, calm, and respectful stay.
 - Metatopic F (e.g., topic 14) is overall related to walking for transport (walkability). It is also semantically close to topics 19 or 22.
 - Metatopic G (e.g., topics 15 and 16) is related to the room, space and location, and stylish touch.

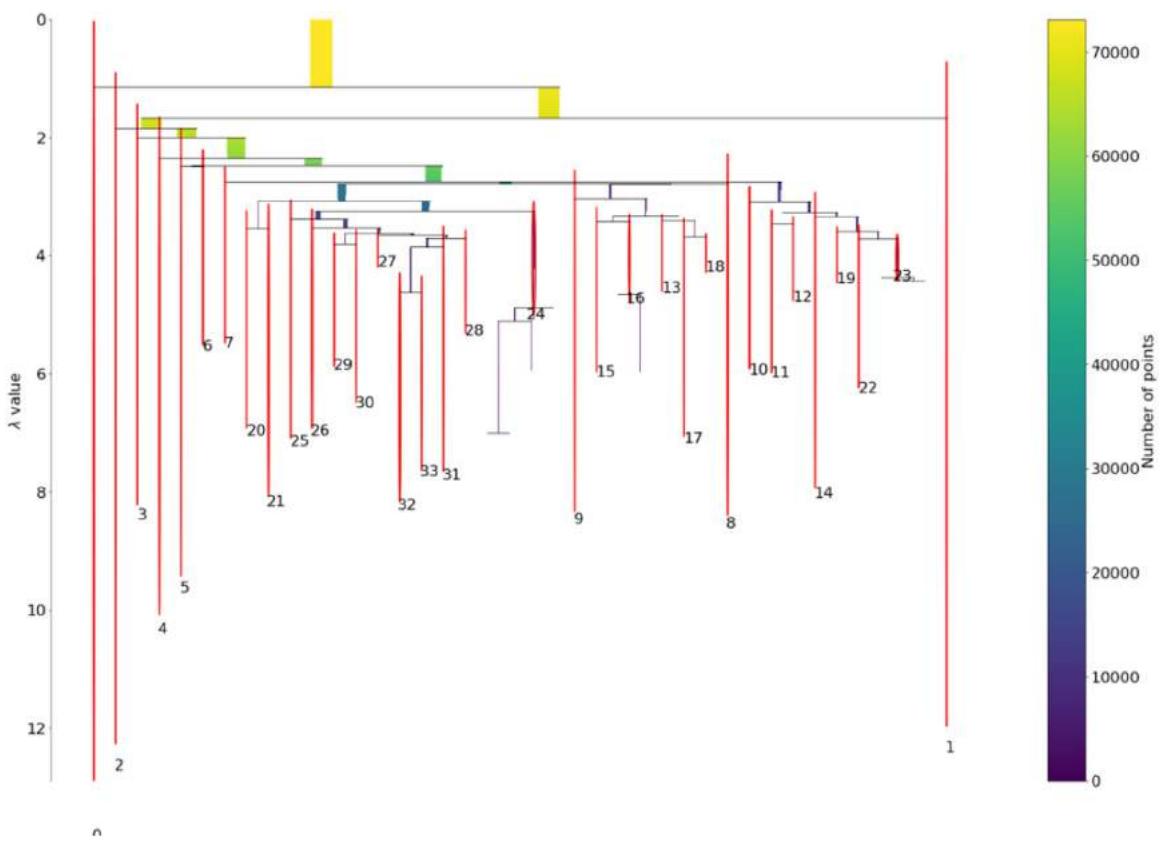


FIGURE 8 Topics identified and visualized by condensed clustering tree produced by hDBSCAN. hDBSCAN, Hierarchical Density-Based Spatial Clustering of Applications with Noise algorithm

- Metatopic H is related to local gastronomy and initially constitutes a compact sub-tree consisting of topics 20 and 21 that are also semantically close to topic 25 (grocery or supermarket) or 26 (coffee shop).
- Metatopic I (semantically close to metatopic E) is composed of two sub-trees comprising topics 6 and 7, and 19, 22, and 23. It is mainly about confidence quality, meeting expectations and review quality or pictures, and consequently, relationship quality or guests' attitudinal loyalty associated with tourists' intentions to recommend a place or Airbnb resources.

Moreover, metatopic I is also related to the homely atmosphere (represented in hosts' pictures) or stylish touch that allows parties to meet the needs and expectations (e.g., apartments with their rooftop deck in New York or Chicago or homely cottage in the nature area). Topics 22 and 23—near topic 19—share semantic space with (perceived) authenticity and local experiences in P2P accommodation environments leading to customer satisfaction.

- Metatopic J (topic 24) is about ease of access to a transportation hub or "walkability" in destinations.
- Metatopic K, consisting of topics 26 and 30 (and 29), is associated with easy access to out- and in-home food-related amenities (e.g., neighborhood amenities such as eating establishments and neighborhood coffee shops and attractions citing restaurants, bars, or pubs).

Furthermore, metatopic K, close in 2d-UMAP mapping to metatopic L, descends from topic 27 (e.g., husband or boyfriend as key terms) and topic 31 (bathroom facilities). In this regard, males are closely focused on the quality of practical household benefits (e.g., not only functional amenities such as a full kitchen, washing machine and dryer, multiple bathroom facilities, or cleanliness and comfort) but also here with outdoor amenities serving as surrogates for more comprehensive processing (cf. Sánchez-Franco & Alonso-Dos-Santos, 2021).

- Topics 32 and 33 relate to outdoor amenities in coastal surroundings and form the metatopics M and N, respectively. Metatopics M and N are mainly associated with natural resources. They represent esthetic and recreational activities in a sun, sea, sand environment, for example, snorkeling or surf, among others, and additionally swimming-related facilities such as pool, backyard, or beach amenities, that is, towels, umbrellas, or beach chairs.

To further elaborate on the results presented above, our study executes a correspondence analysis (CA) to describe-explore (and easily and symmetrically visualize) the different associations (or similarities) between destinations and metatopics. Our research employs FactoMineR 2.4 and factoextra 1.0.7 packages in R for this purpose. A χ^2 statistic ($20,150$, $df = 39$, $p < 2e-16$) identifies the similarities in metatopics across our four cities. The results affirm that

the associations are not random. The two-dimensional space explains 87.62% of the variance (>80%). The singular values (eigenvalues) of the dimensions are 0.391, 0.128, and 0.073 (see Figure 9).

Although our analysis cannot confirm a high discriminant value, it cautiously concludes that

- New York is mainly associated with metatopic J. This denotes the ease of access to transportation systems and the closeness to the apartment or distance to the subway, bus or train, and walkability. Traveler segments could find it valuable (and are willing to pay more) to lodge outside of a tourist neighborhood and enjoy the amenities of residential areas.
- Reviews about Airbnb Chicago contain comments about apartment closeness to downtown and hot attractions (metatopic B). In this regard, the guests mention terms associated with bus, train, subway, walk, or nearby.
- The most distinguishing metatopics of Hawaii's reviews mainly relate to ocean views (e.g., sunset) from the backyard, shore or boardwalk, natural resources and sports (metatopics E and N). These topics are mainly associated with Hawaiian culture and lifestyle (snorkeling, surf, swim, etc.). Therefore, their position in Figure 9 clearly shows their importance in coastal destinations. Likewise, the arrows suggest a slight association between Hawaii and metatopic K, that is, local gastronomy.

▪ Fort Lauderdale narratives are highly related to outdoor amenities related to sun, sea, and sand (metatopic M) and close to transportation systems to initiate (or end) guests' journeys (metatopic C) from their place of residence until arriving at their destination, or to enjoy cruise tourism to visit, for instance, beaches of the Bahamas, among others. The transportation system can thus be essential for being both practical and for being pleasing.

Fourth, our study focuses on the mechanisms through which UGC denotes guests' satisfaction or polarity scores towards Airbnb stay. A tourism experience could indeed be holistic, personal, and situational (Kalbach, 2016) and positive or negative. In particular, sentiment analysis, as a sub-field of NLP, enables us "to determine the 'sentiment' of the [...] author of a piece of text, and can range from negative to positive as scored on whatever scale the particular sentiment analysis software chooses to use" (Pitt et al., 2018, p. 1012). Sentiment analysis highlights, for instance, where an Airbnb stay has failed to deliver services or, in contrast, where Airbnb hosts seduced guests to provide positive word of mouth or revisit intentions.

Here, to identify and categorize the guests' opinions, our approach applies an unsupervised lexicon-based approach using TextBlob, that is, a Python library for different NLP tasks such as sentiment extraction. TextBlob offers two metrics: (1) polarity that is

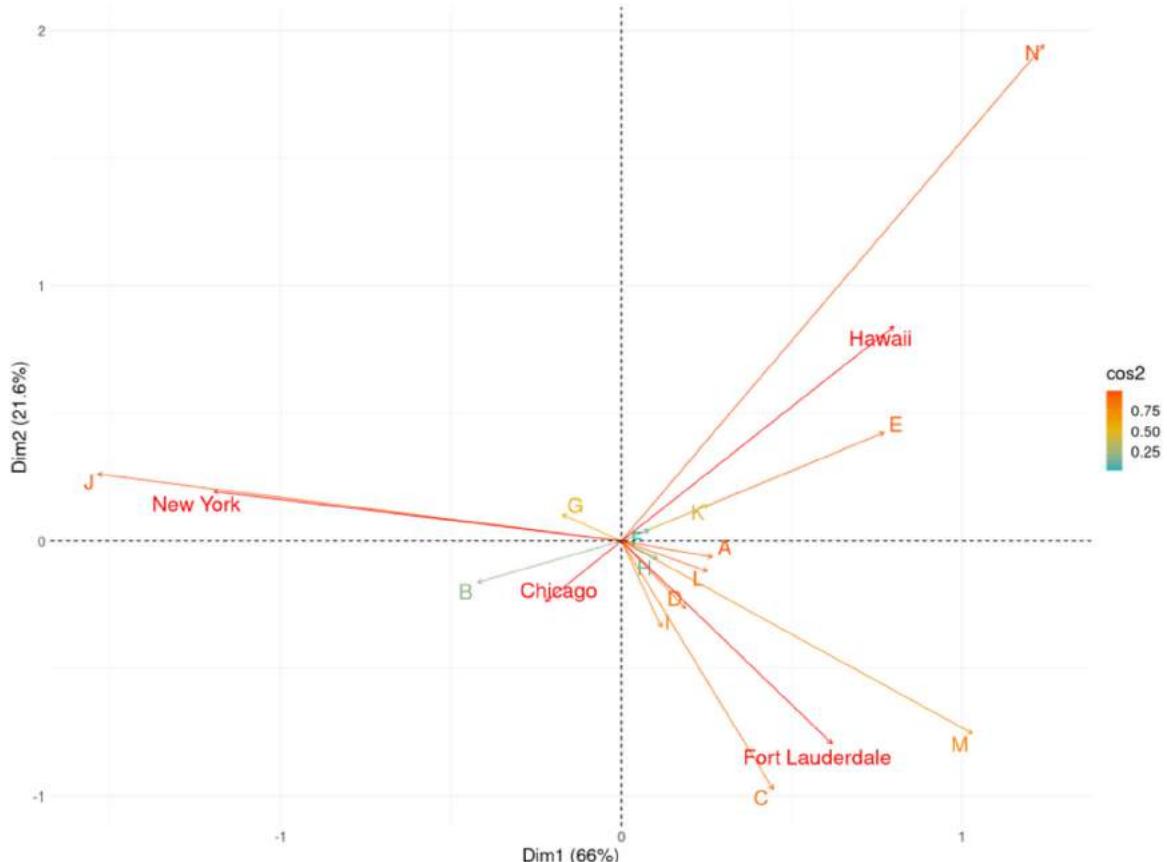


FIGURE 9 Correspondence analysis: Results

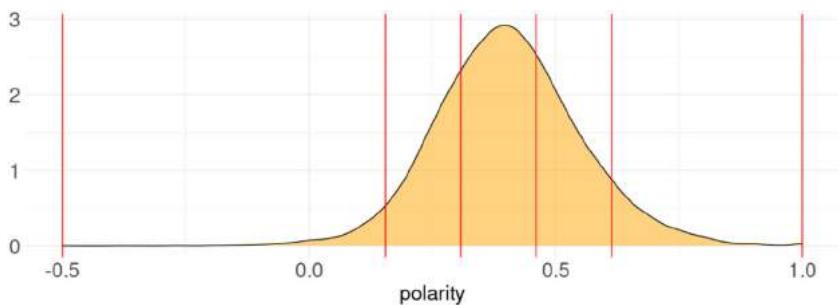


FIGURE 10 Density plot of polarity variable

a value that ranges within [-1, negative, +1, positive], and (2) subjectivity that is also a value that lies in the range of [0, objective, 1, subjective]. Additionally, our analysis discretises the polarity scores into five intervals grouping by the standard deviation method (see Figure 10). Subsequently, it displays a mosaic plot indicating deviations from a specified independence model in a high-dimensional contingency table, that is, (metatopics + discretised polarity) \times destination. Each cell is a rectangular area of size proportional to the corresponding observed cell frequency. The colors encode the χ^2 residuals of the cell concerning the model of mutual independence, that is, colors measure the distance of each cell from independence. If the residual is less (greater) than -2 (+2), the observed frequency of the cell is less (greater) than the expected frequency. Blue (red) here means a positive (negative) sentiment. Our analysis applies vcd 1.4-8 package in R for this purpose (see Figure 11).

Next, our study summarizes the main results below:

- In urban destinations, guests tend to provide positive word of mouth and revisit intentions about "walkability" (F), the apartment and its stylish touch (G), and, as in coastal destinations, the relationship quality (I). On the other hand, metatopic J (i.e., the ease of access to a transportation hub) shows observed frequencies higher than expected in each sentiment cell excepting the fifth cell (most favorably).

In contrast, guests rate public transportation, such as train, subway, or bus system (metatopic B), less favorably. The less favorably polarized cells (2 and 3 points out of 5) are significantly higher than expected.

- In coastal destinations, guests positively evaluate critical topics associated with peaceful, calm, and respectful Airbnb stays (E). Metatopics M and N also show observed frequencies higher than expected in each sentiment cell. They are also related to swimming-related facilities and esthetic and recreational activities in a sun, sea, and sand environment. Contrariwise, guests mention less favorably the aspects above transport hubs such as airports or port (C).
- In urban destinations, guests favorably mention their attitudinal loyalty and intention to recommend Airbnb (I).
- Finally, although our correspondence analysis cannot confirm a high discriminant value between destinations concerning metatopics A, L, or D, coastal guests less favorably report topics related to travel companions (A) and husband or boyfriend as key terms (L), or the cleanliness, comfort, and in-household facilities (D).

7 | CONCLUSION

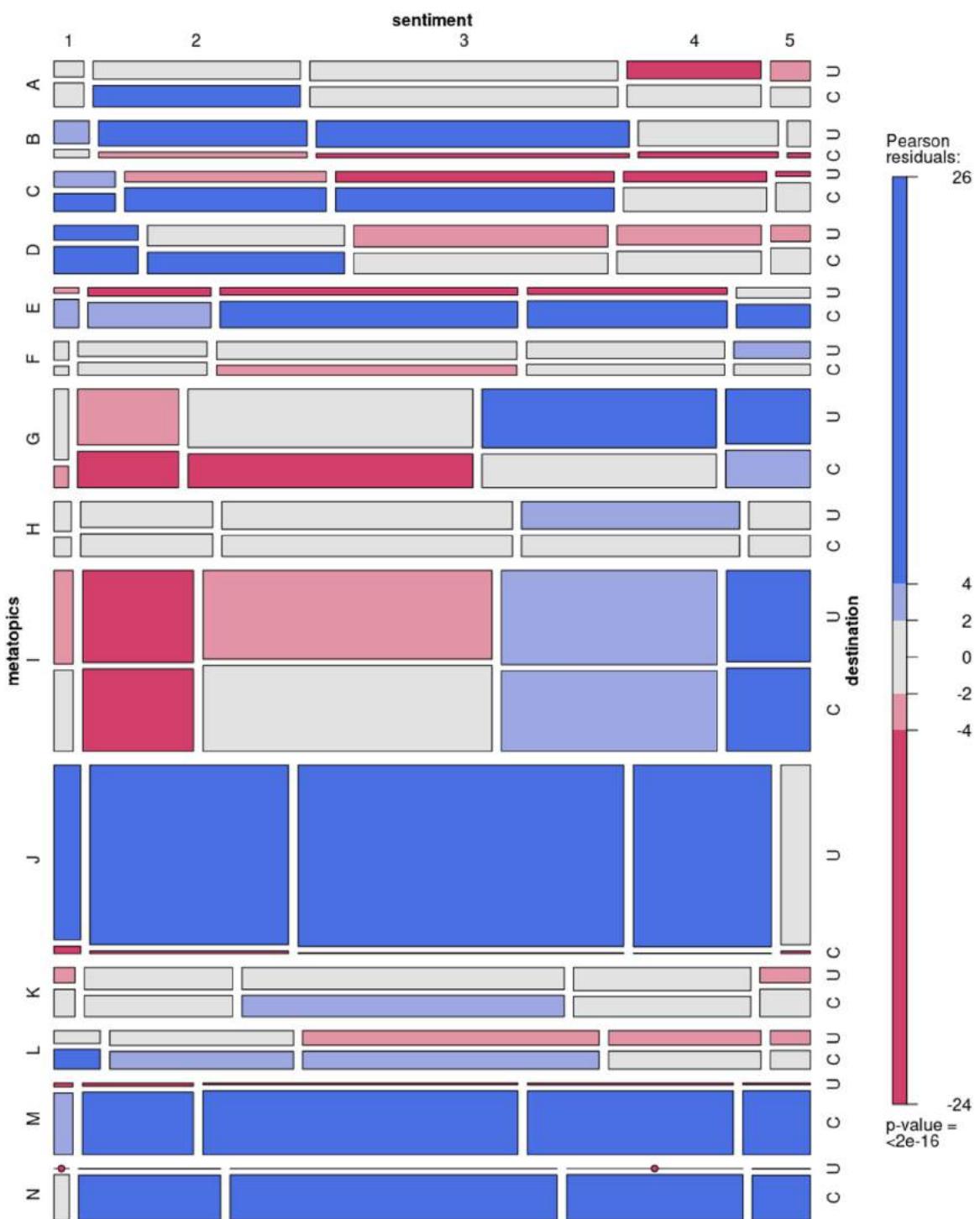
To understand the relevant topics expressed by guests in their narratives and how they could impact managers' decisions, our research applies a text-mining algorithm to discover dense semantic structures in a continuous semantic space. Our processed data set contains 73,557 reviews between 2017 and 2020. Using techniques for the NLP and the BERTopic approach, our research goes beyond the previous literature results about Airbnb accommodation features. It allows us to gather information needed in a reliable, authentic, and efficient way (behaving as problem solvers) and look for fun-related experiences (acting as travelers; cf. Del Chiappa et al., 2015). According to the previous literature, an extensive data set offers a low likelihood of error, and UGC is trustworthy for adjusting new services in specific destinations.

Additionally, our study goes beyond previous research by incorporating a regional or city dimension. By displaying associations between metatopics and assuming that rural areas seem to have a higher level of heterogeneity (cf. Falk et al., 2019), our research combines urban tourism (as a mainstream) and coastal tourism (as an emerging theme). Thus, our study is relevant to analyse the interacting effects of urban—or coastal—destinations on the features of Airbnb accommodations' influence on travelers' decisions. It offers guidelines to (1) implement an integrated marketing and communications strategy that attracts target markets and (2) foster positive behavioral intentions regarding relationship quality. Furthermore, the proposed method allows managers to non-confuse planning decisions and enhance the heterogeneous distinctiveness of diverse destinations using advanced topics modeling approaches.

8 | DISCUSSION

8.1 | Theoretical implications

Travelers visit destinations with distinct motivations to engage in activities that offer them specific benefits (hedonic, symbolic, and social) and vary due to the singular offers of each destination. In this regard, our research proposes vital insights into how different travelers' segments assess a short-rental listing in their online travel reviews (Lalicic et al., 2021) and differentiates the direction or strength of the associations between metatopics and

**FIGURE 11** Mosaic plot

†. C, coastal destination; U, urban destination

destinations. In particular, our analysis expands the research stream to emerging scholar areas, adequately combining geographical factors related to tourists' accommodation trends and functional, hedonic, and authentic local lifestyle experiences. "Although Airbnb and the sharing economy are global phenomena, their impact has a more than evident local component" (Moreno-Izquierdo et al., 2019).

Moreover, post-modern travelers precisely seek emotional, authentic, and unique experiences. And guests' narratives contain the genuine relationship with the host, the accommodation features and amenities, and their relevant experiences that impact future perceptions of the destination image (Lin et al., 2019; Shi et al., 2019). Understanding the hospitality service features for each destination (coastal or urban) from the demand side is thus of paramount

relevance for DMO. "While other sources of travel reviews (e.g., TripAdvisor) have been used to assess destination image and experiences, P2P accommodation reviews are often left aside" (Lalicic et al., 2021). To sum up, guests' narratives are here employed and analysed to understand which accommodation attributes guests mainly mention to develop tourism strategies to foster destinations' history and image. And although there are, overall, interdisciplinary themes in each narrative related to an Airbnb stay, our study applies NLP techniques and consequently detect cohesive stay-related features that are most informative.

Most research assesses tourist preference by adopting small group opinion-based methods (Sun et al., 2018) to explore whether customers' preferences determinants are locally generalizable across different destinations. Contrariwise, our analysis analyses a bulk set of UGC after an actual stay through its preprocessing (cleansing data) and data mining processing and subsequently applies a novel topic modeling to summarize a global dense semantic structure from a continuous semantic space and uses a product, feature-oriented approach. It focuses on a non-supervised hierarchical clustering of reduced embeddings to identify documents very similar in each cluster (or topic) of varying densities. In this regard, our study uses pre-trained embeddings to extract a latent semantic structure or topics (in a large collection of documents) which are more informative than topics proposed by the classic LDA or PLSA models, among others. Our analysis efficiently detects areas of highly similar documents and does not predefine the number of topics, nor does it profit multiple parameters as LDA does. As a result, our study identifies metatopics as easily interpretable and representative.

To sum up, following BERTopic approach (Grootendorst, 2020; cf. also Top2Vec, Angelov, 2020), our analysis exemplifies the relevance of using novel techniques to interpret the semantic structures hidden in data. Furthermore, according to the approximate similarities between the topics shown in the 2d-UMAP mapping, our method also displays how the destination shapes the UGC about Airbnb stays, consistent with our primary research objective, that is, the guests' narratives offer valuable information to subsequent travelers. Accordingly, our study recommends using BERTopic to identify recurring themes discussed in the corpora and can be used as a baseline for future research.

8.2 | Managerial implications

Our results are relevant for urban and coastal tourism development and a higher understanding of the essential relationships between destinations and P2P accommodations. In particular, it enables hosts to enhance marketing strategies and differentiate touristic short-rentals lodgings and travel experiences. Our findings thus provide practical results for Airbnb managers that should facilitate the conditions of a touristic experience based on services and activities (e.g., lodgings and attractions), and consequently, embellish the holistic experiences of the place visited (Cetin & Bilgihan, 2016).

In particular, people seek relaxation and recreation at the coast. Coastal Airbnb guests refer to recreational activities that include informal pleasures, swimming, surfing, snorkeling, and other sun-and-beach leisure activities. Guests highlight (in their reviews) amenities and services through which visitors pursue their comfort and enjoyment (e.g., hot tub, pool, and jacuzzi) or enjoy proximity to the beach, fresh air or nature tourism in conjunction with scenic esthetics (cf., metatopic E). Beyond the heterogeneity of coastal tourists, nature authenticity is essential. In particular, metatopics M and N are here preferential, that is, recreation on the beach experiences and ocean view of the natural surroundings. They are related explicitly to gratifying activities such as surfing associated with Hawaiian culture and lifestyle. Sports and adventure, relaxation or experiencing nature are also distinct preferences of tourists staying in nature destinations. These experiences create a sense of "place" and foster destination appeal.

Moreover, post-modern travelers precisely seek emotional, authentic, and unique experiences. Airbnb hosts should therefore (1) monitor guests' reviews, (2) promote these exotic and local authenticity aspects in their listing descriptions using, for instance, customized photography reflecting host and guest interactions (e.g., gratifying hosts' interactions related to check-in or "homely feelings"), and (3) create and intensify a favorable destination branding to differentiate their hospitality offerings. In addition, proximity to the ocean is a crucial attraction because of the implied closeness to the recreational activities offered on the beaches. In this regard, metatopic I identifies the homely atmosphere (represented in hosts' pictures) or stylish touch that allows parties to meet their needs and expectations.

The length of stay at any urban tourism destination is shorter than in beach surroundings which are more holiday-dependent. Consequently, guests (e.g., older tourists and those with a disability) assess metatopics (e.g., F or J) that enhance their visitor transport experience based on speed, safety and comfort, that is, efficient mobility and experiential connectivity (and inter-modality, e.g., walking—feasible only for short distances—cycling, with cycling support infrastructure—or public transport, among others). In urban destinations, tourism is the movement of travelers between main attractions. Guests who remain in urban destinations could desire cultural and traditional activities and educational and social factors (e.g., gastronomic culture). It is thus related to accommodation location measured as the distance from the apartment, tourist attractions and transportation hubs. In addition, walkable facilities and services of urban destinations allow enjoying short breaks or an extended weekend. For example, New York relates to shopping, sightseeing and theatre-going, and Chicago to the arts scene, cultural- and architecture-attractions.

A significant objective of transport policy is to achieve a sustainable, coordinated and integrated public transportation system and combine it with private transportation services, for example, Uber or Lyft related to transportation, taxis or shuttles. Overall urban guests could pay more (less) for entire apartments in highly (lowly) rated locations than coastal destinations, that is, guests partially focus

on which transport type to use at the destination. The inherent density of the metatopics based on transportation systems and neighborhood amenities that facilitate the flow of guests between features of the tourist experience (e.g., nightlife attractions) is (here) highly associated with urban destinations.

Finally, hospitality features based on home-like lodging conditions (e.g., household amenities and basic functionalities such as overall homely feel or functional amenities related to kitchen and bathroom, among others) are standard features influencing guests' decisions without establishing significant differences by type of destination.

9 | LIMITATIONS

Several limitations need to be acknowledged. First, "big data's characteristics of incompleteness, inaccessibility, and non-representativeness are generally problematic for academic research" (Cai, 2021, p. 7). Our study in isolation cannot thus firmly determine the motivations (e.g., cultural or sun, sea, and sand motives) for the traveler's stay. Second, although a representation of topics changes over time, future research should assess whether the topics and metatopics found in urban and coastal destinations are stable as time goes on. Third, the bias towards positive reviews unbalances our analysis of latent semantic structures. Again, however, future contributions should overcome them to yield generalizable results. Moreover, future research could compare our results with those achieved by other topic modeling approaches.

Finally, the essence of the sharing economy is conceptualized as obtaining, giving, or sharing access to goods and services without expecting any return. While Airbnb may not strictly conform to the sharing economy concept (Eckhardt & Bardhi, 2015), in our opinion, our study is closely aligned with the idea of the collaborative economy narrative. It analyses a commercial exchange (rentals) between amateur host and guest (cf. Palgan et al., 2017). Amateur hosts grant each other temporary access to underutilised physical assets such as a second homes (cf. Frenken & Schor, 2017). Second homes are likely used to take advantage of an opportunity for passive income and rent them out through community-based online services. Future research should, however, critically interrogate the sharing economy concept concerning the accommodation-sharing platform Airbnb.

ACKNOWLEDGMENTS

Research Group SEJ-494, Andalusian Regional Government, Spain.
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How to cite this article: Sánchez-Franco, M. J., Rey-Moreno, M. (2022). Do travelers' reviews depend on the destination? An analysis in coastal and urban peer-to-peer lodgings. *Psychol Mark*, 39, 441–459. <https://doi.org/10.1002/mar.21608>

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Consumer Trust, Value, and Loyalty in Relational Exchanges

Article in *Journal of Marketing* · January 2002

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Source: *Journal of Marketing*, Vol. 66, No. 1 (Jan., 2002), pp. 15-37

Published by: [American Marketing Association](#)

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Consumer Trust, Value, and Loyalty in Relational Exchanges

The authors develop a framework for understanding the behaviors and practices of service providers that build or deplete consumer trust and the mechanisms that convert consumer trust into value and loyalty in relational exchanges. The proposed framework (1) uses a multidimensional conceptualization for the trustworthiness construct; (2) incorporates two distinct facets of consumer trust, namely, frontline employees and management policies and practices; and (3) specifies value as a key mediator of the trust–loyalty relationship. The authors test the proposed model using data from two service contexts—retail clothing ($N = 264$) and nonbusiness airline travel ($N = 113$). The results support a tripartite view of trustworthiness evaluations along operational competence, operational benevolence, and problem-solving orientation dimensions. Moreover, the authors find evidence of contingent asymmetric relationships between trustworthiness dimensions and consumer trust. For frontline employees, benevolent behaviors demonstrate a dominant “negativity” effect (i.e., a unit negative performance has a stronger effect than a unit positive performance), whereas problem-solving orientation has a dominant “positivity” effect (i.e., a unit positive performance has a stronger effect than a unit negative performance). Value completely mediates the effect of frontline employee trust on loyalty in the retailing context and partially mediates the effect of management policies and practices trust on loyalty in the airlines context. The role of frontline employees is more critical in the retailing context, whereas management practices and policies play the dominant role in the airlines context. Overall, the proposed framework successfully models trust and loyalty mechanisms across the two industries examined in the study, while remaining sensitive to essential contextual differences.

The growing importance of relationship marketing has heightened interest in the role of trust in fostering strong relationships. As Berry (1996, p. 42) asserts, “the inherent nature of services, coupled with abundant mistrust in America, positions trust as perhaps the single most powerful relationship marketing tool available to a company.” Likewise, Spekman (1988, p. 79) has observed that trust is the “cornerstone” of long-term relationships. Not surprisingly, several conceptual (Gundlach and Murphy 1993; Nooteboom, Berger, and Noorderhaven 1997) and empirical (Garbarino and Johnson 1999; Tax, Brown, and Chandrashekaran 1998) studies have posited trust as a key determinant of relational commitment. For example, Urban, Sultan, and Qualls (2000) propose customer trust as an essential element in building strong customer relationships and sustainable market share. More directly, Reichheld and Schefter (2000, p. 107) observe that “[t]o gain the loyalty of customers, you must first gain their trust.”

Despite the well-recognized significance of trust building in consumer–firm relationships, few studies have exam-

ined company behaviors and practices that build or deplete consumer trust or the mechanisms by which these behaviors/practices contribute to trust enhancement and/or depletion. Instead, most studies have focused on the consequences of perceived trust for outcomes such as loyalty and cooperation (Garbarino and Johnson 1999; Tax, Brown, and Chandrashekaran 1998). Therefore, although sufficient evidence exists to suggest that trust matters for critical relational outcomes, fundamental gaps remain in the understanding of the factors that build or deplete consumer trust and the mechanisms that might explain the process of trust enhancement or depletion in consumer–firm relationships.

This research aims to fill the preceding gap in the literature. Specifically, four aspects of our study are noteworthy. First, we distinguish between trustworthiness and trust; develop a multifaceted, multidimensional model of the behavioral components of trustworthiness; and examine their differential effects on consumer trust. The focus on specific behavioral dimensions for two key facets of relational exchanges—frontline employee (FLE) behaviors and management policies and practices (MPPs)—is conceptually appealing because these dimensions and facets are rooted in strong theoretical frameworks and facilitate a fine-grained understanding of their differential effects on consumer trust. Moreover, this focus is managerially useful because it pinpoints those frontline behaviors and management practices that likely are the key drivers of consumer trust. Second, in mapping the mechanisms that link trustworthy behaviors and practices to consumer trust, we do not limit our conceptualizations to simple, linear relationships. Instead, on the basis of emerging theoretical ideas in social psychology and decision-making research, we postulate contingent asymmetric relationships. Specifically, we allow

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for the possibility that the trust-building effect of a unit positive change in performance on any factor of trustworthy behaviors/practices may not be equivalent to the trust depletion effect produced by a unit negative change in performance. Managerially, this implies that for some dimensions, negative performance may not deplete consumer trust significantly, and positive performance on other dimensions may not build consumer trust. Linear conceptualizations fail to reveal such theoretically and managerially interesting asymmetries. Third, we do not study consumer trust in isolation. Rather, we test a nomological model that proposes interrelationships among consumer trust and loyalty, in which value serves as a critical mediating variable. This approach provides several advantages, including (1) a direct confrontation of the thesis that consumer trust matters in relational exchanges, (2) understanding the differential effects of trust facets on value and loyalty, and (3) insights into mechanisms that link consumer trust and loyalty. To enhance the validity of our nomological model, we control for recency effects by partialling out the effect of satisfaction, a transactional variable capturing customers' experiences during the most recent episode. Fourth, to examine the sensitivity of the proposed model, we use data from two different relational service contexts for empirical testing. In particular, we use data from retail (i.e., major clothing purchase from a frequently visited department store) and service (i.e., nonbusiness travel on a frequently used airline) industries. We begin our discussion with the proposed conceptual model.

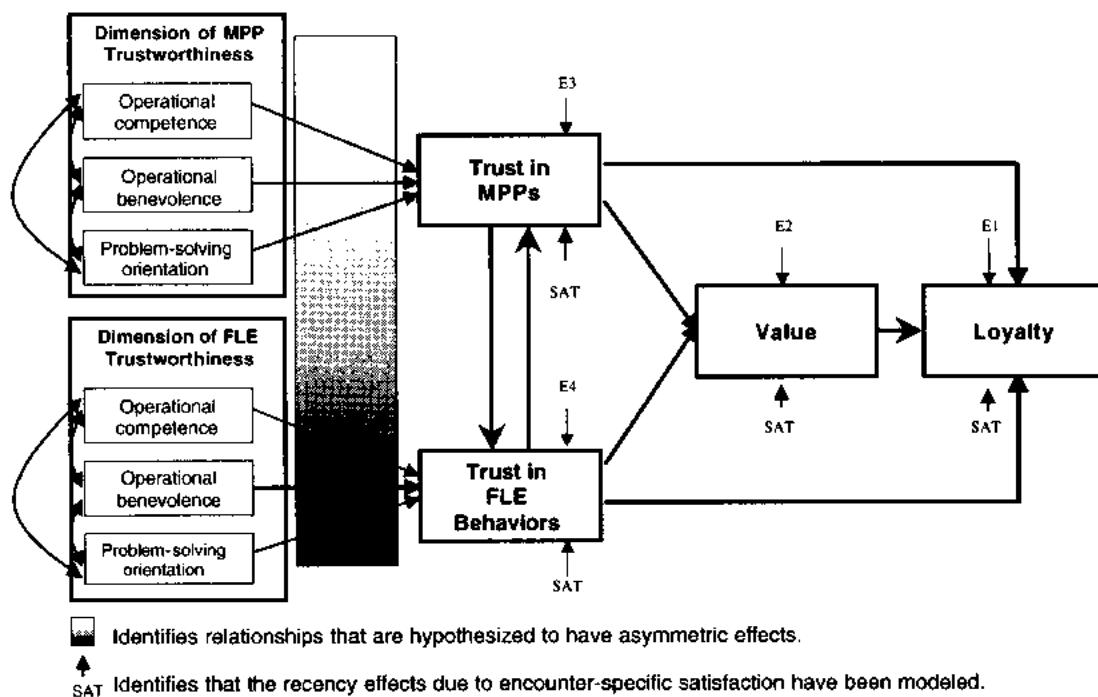
A Model of Trustworthy Behaviors and Practices, Trust, Value, and Loyalty

The conceptual model guiding this research is depicted in Figure 1. The proposed model draws from the diverse research on trust in social relationships (Deutsch 1958; Sorrentino et al. 1995) and interorganizational relationships (Moorman, Deshpande, and Zaltman 1993; Morgan and Hunt 1994). However, we recognize that the distinct characteristics of consumer-firm exchanges, including unique structural aspects (Fournier, Dobscha, and Mick 1998), asymmetric relationship motivations (Deighton and Grayson 1995), and desired end states (Gwinner, Gremler, and Bitner 1998), make the direct translation of constructs from other contexts difficult at best and inappropriate at worst. Therefore, we used caution in translating constructs and adapting conceptualizations based on related literature in consumer behavior. We begin our discussion of the proposed model by conceptualizing consumer trust and distinguishing it from trustworthy behaviors and practices.

Facets of Consumer Trust and Trustworthy Behaviors and Practices

As in Figure 1, we conceptualize consumer trust as a multi-faceted construct, involving FLE behaviors and MPPs as distinct facets. In the literature, some authors have conceptualized trust in conative or behavioral terms (Ganesan 1994; Mayer, Davis, and Schoorman 1995). Emphasizing behavioral intent, Moorman, Zaltman, and Deshpande

FIGURE 1
The Empirical Model Tested for Estimating the Interrelationships Among Trustworthiness, Trust, Value, and Loyalty



(1992, p. 315) define trust as "a willingness to rely on an exchange partner in whom one has confidence." Other researchers use cognitive or evaluative definitions of trust, arguing that the link between trust evaluations and behavioral response should be open to empirical investigation and likely subject to the influence of other contextual factors (Doney and Cannon 1997; Morgan and Hunt 1994). Adopting this approach, Morgan and Hunt (1994, p. 23) define trust "as existing when one party has confidence in the exchange partner's reliability and integrity." Therefore, we define consumer trust as the expectations held by the consumer that the service provider is dependable and can be relied on to deliver on its promises.¹

Consumers' trust in the service provider is hypothesized to develop around two distinct facets, FLEs and MPPs.² In most service contexts, these facets are structurally distinct nodes around which the customer is likely to make independent judgments during the course of a service exchange. For example, it is plausible for a consumer to trust a retail clothing store's management but view its salespeople with less trust or, perhaps, with distrust. These differences may occur because the inferential basis of evaluations is different; FLE evaluations are based on observed behaviors that are demonstrated during the service encounter, whereas MPP judgments are based on the policies and practices governing the exchange. The inclusion of multiple facets in consumer evaluations of services has been supported by several authors (Crosby and Stephens 1987; Doney and Cannon 1997; Singh 1991). Crosby and Stephens (1987) conceptualize consumers' overall satisfaction with a service as having three distinct facets, including satisfaction with (1) the contact person, (2) the core service, and (3) the organization. Likewise, in a medical service context, Singh (1991) demonstrates that the consumer's judgments of satisfaction at three distinct nodes, including the physician, hospital, and insurance provider, achieve discriminant validity.

More important, the preceding studies demonstrate that a multifaceted conceptualization is not only consistent with data on consumer/buyer judgments but also more likely to reveal the differential effects of the facets. For example, in Crosby and Stephens's (1987) study, each facet of satisfaction relates to different sets of antecedents (e.g., contact person satisfaction is mostly sensitive to interactional factors) and contributes uniquely to overall satisfaction. Likewise, Macintosh and Lockshin (1997) find that for customers with strong interpersonal ties with a retail salesperson, store loyalty and purchase intentions are influenced more strongly by salesperson trust than by store trust. In contrast, trust in the store was a critical determi-

¹Unless otherwise specified, the term "service provider" is used in this article to refer to the service organization as an entity. When appropriate, distinct facets including company management and FLEs are identified and referred to separately.

²The specific facet of interest in this research is "management policies and practices," or MPPs, rather than management. The focus is on the specific domain of policies and practices that consumers experience rather than consumers' overall perceptions of the company's management.

nant of store loyalty for consumers without such interpersonal ties.

Consequently, trustworthy behaviors and practices are conceptualized distinctly for FLEs (i.e., trustworthy behaviors) and management (i.e., trustworthy practices). We define trustworthiness to include FLE behaviors and MPPs that indicate a motivation to safeguard customer interest. Recognizing that only a subset of the complete domain of observed behaviors and practices is likely to be relevant for the trustworthiness construct, prior research has sought to identify valid and relevant dimensions (Ganesan 1994; Smith and Barclay 1997). Invariably, a multidimensional conceptualization is suggested that includes notions of (1) competence and (2) benevolence. Next, we develop and extend this conceptualization by including problem-solving orientation as the third dimension of trustworthiness. We initially propose hypotheses for direct, linear, symmetric effects of trustworthy behaviors and practices on their corresponding trust facets. Thereafter, we discuss the potential for asymmetries and propose hypotheses for empirical testing. This coheres with our methodological approach, in which we examine the asymmetrical hypotheses for their incremental contribution to a baseline model of symmetrical effects.

Readers will note that our discussion of the development of trustworthiness cognitions in the following sections is in the context of "experience" services, in which consumers have the ability to make judgments by processing experience information. In contrast, judgments of trustworthiness and development of trust in "credence" contexts are more likely to approximate bonding and signaling processes, because consumers are unable to obtain experience-based information veridical to the judgment at hand. We allude to this alternative mechanism subsequently.

Dimensions of Trustworthy Behaviors and Practices and Their Effects on Trust

Operational competence. The expectation of consistently competent performance from an exchange partner has been noted as a precursor to the development of trust in a variety of business relationship contexts. For example, Mayer, Davis, and Schoorman's (1995, p. 717) conceptual model includes ability, or "that group of skills, competencies, and characteristics that enable a party to have influence within some specific domain," as a key element of trustworthiness. Likewise, Smith and Barclay (1997) define role competence as the degree to which partners perceive each other as having the skills, abilities, and knowledge necessary for effective task performance. Sako (1992, p. 43) goes as far as to say that "competence trust is a prerequisite for the viability of any repeated transaction." Empirically, competence-related dimensions have been found to exert a strong influence on trust in diverse contexts. For selling alliances in the computer industry, Smith and Barclay (1997) find that perceptions of role competence have a significant effect on the partner's willingness to invest in the relationship. Doney and Cannon (1997) find that salesperson expertise is a significant predictor of the buyer's trust in the salesperson.

We extend the preceding discussion by focusing on the notion of operational competence in service exchanges. By

operational competence, we imply the competent execution of visible behaviors as an indication of "service in action" (e.g., response speed) and distinguish it from the inherent competence (e.g., knowledge) of FLEs and MPPs. In consumer-service provider exchanges, this operational focus is appropriate because competence judgments are typically based on observation of FLE behaviors and/or MPPs. For example, a retail salesperson may possess the knowledge or ability required to perform his or her role, but unless this knowledge is translated into observable behaviors (e.g., helping the consumer in finding a desired style of clothing), it is less likely to be processed as an indication of trustworthiness. Likewise, although management may be technically competent, consumers would likely lack information to make competency judgments unless it is indicated by visible practices (e.g., providing enough check-out counters to reduce wait times). Therefore, we propose that consumer judgments of operational competence are a critical determinant of trust and are drawn from the relevant domains of FLE behaviors and MPPs.

H_1 : The consumer's perception of the operational competence evident in FLE behaviors is positively related to FLE trust.

H_2 : The consumer's perception of the operational competence evident in MPPs is positively related to MPP trust.

Operational benevolence. Operational benevolence is defined as behaviors that reflect an underlying motivation to place the consumer's interest ahead of self-interest. Our notion of operational benevolence recognizes that simply having a benevolent motivation is not sufficient; rather, this motivation needs to be operationalized in visible FLE behaviors and MPPs that unambiguously favor the consumer's interest, even if a cost is incurred in the process. Sako (1992, p. 39) refers to this dimension as "goodwill trust" and notes that, unlike competence trust, a benevolent partner "can be trusted to take initiatives [favoring the customer] while refraining from unfair advantage taking." Benevolent behaviors provide diagnostic evidence of trust because by going beyond the terms of the explicit "contract," the service provider indicates proconsumer motivations, restraint on self-serving opportunism, and a willingness to assume fiduciary responsibility (Barber 1983; Ganesan and Hess 1997; Morgan and Hunt 1994). Consequently, benevolent behaviors and practices are often regarded as "extra-role" actions that are performed at a cost to the service provider with or without commensurate benefits. Empirical findings generally corroborate the influence of operational benevolence in the development of trust (Hess 1995; Smith and Barclay 1997). In a study of consumer trust in a brand, Hess (1995) demonstrates that altruism, or the perception that the brand has the consumer's best interests at heart, explains the greatest proportion (40%) of variance in trust. Smith and Barclay (1997) report that character (including operational benevolence) has a significant impact on investment in buyer-seller relationships. Likewise, McAllister (1995) finds that the manager's affective trust in a peer is positively affected by the citizenship or extra-role behaviors.

Extending the preceding research to consumer-service provider exchanges, we propose that consumers formulate

perceptions of operational benevolence separately for FLEs and management on the basis of corresponding behaviors and practices. For example, airline management might provide evidence of operational benevolence by instituting practices that indicate respect for the customers and favor their best interests (e.g., upgrading passengers, providing more leg room). In turn, because operational benevolence is associated with restrained opportunism and building "goodwill," consumers are thought to reciprocate benevolent FLE behaviors (MPPs) by placing greater trust in the FLE (management).

H_3 : The consumer's perception of the operational benevolence evident in FLE behaviors is positively related to FLE trust.

H_4 : The consumer's perception of the operational benevolence evident in MPPs is positively related to MPP trust.

Problem-solving orientation. Finally, problem-solving orientation is defined as the consumer's evaluation of FLE and management motivations to anticipate and satisfactorily resolve problems that may arise during and after a service exchange. It is recognized that (1) problems often arise during the course of service delivery (Bitner, Booms, and Tetreault 1990; Zeithaml and Bitner 1990) and/or in the postexchange phase (Smith, Bolton, and Wagner 1999; Tax, Brown, and Chandrashekaran 1998) because of service heterogeneity (e.g., large variance in service delivery) and intangibility (e.g., quality can be reliably judged only after experience), and (2) the manner in which service providers approach such problems are critical incidents that provide insight into the character of the service provider (Kelley and Davis 1994; Smith, Bolton, and Wagner 1999). Interest in the problem-solving orientation of service providers can be traced to prior work on the role of service recovery in consumer evaluations. For example, Goodwin and Ross (1992) suggest that problem-solving perceptions are affected by the nature and promptness of company effort. Likewise, Smith, Bolton, and Wagner (1999) find that failures in the process of service delivery (attributed to the FLE) are a greater cause of dissatisfaction than are tangible problems such as stock-outs. Hart, Heskett, and Sasser (1990, p. 151) note that "every customer's problem is an opportunity for the company to prove its commitment to service [and build trust]—even when the company is not to blame."

The services literature offers conceptual and empirical evidence to suggest that problem-solving orientation is a distinct factor in consumer judgments. Zeithaml and Bitner (2000, p. 179) note that "for service employees, there is a specific need for [problem-solving] training.... [E]ffective recovery skills include hearing the customer's problems, taking initiative, identifying solutions, and improvising." Calantone, Graham, and Mintu-Wimsatt (1998, p. 21) emphasize the unique aspects of problem solving, noting that it is "characterized by behaviors that are cooperative, integrative, needs-focused, and information-exchange oriented." Levesque and McDougall (2000) go so far as to suggest that problem-solving contexts involve unique "exchanges" that occur within the context of the larger consumer-firm relationship.

As such, behaviors that demonstrate a problem-solving orientation are related to but distinct from those demon-

strated during routine contexts. Specifically, such behaviors demonstrate the firm's ability and motivation to sense and resolve customer problems during and after exchange episodes. Although operational competence and operational benevolence are likely to be implicated during problem solving, they are not likely to capture the unique cognitive judgments that arise during and after problem resolution.³ Consequently, we argue that they cannot be subsumed under the other two dimensions, and we propose problem-solving orientation as a distinct dimension of trustworthiness. Surprisingly, the role of problem-solving orientation has not been examined in most trust research to date. One exception is a study by Tax, Brown, and Chandrashekaran (1998) that uses the justice literature to propose that fairness in problem solving is crucial to consumer evaluations of satisfaction and trust in a range of service industries (e.g., bank, telecommunications firm, health care insurer). Their results indicate that first-time customers' dissatisfaction with problem handling was strongly and directly related to trust in the service organization ($\beta = -.73$). This was also evident for existing customers ($\beta = -.70$), though favorable prior experiences dampened this effect.

Drawing on the preceding literature, we posit that in service contexts, consumers garner evidence from FLE behaviors and MPPs that facilitates evaluation of the problem-solving orientation of each facet (i.e., FLEs and MPPs). However, this evidence is not limited to postconsumption service failures and may include problems that the customer faces during the actual service encounter. For example, during the course of a flight, a distressed airline passenger may require assistance from a flight steward in contacting family on the ground. Similarly, airline policies and practices for locating and retrieving lost baggage may provide critical evidence of trustworthiness. Consequently, we posit that consumers are alert to evidence of problem-solving orientation throughout the process of service consumption and use this evidence to formulate trust judgments. Therefore,

H₅: The consumer's perception of the problem-solving orientation evident in FLE behaviors is positively related to FLE trust.

H₆: The consumer's perception of the problem-solving orientation evident in MPPs is positively related to MPP trust.

Thus far, we have proposed that (1) consumers use evidence from three critical domains of FLE behaviors and MPPs, including operational competence, operational benevolence, and problem-solving orientation, and (2) judgment of trust in the FLE and management is directly affected by consumers' perceptions of trustworthy behaviors and practices. In developing the hypotheses for asymmetric

effects of trustworthy behaviors and practices on trust, we view hypotheses H₁ to H₆ as the baseline model of linear effects and examine the potential for asymmetries.

Asymmetric Effects of Trustworthy Behaviors and Practices on Consumer Trust

Although trust research has mostly focused on linear effects, we propose that trustworthy behaviors and practices may exert asymmetric effects on trust. That is, for any dimension of trustworthy behaviors and practices, negative versus positive performance may have a differential impact on consumer trust. The limited research in marketing proposing asymmetric effects has primarily argued for negativity, or the dominance of negative over positive information in judgments (Anderson and Sullivan 1993; Mittal, Ross, and Baldasare 1998). Theoretical support for these predictions has been primarily drawn from Kahneman and Tversky's (1979) loss-aversion hypotheses and from Wyer and Gordon's (1982) notion of distinctive coding of negative events in memory. Empirical support for these theoretical predictions has been found in several streams, including multiattribute judgments (Kahn and Meyer 1991), effects of performance on disconfirmation (Mittal, Ross, and Baldasare 1998), effects of disconfirmation on customer satisfaction (Anderson and Sullivan 1993), and effects of service quality on behavioral consequences (Zeithaml, Berry, and Parasuraman 1996).

We extend this work by drawing on research in norm theory (Herzberg 1966) and cue diagnosticity in social judgments (Oliver 1997; Skowronski and Carlston 1987; Taylor 1991) to propose "contingent" asymmetric effects where either negativity or positivity effects may be observed. In accord with the classic need satisfaction theories, such as Herzberg's (1966) dual-factor theory, researchers distinguish between "hygienes" (the dissatisfaction-avoidance factors) and "motivators" (the satisfaction-producing factors). Negative performance on hygienes has a stronger effect on satisfaction than does positive performance, in accord with the negativity effect. In the case of motivators, however, stronger effects are expected for positive performance than for negative performance. Drawing from cue diagnosticity theory, Skowronski and Carlston (1987) note that the perceptual interpretation of performance on an attribute is affected by the person's neutral point (anchor) for that attribute compared with other attributes. If past performance indicates that positive (negative) performance is the norm, then negative (positive) performance on that attribute may carry a greater weight in subsequent judgments. As such, this view rejects the notion that negativity effects are pervasive and argues that both negativity and positivity effects are plausible "contingent" on the nature of the attribute. Several authors have found support for this contingency hypothesis (Maddox 1981; Swan and Combs 1976). In the context of clothing purchases, Swan and Combs (1976) identify "instrumental" (hygiene) factors—including durability and construction—that are expected to contribute to maintaining satisfaction or to lead to dissatisfaction when performance is poor. Another set of factors, identified as "expressive" (motivators)—including styling and color—is expected to enhance or maintain satisfaction. However, dissatisfaction is not expected to result from poor "expressive"

³As we discuss in the "Methods" section, we collected qualitative data (through focus groups and depth interviews) to substantiate inductively the key dimensions of trustworthiness in consumer-firm relationships. Independent judges who were provided with definitions for each dimension coded and sorted data into prespecified dimensions. The notion that problem-solving orientation may be a salient and distinct factor in consumers' trust judgments was evident in these codings. Specifically, judges coded a significant number of the total responses into problem-solving orientation for FLEs (23%) and MPPs (23%).

performance. The results of the study support the predictions based on theory. Even in Mittal, Ross, and Baldasare's (1998) study that proposes hypotheses solely based on negativity arguments, some evidence of contingent effects is obtained. In their analysis of automobile satisfaction, Mittal, Ross, and Baldasare report that for the attribute of "interior roominess," the regression coefficient for positive performance is about threefold larger than for negative performance (.49 versus .17), suggesting a positivity effect.

Although we draw from the preceding literature to propose asymmetric relationships between trustworthy dimensions and trust facets, it is difficult to predict directional hypotheses because of three limitations of prior research. First, to our knowledge, extant trust research (Lewicki, McAllister, and Bies 1998; Singh and Sirdeshmukh 2000) has not empirically examined propositions regarding the proposed asymmetry in the underlying mechanisms. As a result, confidence in the conceptual arguments remains tentative until a base of empirical support is built. Second, these studies primarily discuss asymmetry in the consequences of trust versus distrust (rather than the determinants of trust). For example, Singh and Sirdeshmukh (2000) propose that the absolute magnitude of the influence of competence distrust on prepurchase expectations would be greater than competence-based trust. Asymmetric influences of trust determinants have not been proposed or empirically tested to date. Third, this stream of work has focused on loss aversion-based hypotheses, ignoring the possibility of contingent effects. For FLE operational benevolence, it is possible that consumers expect FLEs to work for the customers' best interests (e.g., "after all, that is what they are hired for") so that a negativity effect may be more plausible. Alternatively, the FLE may be so closely associated with self-serving or profit-making interests (e.g., in the case of automobile retailing) that when an FLE behaves benevolently, a positivity effect is evident. These asymmetrical relationships may be contingent not only on the dimension of trustworthiness but also on the service context. Therefore, we adopt an exploratory perspective and posit nondirectional asymmetrical hypotheses.

H_7 : FLE (MPP) trust will be affected asymmetrically by a unit positive change in FLE (management) operational competence versus a unit negative change.

H_8 : FLE (MPP) trust will be affected asymmetrically by a unit positive change in FLE (management) operational benevolence versus a unit negative change.

H_9 : FLE (MPP) trust will be affected asymmetrically by a unit positive change in FLE (management) problem-solving orientation versus a unit negative change.

Reciprocal Relationship Between FLE Trust and MPP Trust

Consumer trust in FLEs is proposed to influence MPP trust directly, consistent with agency theory (Bergen, Dutta, and Walker 1992) and research on the role of causal attributions in judgments (Folkes 1988). According to agency theory, FLEs interact with a customer as agents of the firm, presumably acting within the roles prescribed by management rather than as completely independent entities. Therefore, greater consumer trust in FLEs is likely to generate a higher

level of consumer trust in the management—the principal that apparently controls and determines the behaviors of the agent. Likewise, attribution theory proposes a related mechanism whereby consumers attribute FLE trust in part to management involvement in FLE hiring, training, service culture, and other practices (Heskett, Sasser, and Schlesinger 1997). Although FLE behaviors are directly observable, the reasons underlying the behaviors must be inferred by consumers. To the extent that the consumer attributes the locus and controllability of the causes underlying FLE behaviors to MPP, FLE trust is likely to influence MPP trust (Folkes 1988). Empirical support is forthcoming from the services literature (Bitner, Booms, and Tetreault 1990; Crosby and Stephens 1987). For example, Crosby and Stephens (1987) demonstrate that satisfaction with the contact employee contributes to the customers' judgment of the core service.

The literature also offers support for a reciprocal relationship such that consumers' judgments of MPP trust are likely to enhance trust in the FLE.⁴ Doney and Cannon (1997) argue that when customers have limited knowledge of the salesperson, their trust in the firm is likely to have a direct impact on trust in the salesperson through a process of affect transfer. The authors find support for the proposed reciprocal effects, though salesperson trust had a stronger effect on trust in the firm ($\beta = .77$) than the reverse effect did ($\beta = .52$). In our research, consumers are evaluating providers with which they are in a relational exchange (i.e., they have experience and familiarity with the provider and its employees). In such contexts, the process of affect transfer is less likely to determine FLE trust; rather, judgments based on observed behaviors are likely to dominate, as proposed previously. Therefore, in the present research context, we posit the following:

H_{10} : FLE trust will have a reciprocal influence on MPP trust such that the direct effect of FLE trust on MPP trust is larger than the reciprocal influence.

Consumer Trust and Loyalty

Consistent with prior research, consumer trust in the FLE and MPPs is posited to affect consumer loyalty toward the service provider directly. Consumer loyalty is indicated by an intention to perform a diverse set of behaviors that signal a motivation to maintain a relationship with the focal firm, including allocating a higher share of the category wallet to the specific service provider, engaging in positive word of mouth (WOM), and repeat purchasing (Zeithaml, Berry, and Parasuraman 1996).

The proposed relationship between consumer trust and loyalty is supported by reciprocity arguments. When providers act in a way that builds consumer trust, the perceived risk with the specific service provider is likely reduced, enabling the consumer to make confident predictions about the provider's future behaviors (Mayer, Davis, and Schoorman 1995; Morgan and Hunt 1994). Here, we distinguish between relational risk (i.e., perceived risk within the relational exchange context) and industry risk (i.e., perceived risk in a specific industry such as medical,

⁴We thank a reviewer for suggesting that we investigate this reciprocal relationship.

airline, or hair styling). The mechanisms involving these two types of risk may be different in nature and independent. For example, industry risk is likely to moderate rather than mediate the trust–loyalty relationship within an exchange. While recognizing the potential role of industry risk, we focus on relational risk for the purposes of our study. When service providers' behaviors and practices reduce relational risk, the reciprocity literature argues that consumers are likely to act "cooperatively" toward such a trustworthy service provider to maintain trust, by demonstrating behavioral evidence of their loyalty (Gassenheimer, Houston, and Davis 1998). Thus, with increasing trust in FLE and MPPs, consumers' loyalty is likely enhanced.

Trust also influences loyalty by affecting the consumer's perception of congruence in values with the provider (Gwinner, Gremler, and Bitner 1998). When there is perceived similarity in values between the firm and the consumer, the consumer's embeddedness in a relationship is enhanced, promoting reciprocity and contributing to relational commitment. Gwinner, Gremler, and Bitner (1998) demonstrate that such value congruence is significantly related to the consumer's loyalty and satisfaction. For this reason, we propose the following:

- H₁₁: The consumer's loyalty toward the focal firm will be positively influenced by FLE trust.
H₁₂: The consumer's loyalty toward the focal firm will be positively influenced by MPP trust.

The Mediating Role of Value in the Trust–Loyalty Relationship

We posit an alternative mechanism for the trust–loyalty relationship whereby value mediates the effect of trust on loyalty. Following Zeithaml (1988), we define value as the consumer's perception of the benefits minus the costs of maintaining an ongoing relationship with a service provider. Relational benefits include the intrinsic and extrinsic utility provided by the ongoing relationship (Gwinner, Gremler, and Bitner 1998; Neal and Bathe 1997), and associated costs include monetary and nonmonetary sacrifices (e.g., time, effort) that are needed to maintain the relationship (Houston and Gassenheimer 1987; Zeithaml 1988).

Goal and action identification theories provide a conceptual framework for hypothesizing the mediating role of value in relational exchanges (Carver and Scheier 1990; Vallacher and Wegner 1987). Together, these theories posit that (1) consumer actions are guided or "identified" by the underlying goal they are expected to help attain; (2) multiple and sometimes conflicting goals may be operative at any instance; (3) goals are organized hierarchically, with superordinate goals at the highest level and subordinate goals at the lowest level; and (4) consumers regulate their actions to ensure the attainment of goals at the highest level. As such, superordinate goals are desired end states, whereas focal and subordinate goals serve instrumental roles. Bagozzi and Dholakia (1999) and Bagozzi (1992) have recently discussed the significance of goal and action identification theories for consumer behavior. We supplement and extend this work to the study of relational exchanges.

Using the perspective of goal and action identity theories, we posit value as the superordinate consumer goal in

relational exchanges.⁵ The central role of consumer value has been conceptualized (Houston and Gassenheimer 1987; Neal 1999; Woodruff 1997) and empirically demonstrated (Bolton and Drew 1991; Grisaffe and Kumar 1998) in the marketing literature. As "value-maximizers" (Kotler 2000, p. 32), consumers are thought to consummate exchanges with providers that provide maximal value. The key role of value is also notable in calls for building "consumer-value-centric" organizational processes and competencies (Heskett, Sasser, and Schlesinger 1997; Srivastava, Shervani, and Fahey 1999). For example, Srivastava, Shervani, and Fahey (1999, p. 172) assert that "the value ... experienced by end customers is the driving obsession [of organizations]." Holbrook (1994, p. 22, emphasis in original) goes as far as to note that "customer value is the fundamental basis for all marketing activity."

Value, in turn, is hypothesized to be affected by judgments of FLE and MPP trust. Specifically, trust creates value by (1) providing relational benefits derived from interacting with a service provider that is operationally competent, benevolent toward the consumer, and committed to solving exchange problems and (2) reducing exchange uncertainty and helping the consumer form consistent and reliable expectations of the service provider in ongoing relationships. Although no empirical study has examined this hypothesis, indirect support is forthcoming from the service quality literature. For example, in the context of telephone services, Bolton and Drew (1991) find a positive association between global service assessment ("easy to do business with") and value. Kerin, Jain, and Howard (1992) report a similar effect on value in a retail context using a composite measure of FLE friendliness and store MPPs (e.g., variety, check cashing policy).

On the basis of self-regulation processes, we posit that value, a superordinate goal, regulates consumer actions at the lower level, including behavioral intentions of loyalty toward the service provider (Carver and Scheier 1990). Consumers are expected to regulate their actions—that is, engage, maintain, or disengage behavioral motivation—to the extent that these actions lead to attainment of superordinate goals. Accordingly, consumers are hypothesized to indicate behavioral intentions of loyalty toward the service provider as long as such relational exchanges provide superior value. Otherwise, the consumer is motivated to disengage, demonstrating lack of loyalty. By focusing on behavioral motivation, we recognize that in some circumstances, individual choice may be constrained by switching costs, market constraints, or other impediments such that while the behavioral motivation exists, the consumer is unable to disengage. The notion that value drives loyalty, albeit imperfectly, has substantial support among marketing practitioners (Neal 1999) and scholars alike (Chang and Wildt 1994). For example, Bolton and Drew (1991) report that value is a significant determinant of consumers' behavior intentions to remain loyal to a telephone service by continuing the rela-

⁵In a broader context, the consumer's life values (e.g., happiness, love, security) are the "super-superordinate" goals, and obtaining value in market exchanges is a lower-level goal. Our point is that within a market exchange context, the superordinate goal for most consumers is to obtain maximal value, or more aptly "market value."

tionship and engaging in positive WOM. Empirical support for this linkage is also established in different contextual settings by Chang and Wildt (1994) and Grisaffe and Kumar (1998).

Because loyalty is regulated by the consumer's superordinate goal of value, we posit that trust will affect loyalty through its influence in creating value. This parallels the mediational role of value hypothesized and tested in service quality-loyalty relationships in prior research (Chang and Wildt 1994; Grisaffe and Kumar 1998). For example, Chang and Wildt (1994) report that value mediates the perceived quality-loyalty link in the context of personal computers and apartments. However, Grisaffe and Kumar's (1998) research indicates that though value may be a significant mediator of the service quality-loyalty relationship, it does not imply that value fully mediates the effect of quality. In their study of office products and financial services, the authors find that though value mostly mediates the effect of quality on positive WOM, quality continues to have residual direct effects on positive WOM that are borderline significant. Similarly, we hypothesize that value partially mediates the relationship between trust and loyalty. Direct effects of trust on loyalty may achieve significance, consistent with H_{11} and H_{12} , in addition to the mediated effect through value. Therefore,

H_{13} : Consumer loyalty toward the service provider will be positively influenced by value.

H_{14} : Value will be positively influenced by FLE trust.

H_{15} : Value will be positively influenced by MPP trust.

Research Design and Method

Overall Considerations

Two industries, retail (clothing purchases) and services (nonbusiness airline travel), were selected as the exchange context for this research. The use of multiple service categories provides a robust test of model relationships by allowing greater variability in study constructs. By means of multiple-group path analysis procedures, the modeled relationships can be examined simultaneously and compared for equivalence across the two service contexts. This procedure allows for a systematic examination of salient similarities and differences across the service contexts.

The service contexts selected for the study possessed multiple desired characteristics, including (1) experience properties, (2) distinct role of the FLE, (3) consequentiality, and (4) variability in the significance of MPP and FLE. We preferred experience service contexts because such contexts enable consumers to observe and evaluate behaviors of service providers and are consistent with the behavioral focus of the trustworthiness construct. In contrast, in credence contexts, trust development is likely affected by signals that convey credibility and bonding, given the consumer's inability to interpret and process behavioral evidence (Bergen, Dutta, and Walker 1992; Singh and Sirdeshmukh 2000). We preferred consequential service contexts because we reasoned that less consequential and relatively risk-free exchanges were more likely to evidence transactional characteristics and therefore, *a priori*, were less relevant to trust

development. On the basis of some evidence from the qualitative work and our judgments, we asked consumers to focus on exchanges with a retail store that involved at least a \$50 purchase in the last visit and at least two visits over the past six months. If consumers could not come up with exchanges that satisfied the preceding qualifying criteria, they were excluded. Likewise, for airline travel, we asked consumers to focus on exchanges with an airline company for which they have a frequent flyer account and made at least one nonbusiness trip during the past six months. Finally, we preferred service contexts that indicated a distinct role for the FLE and variability in the relative effects of FLE and MPP trust. We reasoned that relationships with the FLE could range from "close" to "distant," and this might influence the relative effect of FLE trust. Recently, Gupta (1999) reported that reliability was more frequently mentioned as a key factor in the airline context, whereas process customization was more frequently mentioned in the retail context. The latter is likely to heighten the role of FLEs, just as the former is likely to diminish it.

Because of the nascent stage of the consumer trust literature, we used a mix of qualitative and quantitative approaches for data collection. Initially, we employed focus groups and personal interviews to identify salient behavioral domains that underlie consumer judgments of trustworthiness and to generate and refine items for the quantitative phase. Next, we administered cross-sectional surveys with structured questions in two waves. We asked respondents to identify a specific, recent service exchange encounter with a provider that met qualifying criteria and to complete the survey with that relational exchange in mind. Although the unit of analysis is the relational exchange between a consumer and service provider maintained across multiple episodes, we reasoned that cuing a specific encounter would facilitate recall of exchange characteristics and relational judgments. Similar approaches have been used in services research (Bitner, Booms, and Tetreault 1990; Tax, Brown, and Chandrashekaran 1998).

Sample

The sample was randomly drawn from the population of consumers with household annual incomes of \$35,000 or higher, who reside within the metropolitan area of a large city in the Midwest. Questionnaires containing the measures, accompanied by a cover letter and a stamped, return envelope, were mailed to 1230 respondents for each service category. The cover letter explained the purpose of the study, assured confidentiality of data, and thanked the participant. After the initial section, respondents completed measures pertaining to FLE behaviors, FLE trust, MPPs, MPP trust, value, and loyalty, and finally, respondents answered demographic questions. Four weeks after the initial mailing, a second wave of questionnaires was mailed to all respondents along with a cover letter with a reminder.

Because a random sample includes consumers who may lie anywhere on the transactional-relational continuum, we excluded respondents who did not fall within the relational domain, using the frequency (e.g., number of visits/flights) and level of commitment (e.g., amount spent/frequent flier account). We used data from respondents who did not meet these criteria and extrapolation methods to estimate the

number of disqualified respondents and compute reasonable response rates. In the retail category, the first wave resulted in 182 returned surveys, of which 153 (84%) customers met prequalifying criteria, and the second wave led to 143 responses, of which 93 (65%) customers qualified. Extrapolating to a third mailing and averaging across waves, we imputed a usable response rate of 29% for the retail category (Armstrong and Overton 1977).⁶ In the airline travel category, the first wave produced 160 responses, of which 72 (45%) met the prequalifying criteria. Likewise, of the 141 responses in the second wave, 41 (29%) met the prequalifying criteria. Extrapolating to the third wave and averaging across the three waves yielded a qualification rate of 30%, or 378 consumers. With this qualification rate, the 113 usable responses give a usable response rate of 29% (see n. 6).

Sample characteristics are reported in Table 1. A majority of respondents had a college degree or higher, were white, and were married. In the aggregate sample, 45% of respondents were men and 55% were women. However, there was a significant sex imbalance in each service category: Approximately 70% of respondents in the retail sample but only approximately 30% in the airline sample were women. A wave analysis was conducted to examine for profile differences of early and late respondents in each service category. Except for one exception, results indicated no sig-

⁶Nonqualifiers are expected to be represented by late respondents rather than early respondents, and therefore an extrapolation to a third mailing is recommended (Armstrong and Overton 1977). A linear extrapolation of Wave 1 and Wave 2 results leads to an estimate of 50% qualified respondents in Wave 3. The average qualification rate was thus estimated at 66%, or 811 customers. Thus, the 246 usable responses translate to a usable response rate of 30%. In the airline category, the qualified respondents in the first two waves were 45% and 29%. Extrapolating to a third wave estimate of 15%, the average qualification rate was 30%, or 378 customers. The 113 responses translate to a usable response rate of 29%.

nificant demographic differences between the two waves in the retail sample (χ^2 ranging from .53 to 7.9, $p > .1$) or the airline sample (χ^2 ranging from .16 to 10.10, $p > .1$). In the airline sample, the education level of Wave 1 respondents was significantly higher than for Wave 2 respondents ($\chi^2 = 12.75$, $p < .01$).

Measurements

Table 2 provides descriptive statistics, intercorrelations, and reliabilities of study constructs, and the Appendix provides the scale items used.

Trustworthy practices and behaviors. Although previous studies have operationalized the construct of trustworthy behaviors along multidimensional facets, they are exclusively limited to interorganizational contexts (Kumar, Scheer, and Steenkamp 1995; McAllister 1995). To extend this work to the consumer context and obtain contextually meaningful operational items, we initially used four focus groups made up of specific combinations of sex (male, female) and household income level (<\$35,000, >\$35,000). Thereafter, we conducted in-depth interviews lasting 90 minutes each with 12 consumers who met prespecified criteria to refine the operational items. We developed a card-sorting exercise in which each card contained an operational item of trustworthy behavior or practice retained from focus group analysis. "Think aloud" data provided by consumers yielded insight into interpretations of operational items and guided their refinement. On the basis of the results of in-depth interviews, we developed a set of operational measures for trustworthy FLE behaviors and MPPs along three dimensions—operational competence, operational benevolence, and problem-solving orientation—and retained them for the subsequent pretesting phase. Items generated were pretested by five judges, who evaluated them for wording/meaning and consistency with corresponding definitions of the dimensions. On the basis of this feedback, items were

TABLE 1
Demographic Profile of the Respondents

Age (in Years)			Sex		Level of Education		Ethnicity	
Retail	Airline		Retail	Airline		Retail	Airline	
18–24	1.2	1.7	Male	30.2	71.2	High school	17.0	6.0
25–34	15.1	9.3	Female	69.8	28.8	Some college	28.2	19.7
35–44	26.5	26.3				College degree	35.5	46.2
45–54	28.6	25.4				Graduate school	19.3	28.1
55+	28.6	37.3						
Marital Status			Household Size (Number of People)				Annual Household Income	
	Retail	Airline	Retail	Airline			Retail	Airline
Married	77.2	80.5	1	10.5	11.1	Less than \$35,000	8.7	2.5
Single	9.7	6.8	2	32.5	41.0	\$35,000–\$44,999	15.3	11.4
Divorced/separated	8.9	10.2	3	17.1	15.4	\$45,000–\$54,999	16.9	12.3
Widow/widower	4.2	2.5	4	23.3	21.4	\$55,000–\$64,999	12.8	15.8
			5	12.3	7.7	\$65,000–\$94,999	27.3	25.5
			>6	4.3	3.4	\$95,000 and over	19.0	32.5

Notes: All numbers are in percentages.

TABLE 2
Reliabilities and Intercorrelations for the Study Constructs

		Intercorrelations ^{a,b}													
		Management				Employee				MPP		FLE	Value	Loyalty	Satisfaction
		MOC	MOB	MPS	EOC	EOB	EPS	Trust	Trust	Trust	Value				
Management		.77/.73	.62	.61	.69	.65	.45	.68	.61	.61	.49	.46			
Operational competence (MOC)	.54	.90/.86	.70	.69	.79	.62	.78	.67	.61	.58	.56				
Operational benevolence (MOB)	.46	.74	.87/.74	.64	.75	.66	.69	.63	.59	.60	.46				
Problem-solving orientation (MPS)															
Employee		.62	.54	.91/.87	.76	.67	.77	.75	.63	.64	.54				
Operational competence (EOC)	.61	.68	.56	.70	.84/.81	.77	.78	.76	.65	.62	.52				
Operational benevolence (EOB)	.51	.63	.63	.51	.59	.72/.82	.62	.73	.54	.50	.40				
Problem-solving orientation (EPS)	.37														
MPP trust		.66	.63	.57	.67	.54	.96/.96	.85	.72	.65	.63				
FLE trust	.49	.68	.59	.69	.76	.60	.84	.96/.97	.65	.54	.56				
Value	.39	.49	.33	.40	.51	.40	.53	.55	.92/.92	.66	.55				
Loyalty	.19	.42	.39	.38	.40	.44	.51	.52	.56	.90/.94	.43				
Satisfaction	.42	.46	.38	.41	.51	.43	.61	.59	.52	.48	.94/.96				

^aThe alpha reliabilities are on the diagonal, and estimates for the retail context are presented first.

^bThe intercorrelations for the retail context are below the diagonal, and the corresponding correlations for the airline context are above the diagonal. All values are significant at $p = .05$.

either modified or dropped. The resulting instrument included 16 items each for MPPs and FLE behaviors.

We performed two further analyses on the pooled retailing and airline data to ensure that the operational items for trustworthy behaviors and practices had acceptable reliability as well as convergent and discriminant validity. First, we used exploratory factor analysis (EFA) to analyze items separately for each facet. For the MPP items, EFA yielded a three-factor solution based on the "breaks in eigenvalues" criterion. Together, the three factors accounted for 76% of the variance extracted, corresponding closely with the hypothesized dimensions of competence, operational benevolence, and problem solving. However, the results showed that 7 of 16 items were inadequate. These measures did not demonstrate a dominant loading on the hypothesized factor ($<.3$) and/or had significant cross-loadings ($>.3$), and they were dropped from further analysis. Likewise, EFA of the FLE behavior items yielded a three-factor solution that accounted for 73% of the variance extracted. This coheres with our hypothesis of three dimensions of employee trustworthiness—operational competence, operational benevolence, and problem-solving orientation. We retained the 9 items that demonstrated acceptable loading on their hypothesized factor ($>.3$) and no significant cross-loading for further analysis.

Before proceeding to the next step of analyses, we conducted additional procedures to further establish the robustness of the three-factor solution. In particular, our procedures focused on the problem-solving dimension. We reasoned that if problem-solving orientation was not a distinct dimension, forcing a two-factor solution should show that problem solving collapses into one or the other dimension. Conversely, if the other two dimensions collapse into each other and problem solving retains its distinction, this would support our contention that problem-solving orienta-

tion is a distinct aspect of consumer judgments. Results supported the latter; problem-solving orientation maintained its distinctiveness, and the remaining factors collapsed into one for the FLE as well as MPP facets.

Second, we estimated a restricted factor analysis (RFA) model simultaneously for the MPPs and FLE behavior items wherein the items were allowed to load on their hypothesized factor and the cross-loadings were restricted to zero. In addition, we allowed the latent factors to correlate freely. We reasoned that our hypotheses for the validity of trustworthiness facets and dimensions would be supported if (1) the measurement model fitted the data reasonably well, (2) the loadings on hypothesized factors were significant and large, (3) each factor yielded reliabilities exceeding .70, and (4) the intercorrelation among the factors (dimensions) produced evidence of discriminant validity. This measurement model (displayed in Figure 2) produced the following fit statistics: $\chi^2 = 216.2$, degrees of freedom (d.f.) = 120, comparative fit index (CFI) = .99, normed fit index (NFI) = .98, nonnormed fit index (NNFI) = .99, root mean square residual (RMSR) = .04, and root mean square error of approximation (RMSEA) = .047 (90% confidence interval [CI] of .037 to .057).⁷ Moreover, the loadings on hypothesized factors are significant and substantively large (see Table 3). Each factor yielded composite reliability exceeding .70 (Fornell and Larcker 1981). The intercorrelation among the management and employee dimensions ranges from .89 to .54, and constraining this correlation to unity invariably produced a significant change in the goodness-of-fit statistic

⁷Reasonable models that effectively reproduce the observed variance-covariance matrix are characterized by CFI, NFI, and NNFI values exceeding .95; RMSR values less than .05; and RMSEA of .08 or lower with the upper CI not exceeding .10 (Marsh, Balla, and Hau 1996).

FIGURE 2
The Measurement Model Used for the Consumer Trustworthiness Construct

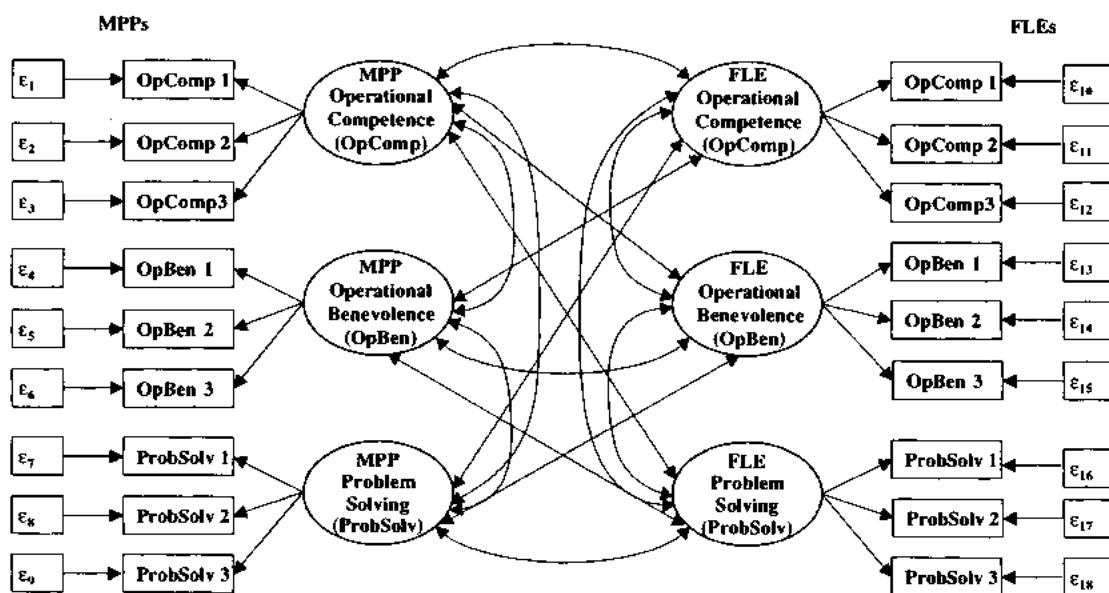


TABLE 3
Confirmatory Factor Analysis of Management and FLE Trustworthiness^a

Construct/ Item	MPPs		FLE Behaviors	
	Loading ^b	t-Value ^c	Loading ^b	t-Value ^c
Operational Competence				
OpComp ₁	.74	13.2	.76	17.4
OpComp ₂	.67	12.2	.72	17.7
OpComp ₃	.86	13.0	.74	18.5
Operational Benevolence				
OpBen ₁	.75	17.7	.68	17.0
OpBen ₂	.81	18.4	.85	18.8
OpBen ₃	.77	16.6	.70	13.0
Problem-Solving Orientation				
ProbSolv ₁	.70	13.3	.57	11.9
ProbSolv ₂	.81	17.8	.79	18.4
ProbSolv ₃	.81	14.0	.62	10.2
Goodness-of-Fit Statistics				
χ^2		216.2		
d.f.		120		
NFI		.98		
NNFI		.99		
CFI		.99		
RMSR		.04		
RMSEA		.047		
(90% CI)		.037-.057		

^aThe estimates reported are from the ERLS (iteratively reweighted generalized least squares) procedure using EQS.

^bThis is the standardized loading estimate from the ERLS procedure.

^cBased on one-tailed tests: for t-values greater than 1.65, $p < .05$; for t-values greater than 2.33, $p < .01$.

($\Delta\chi^2$ ranges from 46.5 to 376.2, d.f. = 1, $p < .01$).⁸ This suggests that the hypothesized measurement model of Figure 2 fits the data reasonably well, and the posited dimensions and facets evidence acceptable reliability and convergent and discriminant validity. The Cronbach reliabilities of the management dimensions of operational competence (three items), operational benevolence (three items), and problem-solving orientation (three items) were .77, .90, and .87, respectively, for the retail context and .73, .86, and .74, respectively, for the airline context. Likewise, the employee dimensions produced corresponding α s of .91, .84, and .72, respectively, for the retailing context and .87, .81, and .82, respectively, for the airline context.

Notwithstanding the adequate measurement properties of the three-dimensional operationalization and the correspondence between our conceptual definitions and operational items, we note the need to conduct further psychome-

tric work in developing the trustworthiness construct. In particular, the items capturing problem-solving orientation bear further refinement and cross-validation across service contexts.

MPP and FLE trust. Measures of MPP and FLE trust were adapted from extant research (Ganesan 1994; Morgan and Hunt 1994). Both measures were operationalized by four items assessed by ten-point semantic differential scales ("very undependable"/"very dependable," "very incompetent"/"very competent," "very low integrity"/"very high integrity," "very unresponsive to customers"/"very responsive to customers"). Alpha reliabilities of the MPP trust and FLE trust scales were .96 or higher for both retail and airline contexts (Table 2).

Value. We adapted the measure of value from existing value research (Dodds, Monroe, and Grewal 1991; Grisaffe and Kumar 1998). We measured the value construct using four items that included the benefits obtained from the relational exchange given the prices paid, the time spent, and the effort involved in maintaining a relationship with the focal provider ($\alpha = .92$ for both contexts).

Loyalty. The loyalty measure was drawn from extant services literature (Zeithaml, Berry, and Parasuraman 1996) and included four items measuring the share of category wallet, intention to recommend, and likelihood of repeat purchase ($\alpha \geq .90$ in both contexts).

Satisfaction. Three items were included to measure episode-specific consumer satisfaction with the last experience ("highly unsatisfactory"/"highly satisfactory," "very unpleasant"/"very pleasant," "terrible"/"delightful"). These measures, intended to capture a transactional evaluation, were adapted from satisfaction research (Spreng, MacKenzie, and Olshavsky 1996). The scale demonstrated satisfactory interitem reliability in both contexts ($\alpha \geq .94$).

Method of Analysis

We examined the proposed hypotheses by introducing dummy variable terms in a regression-like equation for each dependent variable. Because of multiple dependent variables, the analytical method was based on simultaneous estimation of the following system of equations:

$$\begin{aligned} Y_1 = & \beta_{01} + \beta_1 Y_2 + \beta_{11} X_1 + \beta_{21} X_2 + \beta_{31} X_3 + \beta_{41} DX_1 + \beta_{51} DX_2 \\ & + \beta_{61} DX_3 + \epsilon_1, \end{aligned}$$

$$\begin{aligned} Y_2 = & \beta_{02} + \beta_2 Y_1 + \beta_{12} Z_1 + \beta_{22} Z_2 + \beta_{32} Z_3 + \beta_{42} DZ_1 + \beta_{52} DZ_2 \\ & + \beta_{62} DZ_3 + \epsilon_2, \end{aligned}$$

$$Y_3 = \beta_{03} + \beta_{13} Y_1 + \beta_{23} Y_2 + \epsilon_3, \text{ and}$$

$$Y_4 = \beta_{04} + \beta_{14} Y_1 + \beta_{24} Y_2 + \beta_{34} Y_3 + \epsilon_4,$$

where \mathbf{Y} is a vector of dependent variables, and Y_1 , Y_2 , Y_3 , and Y_4 correspond to FLE trust, MPP trust, value, and loyalty, respectively. The vectors \mathbf{X} and \mathbf{Z} represent independent variables; X_1 , X_2 , and X_3 correspond to the operational competence, operational benevolence, and problem-solving

⁸We also estimated the measurement model separately for the retailing and airline data. The overall pattern of results was similar, with no violation of the conditions for convergent and discriminant validity.

orientation dimensions of FLE trust; and Z_1 , Z_2 , and Z_3 are the corresponding trustworthy dimensions for MPP trust. Note that the asymmetric effects are examined by the use of the dummy variable indicated by D in the equations. The dummy variable (D) is coded so that it takes on a value of zero for all nonpositive values of the corresponding trustworthy dimension; otherwise, it is coded as unity. As such, the estimated coefficients for expressions with dummy variables (e.g., β_{41} in the Y_1 equation for FLE competence) indicate the incremental effect of the respective trustworthy dimension over and above its linear effect (e.g., β_{11} in the Y_1 equation for FLE competence). The asymmetric hypothesis would be rejected if the corresponding coefficient estimated for the dummy variable is not significantly different from zero (Cohen and Cohen 1983). Finally, the reciprocal relationship between FLE and MPP trust is captured by the coefficients β_1 and β_2 in the Y_1 and Y_2 equations, respectively. These coefficients are identified because the three trustworthiness dimensions of FLE trust serve as its instrumental variables and likewise for MPP trust.

In estimating the preceding equations, we were sensitive to three methodological concerns that could interfere in drawing valid inferences: (1) simultaneity, (2) cutoff points, and (3) recency effects. Because the modeled equations have common variables (e.g., the dependent variable in one equation appears as an independent variable in another), we reasoned that the use of standard multiple regression analysis would risk a misspecification bias. This may occur because multiple regression analysis estimates the coefficients for each equation independently (of other equations), assuming that the error terms are uncorrelated. When multiple equations share common variables, this assumption is not warranted. Instead, a simultaneous analysis of the modeled equations is necessary to account for correlated error terms and produce unbiased coefficients. To do so, we used path analysis with the software EQS. This approach allows a simultaneous estimation of all hypothesized relationships, including multiple-group analysis across service contexts (to be discussed). Although we considered the use of latent-variable structural equation modeling, the inclusion of asymmetric terms made this choice less reasonable given the sample sizes involved. Nevertheless, the use of path analysis with EQS has several advantages, including modeling for "restricted" models with systematic constraints on proposed relationships. These restricted models can be evaluated for their fit to the data based on a χ^2 statistic and fit indices including NNFI, CFI, and RMSEA (Marsh, Balla, and Hau 1996).

Determining appropriate cutoff points is a relevant concern in defining the asymmetric terms. In developing the dummy variables, it is necessary to define a point on the trustworthy response scale that would separate the positive and negative domains. Although some researchers have used an absolute cutoff point regardless of the dimension considered (e.g., midpoint of scale provided), this approach is problematic for several reasons. First, the data obtained on most response scales have at best interval properties such that absolute points do not have identical interpretation across different dimensions. Second, consistent with Zeithaml, Berry, and Parasuraman (1996), the notion of "positive" and "negative" evaluations is conceptually defined relative to certain norms. That is, a positive evaluation on a

given dimension occurs when the provider is judged to exceed the norm for that dimension; otherwise, consumers are likely to make a negative evaluation. Such norms are likely to vary with the trustworthy dimension considered. To account for this, we obtained the cutoff points by (1) standardizing the scores for each dimension and (2) coding the dummy variable as 1 for evaluations greater than zero and as 0 otherwise. Note that because the mean of a standardized score is zero, the preceding dummy coding approach ensures that cutoff points are based on the distribution of scores for each dimension. Moreover, we derived the cutoff points separately for each service context to avoid confounding between asymmetric and industry effects.

Finally, we were sensitive to the possibility of recency effects. One particular recency effect of interest is encounter-specific satisfaction. Responses from consumers who are very satisfied with a specific recent exchange with the service provider might inflate the observed correlations and overemphasize the influence of trust factors on value and loyalty. To the extent that more satisfied consumers tend to be overrepresented in surveys (Peterson and Wilson 1992), the recency effects due to satisfaction may be significant. To reduce this bias, we modeled this effect by including satisfaction as an independent variable in each of the four hypothesized equations. Because path coefficients are partial effects, this procedure ensures that the coefficients are estimated after partialling the effect of satisfaction. This procedure has precedence in the literature (Crosby and Stephens 1987).

Results

We fitted the proposed model simultaneously to the airline travel and retail samples using multiple-group path analysis. Initially, we held all paths invariant across the two data sets and estimated a fully restricted model. Subsequently, on the basis of the Lagrange-multiplier test, we sequentially released paths with significant test statistics until further freeing up of constraints failed to enhance model fit. The resultant coefficients and fit statistics are presented in Table 4. On the basis of the statistical test for the goodness of fit, the hypothesized model fits the data adequately ($\chi^2 = 97.3$, d.f. = 87, $p > .21$). Consistent with this, other indicators of fit, including the relative indices (e.g., NNFI = .99, CFI = .99) and absolute indicators of fit (e.g., RMSEA = .02, 90% CI = .00-.037; standardized root mean square residual = .03), indicate that the proposed model is a reasonable explanation of observed covariances among the study constructs. In addition, the NNFI, which is thought to provide an indicator of balance between explanation and parsimony, exceeds .99, indicating that the hypothesized model strikes an appropriate balance between these competing goals. Likewise, the proposed model explains a reasonable proportion of the variances in the dependent variables, including FLE trust ($R^2 = .75, .77$), MPP trust ($R^2 = .75, .83$), value ($R^2 = .40, .63$), and loyalty ($R^2 = .40, .48$).⁹ Taken together, this suggests

⁹For each construct, the R^2 values for the retail sample are followed by values for the airline sample.

TABLE 4
Estimated Coefficients for the Impact of Trustworthy FLE Behaviors and MPPs on Consumer Trust, Value, and Loyalty^{a, b}

Dependent Variable: R ² /Independent Variable	Retail		Airline	
	Coefficient (t-Value) ^c	Δ for Positive Performance ^d	Coefficient (t-Value) ^c	Δ for Positive Performance ^d
Dependent Variable: Trust in FLEs				
R ²	.75		.77	
MPP Trust	.16 (1.9)		.16 (1.9)	
Operational competence	.22 (3.2)	-.01 (-.1)	.22 (3.2)	-.01 (-.1)
Operational benevolence	.43 (5.7)	-.26 (-2.1)	.43 (5.7)	-.26 (-2.1)
Problem-solving orientation	.11 (1.6)	.17 (1.5)	.11 (1.6)	.17 (1.5)
Satisfaction	.14 (3.1)		.14 (3.1)	
Dependent Variable: Trust in MPPs				
R ²	.75		.83	
FLE Trust	.56 (7.3)		.40 (5.0)	
Operational competence	.10 (1.8)	-.18 (-1.5)	.10 (1.8)	.03 (.3)
Operational benevolence	.02 (.2)	.04 (.4)	.29 (3.5)	.04 (.4)
Problem-solving orientation	.25 (3.2)	-.12 (-1.1)	.12 (1.4)	-.12 (-1.1)
Satisfaction	.17 (4.3)		.17 (4.3)	
Dependent Variable: Value				
R ²	.40		.63	
FLE trust	.38 (3.3)		.08 (.6)	
MPP trust	.07 (.6)		.50 (3.9)	
Satisfaction	.27 (4.7)		.27 (4.7)	
Dependent Variable: Loyalty				
R ²	.40		.48	
FLE trust	.04 (.09)		.04 (.09)	
MPP trust	.22 (2.3)		.22 (2.3)	
Value	.40 (6.1)		.40 (6.1)	
Satisfaction	.09 (1.4)		.09 (1.4)	
Goodness-of-Fit Statistics				
Chi-square (p-value)		97.3 (.21)		
d.f.		87		
NFI		.99		
NNFI		.99		
CFI		.99		
RMSR		.03		
RMSEA		.02		
(90% CI)		(.000-.037)		

^aThe estimates reported are from the ERLS (iteratively reweighted generalized least squares) procedure using EQS.

^bThe results are based on multiple-group analyses in which the nomological model was estimated simultaneously in the airline and retail samples. Coefficients that differed significantly ($p < .05$) across the groups are italicized.

^ct-Values are in parentheses. Based on one-tailed tests: for t-values greater than 1.65, $p < .05$; for t-values greater than 2.33, $p < .01$. Significant coefficients are in bold.

^dt-Values are in parentheses. Based on two-tailed tests: for t-values greater than 1.96, $p < .05$. Significant coefficients are in bold.

that the hypothesized model is a reasonable fit to the aggregate data, and the estimated coefficients can be validly examined to reveal interrelationships among the modeled constructs.

Table 4 provides the estimated coefficients from the multiple-group path analysis. Consistent with H_1 , H_3 , and H_5 , each dimension of FLE trustworthy behaviors, including operational competence ($\beta_{OpComp} = .22$), operational benevolence ($\beta_{OpBen} = .43$), and problem-solving orientation ($\beta_{ProbSolv} = .11$), has a significant, direct effect on FLE trust (all with $p < .05$). In addition, these effects are invariant across retailing and airline contexts. In contrast, for the MPP facet, trustworthy practices and policies neither are uniformly significant nor achieve invariance across contexts.

For the retailing context, operational competence ($\beta_{OpComp} = .10$) and problem-solving orientation ($\beta_{ProbSolv} = .25$) significantly influence MPP trust (all with $p < .05$), but operational benevolence does not ($\beta_{OpBen} = .02$). For the airline context, however, operational competence ($\beta_{OpComp} = .10$) and operational benevolence ($\beta_{OpBen} = .29$) have a significant effect on MPP trust, but problem-solving orientation does not ($\beta_{ProbSolv} = .12$). Thus, across both contexts, only the effect of operational competence is invariant. This provides mixed support for H_2 , H_4 , and H_6 .

Moreover, the results in Table 4 provide some support for H_7 to H_9 , wherein we had hypothesized asymmetric effects of trustworthy behaviors and practices on their cor-

responding trust facets. For FLE trust, operational benevolence ($\Delta\beta_{OpBen} = -.26$, $p < .01$) produced a significant change coefficient for positive evaluations. In addition, a borderline effect was obtained for positive evaluations of FLE problem-solving orientation ($\Delta\beta_{ProbSolv} = .17$, $p < .10$). These asymmetric effects for FLE behaviors were invariant across retailing and airline contexts. For MPP trust, a different pattern of asymmetric effects emerged. For the retail context, only the change coefficient for operational competence was borderline significant ($\Delta\beta_{OpComp} = -.18$), whereas for airlines, none of the MPP dimensions achieved significance for asymmetrical effects. Taken together, this offers partial support for H₈ and H₉ for FLE trust and H₇ for MPP trust.

In accord with H₁₀, FLE trust positively influences MPP trust regardless of context, though the influence is substantially stronger for the retail context ($\beta_{FLE} = .56$, $p < .01$) than for the airline context ($\beta_{FLE} = .40$, $p < .01$). The reciprocal relationship is also supported, as the effect of MPP trust on FLE trust is significant and invariant across contexts ($\beta_{MPP} = .16$, $p < .05$). However, as hypothesized, the direct effect of FLE trust is at least twofold stronger than the reciprocal effect of MPP trust (β_{FLE} versus $\beta_{MPP} = .40$ versus $.16$, $p < .01$).

In addition, the two facets—FLE and MPP trust—were posited to directly affect consumer loyalty after we controlled for the mediating influence of value (H₁₁ and H₁₂). Our findings in Table 4 provide support for H₁₂ but not H₁₁. That is, regardless of context, FLE trust has a minimal effect ($\beta_{FLET} = .04$) and MPP trust has a significant effect on loyalty ($\beta_{MPPT} = .22$, $p < .05$). These trust facets significantly influence value as well, in accord with H₁₄ and H₁₅. However, these relationships vary by context. For the retailing context, value is strongly and positively affected by perceptions of FLE trust ($\beta_{FLET} = .38$, $p < .01$) but minimally influenced by MPP trust ($\beta_{MPPT} = .07$). In contrast, in the airlines context, value is strongly influenced by MPP trust ($\beta_{MPPT} = .50$, $p < .01$) but unaffected by FLE trust perceptions ($\beta_{FLET} = .08$). This provides mixed support for H₁₄ and H₁₅.

Finally, regardless of context, value significantly affects loyalty ($\beta_{Val} = .40$, $p < .01$), in support of H₁₃. Taken together, this supports the hypothesized partial mediating role of value, as the trust facets have significant influence on value and value in turn significantly affects loyalty. Specifically, for the retailing context, value appears to mediate the effect of FLE trust on loyalty, whereas for the airlines context, the effect of MPP trust on loyalty is partially mediated by value.

To test this partial mediation hypothesis further, we estimated a model that excluded the value construct. We reasoned that partial mediation by value was supported if (1) FLE and MPP trust had a significant and substantial effect on loyalty in the retail and airlines context, respectively, and (2) this effect declined significantly when value was introduced into the model. In the model that excluded value, FLE trust yielded a significant effect on loyalty in the retail context ($\beta = .32$, $p < .05$), and MPP trust produced a similar significant effect on loyalty in the airlines context ($\beta = .66$, $p < .01$). When value is introduced as a partial mediator, the corresponding effects for FLE and MPP trust are $\beta = .04$, $p > .50$, and $\beta = .22$, $p < .05$, respectively, in support of the partial mediation hypothesis.

Discussion and Implications

In this study, we aimed to (1) use a multidimensional and multifaceted model for the behavioral components of trustworthiness in consumer-firm exchange relationships, (2) examine the asymmetric influence of trustworthiness dimensions on facets of consumer trust, (3) empirically test the linkage between consumer trust and loyalty with value as a partial mediator, and (4) explore variations in these relationships across industry contexts. Previous studies have examined neither the antecedents of consumer trust nor the mediated influence of trust on loyalty. Consequently, our study can directly address many questions that have remained largely untested but hold significant interest for theory and practice. What FLE behaviors and MPPs contribute to trust building and, conversely, trust depletion? Is the depletion effect (reduction in consumer trust due to a unit drop in trustworthiness behavior and practices) symmetrically equivalent to the building effect (the gain due to a unit increase in trustworthiness behavior and practices)? Does consumer trust translate into loyalty? If so, what is the magnitude of this conversion effect, and what role does value play in this conversion? Are these effects robust to varying satisfaction levels in individual encounters? Do the results depict variability across service contexts? Our study offers clear and compelling answers to these questions. Nevertheless, we recognize that a single, cross-sectional study can offer only initial insights. In this light, we first discuss the limitations of our work and follow it up with a discussion of the key findings.

Limitations

This study is subject to several limitations. First, the study may have limited generalizability because of the regional sampling plan used. Note that we randomly sampled from a list of households residing in Zip codes within the selected standard metropolitan statistical area. We selected this statistical area because of the location of our affiliated university, presuming that respondents were more likely to comply with a request from a recognized institution. This might have biased the responses in an unspecified manner. In addition, the size of the airline sample is relatively small, mainly because of a lower qualifying rate. This is consistent with the expectation that in a random sample, consumers are more likely to have shopped at least twice at a retail clothing store in the last six months than to have traveled on an airline for a nonbusiness trip. Nevertheless, replication studies in different service contexts and with varying sampling procedures would provide greater confidence in our results.

Second, because this was a cross-sectional study, the findings may be biased by common method variance and spurious cause/effect inferences. Common method variance is known to inflate correlations, resulting in overestimations of the influence of hypothesized predictors. However, our focus is the differential pattern of results—in terms of asymmetric effects and mediation pathways. Because method variance is “common,” affecting all relationships equally, it is likely to work against detection of differential effects. Moreover, we provided a partial control over common variance by partialling out the effect of satisfaction on all constructs of this study. This reduces the bias due to at

least one source of common variance. We recognize that drawing cause/effect inferences from cross-sectional data is essentially tenuous, and we agree that longitudinal studies are needed to establish the hypothesized sequence of effects.

Third, although we employed several procedures to refine and adapt operational measures for the trustworthiness constructs, more work is needed to establish their psychometric properties. Our qualitative and quantitative procedures inform us that operationalizations from interorganizational contexts cannot be easily adapted to the consumer-firm contexts. Future researchers should regard our operationalizations as starting points for further conceptualizations of the trustworthiness constructs. In particular, it is useful to explore the role of corporate reputation and responsibility in defining the trustworthiness construct and the formation of trust judgments. Yet given the acceptable evidence of reliability and convergent and discriminant validity of the reported measures, it appears that the procedures used in the present study were successful.

Fourth, we recognize that the hypothesized model does not include individual dispositional variables that are likely to moderate the specified relationships. One such dispositional variable that is worthy of pursuit in further research involves individual sensitivity to trust judgments. For some people, a high level of trust is necessary for consummating exchanges, but others may not regard relational trust as highly important.

Fifth, alternative procedures for examining asymmetric effects may be examined. Our approach is based on using cutoff points and estimating the incremental coefficients for the positive domain of the asymmetrical relationship. Alternatively, cubic polynomials can be used to assess asymmetries without relying on cutoff points. Finally, because of the small sample size and inclusion of asymmetric effects, we used a path model with simultaneous estimation of modeled equations but without control over measurement error. Measurement error is known to bias path coefficients. Although procedures for incorporating measurement error in complex nonlinear equations have become available recently, they demand large sample sizes. In addition, data about the performance of these procedures are lacking. Future researchers attempting to replicate or extend the present work may find it useful to examine the potential of these procedures.

Trustworthiness Dimensions and Facets

This study offers support for the proposed multifaceted, multidimensional model of consumer trustworthiness. This support is based on several converging pieces of empirical evidence. First, the dimensions evidence acceptable psychometric properties of reliability and convergent and discriminant validity. Without exception, the operational items load significantly on their posited dimensions. Moreover, a constrained model that restricted all cross-loadings to zero reproduced the observed variance-covariances reasonably well, thereby supporting the validity of the trustworthiness dimensions. Conversely, a model that constrained intercorrelations between the facets or among the dimensions to unity produced an ill-fitting model that significantly deteriorated the correspondence between the data and model. This enhances our confidence in the discriminant validity of the trustworthiness facets and dimensions.

Second, the trustworthiness dimensions and facets demonstrate nomological validity through a differential pattern of effects. For example, the management facet of trust had a significant effect on loyalty in both contexts ($\beta_{MPP_Trust} = .22$), but the effect of the FLE facet was nonsignificant ($\beta_{FLE_Trust} = .04$). The MPP facet has a significant effect on value in the airline industry ($\beta_{MPP_Trust} = .50$) but not in the retailing context ($\beta_{MPP_Trust} = .07$). The opposite pattern emerges for the FLE facet ($\beta_{FLE_Trust} = .08$ and $.38$ for airline and retailing, respectively). This differential pattern of effects would likely be obfuscated by an aggregate construct of company trust.

Third, because separate antecedents of FLE and MPP are modeled, we are able to examine the reciprocal relationships among the two trust facets. Evidently, MPP trust spills over to affect trust in the FLE, in accord with the transfer hypothesis. However, this transfer effect is relatively weak compared with the strong and robust influence of consumers' FLE trust on their trust in the management, regardless of context. These dynamic, reciprocal relationships are also obfuscated in an aggregated trust construct. Likewise, the trustworthiness dimensions depict a clear pattern of differential asymmetric effects on their respective facets (to be discussed subsequently). Taking these findings together, we appear to have sufficient evidence to conclude that operational competence, operational benevolence, and problem-solving orientation are distinct dimensions of perceived trustworthiness that are evaluated separately by the consumer for the MPP and FLE facets in relational service exchanges.

Several advantages accrue from a well-specified and fine-grained conceptualization of trustworthiness. It addresses a clear gap in the literature on developing the consumer trustworthiness construct and responds to calls by several researchers who have argued for the centrality of this construct in understanding consumer loyalty (Hart and Johnson 1999). In addition, the inclusion of and support obtained for the problem-solving orientation dimension coheres with findings from recent research in service relationships that has underscored its critical role in building lasting relationships (Smith, Bolton, and Wagner 1999; Tax, Brown, and Chandrashekaran 1998). Finally, our approach can provide managerial insights for targeted intervention efforts because of its focus on specific FLE behaviors and MPPs.

Nevertheless, fruitful areas for further examination of the trustworthiness construct can be identified. First, the psychometric validity of the trustworthiness facets and dimensions across other nonconventional contexts needs to be established. It is conceivable that in certain contexts (e.g., a dentist engaged in private practice), the FLE may be virtually indistinguishable from management and therefore a single facet may suffice. Alternatively, with the rapid growth of e-commerce, technology may emerge as an additional facet of evaluation (see Reichheld and Schefter 2000). Second, the robustness of the three trustworthiness dimensions should be evaluated by further replications and extensions. In particular, although we posit problem-solving orientation as another dimension of trust, further analysis of problem solving versus routine episodes may be pursued for a better understanding of the process by which trustworthiness cognitions develop and are stored. Finally, more work is needed

to establish the distinct influence of trustworthiness dimensions and facets. As an initial step, we partialled out the effect of satisfaction. Other constructs may be similarly considered in order to reveal the distinctive influence of trustworthiness dimensions and facets.

Asymmetric Effects of Trustworthiness Dimensions

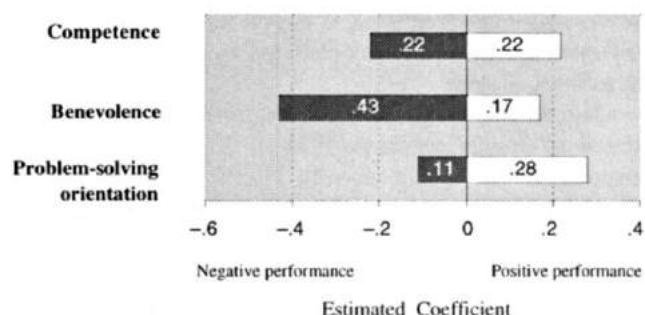
In extending the current trust literature, we hypothesized asymmetric effects for the trustworthiness dimensions and tested these hypotheses by estimating a baseline effect coefficient and evaluating the statistical significance of the incremental coefficient for positive trustworthiness perceptions (see the Δ Positive columns in Table 4). The coefficient for positive change is derived by adding it to the baseline coefficient, and the latter serves as the estimated effect for a negative change. On the basis of these derivations, we plotted the effects separately for each trust facet and industry in Figure 3. These plots help clarify our numerical results and guide our discussion.

Overall, a clear and compelling pattern of asymmetric effects for FLE trust is evident in Figure 3 (Panel A) that is invariant to contextual factors. In particular, the effect of operational competence on FLE trust perceptions is significant but invariant across the positive and negative performance domains ($\beta_{OpCom} = .22$). This suggests that FLE competence contributes equally to trust building and depletion. As such, FLE operational competence is both a motivator and a hygiene factor, because losses and gains matter equally. In contrast, FLE operational benevolence depicts negativity effects whereby its trust-depletion effect is significant and large ($\beta_{OpBen} = .43$) but its trust-enhancing effect is relatively weak but significant ($\beta_{OpBen} = .17$). As such, FLE operational benevolence is more of a hygiene factor than a motivator. This result supports current speculation that though subordinating self-interest to consumers' best interest may help build trust, marketers' actions driven by self-interest that perceptibly subordinate consumer interest are surely going to deplete trust. To the extent that trust depletion in turn reduces loyalty (to be discussed subsequently), this depletion effect can have significant bottom-line consequences. Finally, in accord with cue diagnosticity theory and counter to loss-aversion arguments, positivity effects emerged for the FLE problem-solving orientation. Although the depletion effect due to a unit negative change is significant ($\beta_{ProbSolv} = .11$), the trust-building effect is more substantial ($\Delta\beta_{ProbSolv} = .28$). As such, a unit positive change in FLE problem-solving orientation boosts FLE trust strongly. Thus, problem-solving orientation is a motivator, because its motivating effects significantly exceed its hygiene effects. This coheres with the growing recognition that problem solving is instrumental in shaping trust judgments (Tax, Brown, and Chandrashekaran 1998) and supports Hart and Johnson's (1999) speculation that this dimension holds significant managerial relevance for building consumer trust.

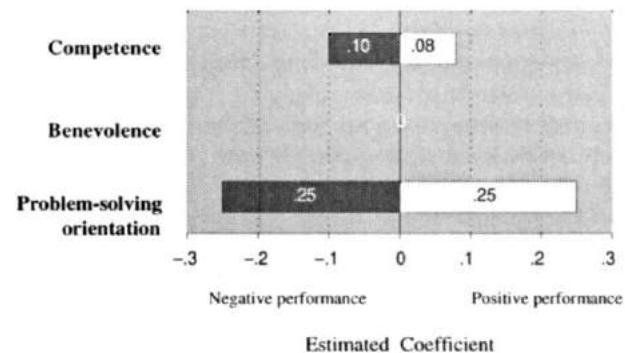
A weaker pattern of asymmetric effects emerges for MPP trust that is disparate across the two contexts (see Figure 3, Panels B and C). For the retailing context, weak effects are obtained for MPP operational benevolence ($\beta_{OpBen} \approx .02$). In contrast, for the airline context, MPP operational benevolence has equivalent and significant depletion and enhancing effects ($\beta_{OpBen} = .29$). As such, MPP operational benevolence is both a hygiene factor and a motivator

FIGURE 3
The Effects of Trustworthiness Dimensions on Consumer Trust in Retail and Airline Contexts

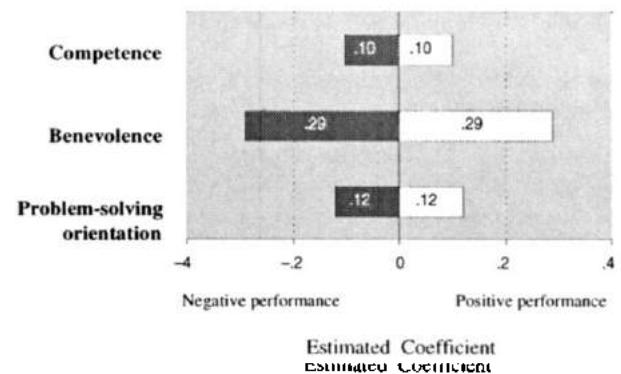
A: Effects of FLE Trusworthiness on FLE Trust^a



B: Effects of MPP Trusworthiness on MPP Trust in the Retailing Context



C: Effects of MPP Trusworthiness on MPP Trust in the Airline Context



^aThe coefficients for positive and negative performance are displayed for each dimension. Findings are invariant for retailing and airline contexts.

in the airline context but is largely impotent in the retailing context. However, operational competence has a significant depleting effect for MPP trust such that a unit negative change produces substantial declines in MPP trust in both contexts ($\beta_{OpCom} = .10$). In contrast, a unit positive change yields a substantially lower and nonsignificant effect on MPP trust for the retailing context ($\beta_{OpCom} = -.08$), but it yields a significant effect for the airlines context that is equivalent to the negativity effect ($\beta_{OpCom} = .10$). As such,

operational competence is a hygiene factor for the retailing context but serves a motivator role as well in the airlines context. Finally, MPP problem-solving orientation has significant and equivalent trust-building and trust-depletion effects for the retailing context ($\beta_{\text{ProbSolv}} = .25$), but its effects in the airlines context are nonsignificant. Thus, problem-solving orientation is both a hygiene factor and a motivator for the retailing context but is largely impotent in the airlines context.

Overall, two broad conclusions can be drawn from the pattern of results obtained. First, it appears theoretically meaningful and pragmatically useful to examine the antecedents of consumer trust. Specific FLE behaviors and MPPs can be conceptualized and psychometrically measured for investigation of their differential effects on consumer trust. Managerial initiatives and interventions for enhancing consumer trust can also be developed. Second, we appear to have sufficient evidence to conclude that further research should reconsider employing linear formulations of the effects of trustworthiness dimensions on trust. Fine-grained insights into the asymmetric mechanisms of trust building and depletion and the way these mechanisms vary across industry contexts are more likely to emerge if researchers adopt approaches along the lines of those employed in this study. At the same time, this study must be viewed as an initial step that encourages future researchers to explore the broad scope and diverse nature of asymmetric mechanisms that involve trust and its dimensions, as proposed by Singh and Sirdeshmukh (2000), Lewicki, McAllister, and Bies (1998), and others. Concurrently, our results suggest that trust judgments are not bound by the rule of negativity effects rooted in loss-aversion arguments. Rather, either positivity or negativity effects may emerge depending on the consumer norms for a given dimension. Further research into the formation and stability of trustworthiness norms and their role in trust mechanisms is warranted.

The Mediating Role of Value in Trust-Loyalty Relationships

Unlike much prior research, we proposed that the effect of trust on loyalty is partially mediated by value. Our conceptual rationale was based on two arguments. First, we posited that though the direct effect of trust on loyalty presumes that trust is intrinsically beneficial, the mediated effect assumes that trust benefits are conditional on producing value. Second, we had noted that value is a superordinate goal in market exchanges, exerting a dominant effect on loyalty and serving as a key mediator of the trust-loyalty relationship.

Our results provide initial empirical evidence to sort through the preceding propositions. Value emerges as the consistent, significant, and dominant determinant of consumer loyalty, regardless of the service category ($\beta_{\text{Val}} = .40$). Specifically, although trust in MPPs has a significant direct effect on loyalty, this influence is relatively weak compared with the effect of value ($\beta_{\text{MPPTrust}} = .22$ versus $\beta_{\text{Val}} = .40$). The direct effect of FLE trust is nonsignificant ($\beta_{\text{FLETTrust}} = .04$). This suggests that consumers' evaluation of value in relational exchanges appears to carry greater weight in loyalty judgments, though consumers find it inherently prefer-

able to maintain long-term relationships with service providers whose policies and practices they can trust.

Our results also establish that value partially mediates the effect of trust on loyalty judgments. This is because, in the retailing context, FLE trust has a significant effect on value, and value in turn influences loyalty. Because the direct effect of FLE trust on loyalty is minimal after we controlled for value in the retailing context, it is clear that value completely mediates the effect of FLE trust. This is also substantiated by the results from a model that excludes value (see n. 8). Likewise, for the airlines context, value appears to partially mediate the influence of MPP trust because (1) MPP trust has a significant, direct effect on value ($\beta_{\text{MPPTtrust}} = .50$); (2) MPP trust has a significant, direct effect on loyalty ($\beta_{\text{MPPTtrust}} = .22$); and (3) the direct effect on loyalty is significantly smaller than its effect when value is omitted ($\beta_{\text{MPPTtrust}} = .66$). However, value does not mediate the influence of MPP and FLE trust in the retailing and airline contexts, respectively. To the extent the mediated effects are significant (e.g., for MPP trust in airlines) or dominant (e.g., for FLE trust in retailing), these results suggest that the effect of trust on loyalty is conditional on its ability to enhance value. Without net increments in value, consumer trust is good to create but apparently does little good for the bottom line.

Taken together, these results suggest caution against blanket assertions that are common in popular press about the purported power of "total" trust in creating consumer loyalty (Hart and Johnson 1999). Our results provide compelling data to counter conventional beliefs that consumer trust converts directly into loyalty and indicate that such beliefs are overly simplistic and probably misleading. As such, managers are well advised to forsake "blind" investments in trust-building activities, in hopes that trust in and of itself produces loyalty. Instead, a careful assessment is needed that provides a full accounting of trust-conversion mechanisms. Our results reveal that the conversion of trust to loyalty involves complex, multiple-loop processes that require an understanding of (1) how specific trustworthiness dimensions can build greater consumer trust in MPPs, the FLE, or both; (2) how increased consumer trust can enhance value for the consumers; and (3) how value translates into loyalty. Our results also suggest that such understandings are sensitive to contextual and industry factors and are likely to involve asymmetric influences. In summary, although there are significant payoffs from building consumer trust in relational exchanges, realizing them is neither straightforward nor inevitable.

Theoretically, the construct of value needs further development. Although the services literature has primarily directed attention toward relational benefits, the nature and role of relational costs have until recently remained largely unexplored (Cannon and Homburg 2001). Because consumers attempt to "manage" their relationships with marketers, they also experience significant and diverse relational costs (Fournier, Dobscha, and Mick 1998). Ironically, these costs are not constant and may decrease or even increase over a relationship with a given provider (e.g., more direct solicitations, information use and privacy concerns). A more complete accounting of value would require a balanced study of the costs and benefits of relationships.

Industry Variability in Trust Mechanisms

The inclusion of multiple service contexts makes possible the testing of the generalizability of our hypothesized model. By generalizability, we do not imply that the estimated path coefficients are necessarily invariant across the two service contexts but that a single conceptual model is an adequate representation of trust mechanisms in both service contexts. However, by imposing parameter constraints, we can examine the sensitivity of path coefficients to contextual variability.

Our results support the generalizability of the conceptual model as indicated by its goodness of fit to the data from two different service contexts (see Table 4). In addition, several of the estimated path coefficients achieve invariance across the service contexts, which suggests that underlying processes are stable and consistent. In all, 15 of the 22 hypothesized paths are estimated to be invariant. More significantly, several critical mechanisms appear to be robust to the service context, including determinants of (1) loyalty and (2) FLE trust. That is, the linkages between loyalty determinants (i.e., MPP trust, FLE trust, and value) and loyalty are consistent across service contexts. Likewise for the asymmetric mechanisms that link FLE trustworthiness and trust. Finally, the proposed model explains a significant amount of variance in dependent variables, ranging from .40 to .83. Overall, this suggests that the conceptual model provides a generalizable, meaningful, and reasonable foundation for the study of consumer trust and loyalty mechanisms across different service settings.

At the same time, the proposed model helps pinpoint important differences across the two service contexts. Specifically, our results suggest that MPPs are more critical to trust and loyalty mechanisms in airlines, whereas FLE behaviors play a more central role in a retail clothing context. This is because, compared with the retailing context, for airlines (1) MPP trust has a stronger, dominant effect on value (.50 versus .07); (2) the effect of FLE trust is minimal and nonsignificant (.08 versus .38); (3) whereas MPP trust has a significant effect on loyalty in both contexts, FLE trust has a weaker, less dominant effect on MPP trust (.40 versus .56); and (4) management operational benevolence holds greater potential in consumer trust building (.29 versus .02). This is consistent with some work in the popular literature that underscores the significance of frontline functions such as personalization and prompt attention in retail business (e.g., Whittemore 1993) and of MPPs such as overbooking and schedule convenience in airline travel (Ostrowski, O'Brien, and Gordon 1993). Therefore, within the context and limitations of our study, we recommend that to provide value to consumers and win their loyalty, retailers should focus strategically on FLE effectiveness and trustworthiness. For airlines, the strategic thrust must keep MPPs and policies in focus as consumers rely heavily on judgments of airline management trustworthiness to determine value in relational exchanges and reciprocate with loyalty accordingly. Overall, we appear to have converging evidence to suggest that we are unlikely to find simple and profound insights into trust and loyalty mechanisms that remain unperturbed by contextual variability.

Concluding Notes

Contemporary thought in marketing recognizes that trust is a critical factor in relational exchanges between consumers and service providers. Although our findings cohere with this basic thought, we refine and extend the literature in several important ways. By modeling trust-building and trust-depletion processes, our approach rejects static notions of trust and embraces a dynamic, asymmetric view in which all good behaviors and practices do not always build trust and the potential for trust depletion is imminent. By including multiple dimensions of trustworthiness, including operational competence, operational benevolence, and problem-solving orientation, along two distinct facets of trust judgments, our modeling offers fine-grained insights into trust-building and trust-depletion processes. This refines and extends contemporary understanding of trust dynamics to provide theoretical and managerial insights. Moreover, by including value as a mediator of the trust–loyalty effect, our study identifies mechanisms that mediate the conversion of trust into loyalty. This rejects simplistic views that payoffs from efforts to build trust are inevitable and enables us to empirically test theory-driven hypotheses about the mechanisms that govern these payoffs. Consequently, our study calls for a shift in the kind of questions that managers and researchers should entertain about the role of trust in relational exchanges. Instead of asking if trust is important to have or whether trust matters, our study argues for questions such as "How can firms build trust?" "What actions will deplete trust?" and "What factors mediate and/or moderate the influence of trust on loyalty?" Although our study only begins to scratch the surface of these inquiries, the insights obtained indicate several fruitful avenues for further research. By pursuing these avenues, future researchers can shed further light on the effect of trust in consumer–firm relationships and the mechanisms that underlie its influence on key consequences, including value and loyalty. These efforts, in turn, have the potential to help managers unlock the payoffs from trust and win consumer loyalty while alerting managers to behaviors and practices that will likely deplete consumer trust and erode consumer loyalty.

Appendix Operational Measures Used to Measure Study Constructs for Retail and Airline Contexts

FLE Behaviors (five-point scale, "strongly disagree"/"strongly agree")

The (store) employees ...

Operational Competence ($\mu_R = 3.67$, $\sigma_R = .8$)

Work quickly and efficiently.

Can competently handle most customer requests.

Can be relied upon to know what they are doing.

Operational Benevolence ($\mu_R = 3.79$, $\sigma_R = .8$)

Act as if they value you as a customer.

Can be relied upon to give honest advice even if they won't make a sale.

Treat you with respect.

Problem-Solving Orientation ($\mu_R = 3.28$, $\sigma_R = .7$)

Don't hesitate to take care of any problems you might have with clothing items purchased at the store.

Go out of their way to solve customer problems.

Are willing to bend company policies to help address customer needs.

MPPs (five-point scale, "strongly disagree"/"strongly agree")

The store ...

Operational Competence ($\mu_R = 3.61$, $\sigma_R = .9$)

Is organized so as to make it easy to pick your clothing selection.

Is generally clean and free of clutter.

Keeps checkouts staffed and moving so you don't have to wait.

Operational Benevolence ($\mu_R = 3.49$, $\sigma_R = .8$)

Has policies that indicate respect for the customer.

Has policies that favor the customer's best interest.

Acts as if the customer is always right.

Problem-Solving Orientation ($\mu_R = 3.56$, $\sigma_R = .8$)

Has practices that make returning items quick and easy.

Goes out of the way to solve customer problems.

Shows as much concern for customers returning items as for those shopping for new ones.

Satisfaction (ten-point scale, $\mu_R = 7.29$, $\sigma_R = 1.8$)

How satisfying was your last shopping experience at this store?

"Highly unsatisfactory"/"highly satisfactory."

"Very unpleasant"/"very pleasant."

"Terrible"/"delightful."

Trust in MPPs (ten-point scale, $\mu_R = 7.84$, $\sigma_R = 1.6$)

I feel that this store is ...

"Very undependable"/"very dependable."

"Very incompetent"/"very competent."

"Of very low integrity"/"of very high integrity."

"Very unresponsive to customers"/"very responsive to customers."

Trust in FLEs (ten-point scale, $\mu_R = 7.38$, $\sigma_R = 1.7$)

I feel that the employees of this store are ...

"Very undependable"/"very dependable."

"Very incompetent"/"very competent."

"Of very low integrity"/"of very high integrity."

"Very unresponsive to customers"/"very responsive to customers."

Value (ten-point scale, $\mu_R = 7.28$, $\sigma_R = 1.5$)

Please evaluate the store on the following factors.

For the prices you pay for clothing items at this store, would you say shopping at this store is a ["very poor deal"/"very good deal," ten-point scale]?

For the time you spent in order to shop at this store, would you say shopping at this store is ["highly unreasonable"/"highly reasonable," ten-point scale]?

For the effort involved in shopping at this store, would you say shopping at this store is ["not at all worthwhile"/"very worthwhile," ten-point scale]?

How you would rate your overall shopping experience at this store? ["extremely poor value"/"extremely good value," ten-point scale].

Loyalty (ten-point scale, "very unlikely"/"very likely," $\mu_R = 6.98$, $\sigma_R = 2.1$)

How likely are you to ...

Do most of your future shopping at this store?

Recommend this store to friends, neighbors, and relatives?

Use this store the very next time you need to shop for a clothing item?

Spend more than 50% of your clothing budget at this store?

FLE Behaviors (five-point scale, "strongly disagree"/"strongly agree")

The (airline) employees ...

Operational Competence ($\mu_A = 3.76$, $\sigma_A = .7$)

Work quickly and efficiently.

Can competently handle most customer requests.

Can be relied upon to know what they are doing.

Operational Benevolence ($\mu_A = 3.58$, $\sigma_A = .8$)

Act as if they value you as a customer.

Can be relied upon to give accurate information in the event of flight delays or cancellations.

Treat you with respect.

Problem-Solving Orientation ($\mu_A = 3.31$, $\sigma_A = .8$)

Don't hesitate to take care of any problems that might arise during flight.

Go out of their way to solve customer problems.

Are willing to bend company policies to help address customer needs.

MPPs (five-point scale, "strongly disagree"/"strongly agree")

The airline ...

Operational Competence ($\mu_A = 3.51$, $\sigma_A = .8$)

Has fast, efficient check-in procedures.

Keeps its airplanes clean and free of clutter.

Has fast, efficient baggage claim service.

Operational Benevolence ($\mu_A = 3.23$, $\sigma_A = .8$)

Has practices that indicate respect for the customer.

Favors the customer's best interest.

Acts as if the customer is always right.

Problem-Solving Orientation ($\mu_A = 3.14$, $\sigma_A = .9$)

Makes every effort to get you to your final destination as quickly as possible when there are delays or cancellations.

Goes out of the way to solve customer problems.

Shows as much concern for customers in economy class as it does for customers in first/business class.

Satisfaction (ten-point scale, $\mu_A = 6.83$, $\sigma_A = 1.8$)

How satisfying was your last experience with this airline?

"Highly unsatisfactory"/"highly satisfactory."

"Very unpleasant"/"very pleasant."

"Terrible"/"delightful."

Trust In MPPs (ten-point scale, $\mu_A = 7.24$, $\sigma_A = 1.7$)

I feel that this airline is ...

"Very undependable"/"very dependable."

"Very incompetent"/"very competent."
"Of very low integrity"/"of very high integrity."
"Very unresponsive to customers"/"very responsive to customers."

Trust in FLEs (ten-point scale, $\mu_A = 7.44$, $\sigma_A = 1.8$)

I feel that the employees of this airline are ...

"Very undependable"/"very dependable."
"Very incompetent"/"very competent."
"Of very low integrity"/"of very high integrity."
"Very unresponsive to customers"/"very responsive to customers."

Value (ten-point scale, $\mu_A = 6.54$, $\sigma_A = 1.8$)

Please evaluate the airline on the following factors...

For the prices you pay for traveling with this airline, would you say travelling on this airline is a ["very poor deal"/"very good deal," ten-point scale]?

For the time you spent in order to travel with this airline, would you say travelling on this airline is ["highly unreasonable"/"highly reasonable," ten-point scale]?

For the effort involved in traveling with this airline, would you say travelling on this airline is ["not at all worthwhile"/"very worthwhile," ten-point scale]?

How you would rate your overall experience with this airline? ["extremely poor value"/"extremely good value," ten-point scale].

Loyalty (ten-point scale, "very unlikely"/"very likely," $\mu_A = 7.30$, $\sigma_A = 2.1$)

How likely are you to ...

Do most of your future travel on this airline?
Recommend this airline to friends, neighbors, and relatives?

Use this airline the very next time you need to travel?
Take more than 50% of your flights on this airline?

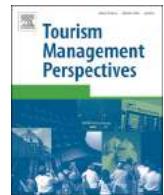
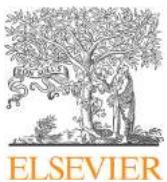
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U.S. Postal Service Statement of Ownership, Management, and Circulation (Required by 39 U.S.C. 3685)		
1. Title of Publication: <i>Journal of Marketing</i>		
2. Publication No. 0022-2429		
3. Filing Date: October 1, 2001		
4. Issue Frequency: Quarterly		
5. No. of Issues Published Annually: 4		
6. Annual Subscription Price: \$80		
7. Complete Mailing Address of Known Office of Publication: 311 South Wacker Dr., Suite 5800, Chicago, IL 60606-2266		
8. Complete Mailing Address of the Headquarters or General Business Offices of the Publisher: 311 South Wacker Dr., Suite 5800, Chicago, IL 60606-2266		
9. Full Names and Complete Mailing Address of Publisher, Editor, and Managing Editor: Publisher: Jack Hollfelder, 311 South Wacker Dr., Ste. 5800, Chicago, IL 60606-2266; Editor: David W. Stewart, Dept. of Marketing, Marshall School of Business, University of Southern California, Los Angeles, CA 90089-1421; Managing Editor: Francesca Van Gorp Cooley, 311 S. Wacker Dr., Ste. 5800, Chicago, IL 60606-2266		
10. Owner: American Marketing Association, 311 South Wacker Dr., Suite 5800, Chicago, IL 60606-2266		
11. Known Bondholders, Mortgagors, and Other Security Holders Owning or Holding 1% or More of Total Amount of Bonds, Mortgages, or Other Securities (If there are none, so state): None		
12. Tax Status (for nonprofit organizations authorized to mail at special rates). The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes: Has Not Changed During Preceding 12 Months		
13. Publication Name: <i>Journal of Marketing</i>		
14. Issue Date for Circulation Data Below: October, 2001		
15. Extent and Nature of Circulation:	Average no. copies each issue during preceding 12 months	Actual no. copies of single issue published nearest to filing date
a. Total No. Copies (Net Press Run)	8,525	8,100
b. Paid and/or Requested Circulation		
(1) Paid/Requested Outside-County Mail Subscriptions	7,668	7,238
(2) Paid/Requested In-County Mail Subscriptions	0	0
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales & Other Non-USPS Paid Distribution	0	0
(4) Other Classes Mailed Through the USPS	0	0
c. Total Paid and/or Requested Circulation [Sum of 15b(1), (2), (3) and (4)]	7,668	7,238
d. Free Distribution by Mail (<i>Samples, Complimentary, and Other Free</i>)		
[Sum of 15d(1), (2) and (3)]	21	21
e. Free Distribution Outside the Mail (Carriers or Other Means)	0	0
f. Total Free Distribution [Sum of 15d and 15e]	21	21
g. Total Distribution (Sum of 15c and 15f)	7,689	7,259
h. Copies Not Distributed	836	841
i. Total (Sum of 15g and h)	8,525	8,100
Percent Paid and/or Requested Circulation (15c/15g x 100)	99.7%	paid circulation
16. This Statement of Ownership will be printed in the January, 2002 issue of this publication.		
17. Signature and title of editor, publisher, business manager, or owner: Jack Hollfelder, Publisher. I certify that the information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including multiple damages and civil penalties).		



Exploring tourists' memorable hospitality experiences: An Airbnb perspective

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ARTICLE INFO

Keywords:

Airbnb
Memorable hospitality experience
Social interaction
Sharing economy
Sharing

ABSTRACT

Airbnb is one of the major players in the tourism sharing economy. This study employs a grounded theory approach to explore the central elements of a memorable Airbnb hospitality experience. An analysis of transcripts from interviews with twenty participants indicate that respondents generally report their Airbnb experience as positive. Memorable Airbnb experiences were related to the social interactions with the host, the attitude of the host and the location of the accommodation. The managerial implications include that hosts should actively interact with the guests and treat their guests in a friendly manner throughout their stay. In addition, hosts should provide information about the location of the accommodation and its proximity to the tourist attractions in their profile. On the contrary, those hosts who welcome guests to empty homes with no time to interact during their stay and are poor communicators should not host on Airbnb.

1. Introduction

Today, offering memorable experiences are pivotal when attempting to gain a competitive advantage (Slatten, Krogh, & Connolley, 2011). Memorable tourism experiences (MTEs) have recently attracted the attention of researchers and practitioners (Kim, Ritchie, & McCormick, 2012). Kim et al. (2012) suggested that a memorable tourism experience (MTE) ‘is selectively constructed from tourism experiences based on the individual’s assessment of the experience’ (p. 13). Accordingly, the authors defined memorable tourism experiences (MTEs) as tourism experiences that are positively remembered and recalled after the events have occurred. Several studies have indicated that MTEs are the best predictors of tourists’ future behaviour (Chandralal, Rindfleish, & Valenzuela, 2015). Kim et al. (2012) identified seven dimensions that represent MTEs and developed a scale for examining these. Recent studies have indicated that memories may be a more appropriate predictor for future behavioural intentions, such as revisiting or word-of-mouth recommendation (Hung, Lee, & Hunag, 2014). For example, Quadri-Felitti and Fiore’s (2013) study showed that positive memories of a trip influence satisfaction and loyalty intentions. In addition, Liu, Lu and Hsu’s (2010) study replaced the concept of overall satisfaction with the concept of memorability. They found that backpackers’ memorable experiences influenced their future behavioural intentions regarding tourism.

The widespread adoption of the MTE scale has enriched the tourism

literature but has been criticised on both theoretical and methodological grounds. Methodologically, Chandralal et al. (2015) and Hung et al. (2014) argued that the student sample that was used in Kim et al.’s study does not accurately represent typical tourists. Thus, the findings of their study cannot be generalised to more authentic travel populations. There is also a lack of theoretical unanimity among researchers regarding the components of MTEs (Chandralal et al., 2015). Kim and Ritchie (2014) suggested that the MTE scale needs to be tested against new samples in a wider variety of tourism contexts. Researchers have called for further academic enquiries that would apply the constructs to a real-world tourism context, hence enriching the understanding of MTEs (Chandralal et al., 2015; Hung et al., 2014). Similarly, Sthapit and Coudounaris (2017) suggested that future studies should be critical of the MTE scale because there may be dimensions that it does not account for that have an impact in other contexts, such as creative tourism experiences (Hung et al., 2014), culinary-gastronomic experiences (Sthapit, 2017), and souvenirs (Sthapit & Björk, 2017).

In today’s experiential marketplace, a growing number of accommodation service providers have shifted their focus from delivering services to offering memorable experiences (Ariffin & Maghzi, 2012). However, most research regarding accommodation is limited to those hotel attributes that influence tourists’ accommodation decisions (Sohrabi, Vanani, Tahmasebipur, & Fazli, 2012; Stringam, Gerdes, & Vanleeuwen, 2010). The present study’s focus on experiences addresses new forms of accommodation, including Airbnb. Characterised by peer-

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to-peer (P2P) transactions, an economic form that has seen immense growth recently, Airbnb is one of the most successful models in the sharing economy (Fagerstrøm, Pawar, Sigurdsson, Foxall, & Yani-de-Soriano, 2017) and is having a significant impact on the tourism and hospitality industry (Zhu, So, & Hudson, 2017). Airbnb has emerged as a ‘disruptive innovation’, enabling consumers to participate in what is termed ‘collaborative consumption’, wherein they share underutilized resources, such as cars and rooms (Botsman & Rogers, 2010; Zervas, Proserpio, & Byers, 2016). On the supply side, P2P business platforms, such as Airbnb, enable rental hosts to act in an entrepreneurial manner, whereby they list their available accommodation on Airbnb and profit by renting it out, usually at cheaper rates than comparable hotels, leading to savings for travellers (Varma, Jukic, Pestek, Shultz, & Nestorov, 2016). On the demand side, Airbnb fulfils travellers’ needs, such as accommodation with lower prices and opportunities to interact with the local community (Guttentag, 2015). Recent data from Airbnb (2016) shows that more than 200 million guests have used Airbnb, the company has 10 million current bookings and is used by more than 50,000 renters per night (PricewaterhouseCoopers, 2015).

Recent studies on Airbnb have mainly focused on its commercial aspects (Guttentag, 2015), regulations (Koopman, Mitchell, & Thierer, 2015) and on identifying the factors that affect consumers’ attitudes toward Airbnb and their decisions to adopt it. The latter includes lower costs (Guttentag, 2015; Priporas, Stylos, & Fotiadis, 2017), perceived value (Mao & Lyu, 2017; Zhu et al., 2017), social benefits (Tussyadiah, 2016), social interactions (Guttentag, Smith, Potwarka, & Havitz, 2017; Stors & Kagermeier, 2015; Tussyadiah, 2015), home atmosphere and sustainability (Guttentag, 2015; Tussyadiah, 2015), authenticity (Guttentag et al., 2017), novelty (Guttentag, 2016), unique experience (Mao & Lyu, 2017) and trend affinity (Mohlmann, 2015). Other studies examine the factors that influence guests’ satisfaction with a P2P accommodation (Tussyadiah, 2016), such as enjoyment, monetary benefits and accommodation amenities, and accommodation attributes, such as service, facility, location, feel welcome, and comfort of a home, that are linked to customers’ satisfaction in the context of Airbnb (Guttentag et al., 2017; Tussyadiah & Zach, 2017). There has recently been great interest in developing more sophisticated theoretical explanations of the factors that relate to consumers’ overall attitudes, purchase-relevant behaviours and satisfaction toward Airbnb; however, an approach that considers the central elements of a memorable Airbnb accommodation experience based on guests’ on-site experiences is absent. Regarding the research methodology, there is a lack of qualitative approaches (Sthapit & Jiménez-Barreto, 2018a, b) and given the nature of our research question, understanding memorable experiences a qualitative approach is more appropriate to explore this phenomenon rather than surveys or other approaches.

Given the significance of offering memorable experiences in today’s experiential marketplace, this study aims to address the paucity in the existing literature by exploring the central elements of a memorable Airbnb accommodation experience. By doing so, this study attempts to make a meaningful contribution to the literature on the sharing economy and MTE. In addition, there are advantages for hosts to foster memorable Airbnb experiences. Tourists who have positive MTEs regarding a destination are more likely to share positive word-of-mouth opinions about it (Coudounaris & Sthapit, 2017), as well as being more likely to bring others to the destination (Tung & Ritchie, 2012). Memories of a trip experience are also said to contribute to tourists’ subjective wellbeing (Sthapit & Coudounaris, 2017), enhance their identification with or strong attachment to a place (Sthapit, Björk, & Coudounaris, 2017) and is the single most important source of information for an individual when making a revisit decision (Chandralal et al., 2015; Coudounaris & Sthapit, 2017). Hence, the study of memorable Airbnb experiences is relevant because of its marketing implications.

2. Literature review

2.1. Tourist decision-making process and choice of accommodation

When travelling from ‘home’ to ‘away’, tourists make multiple choices regarding the various elements of the holiday itinerary (Decrop & Snelders, 2005; Fesenmaier & Jeng, 2000)—from ‘where to go’ to ‘what are we going to do now that we’re here’ and beyond (Smallman & Moore, 2010). Some decisions are made before the trip, while others are made on-site (Fesenmaier & Jeng, 2000). For example, Fesenmaier and Jeng’s (2000) study revealed that the choice of accommodation is made in the early stages together with other core choices, such as the destination, the time and the duration of the trip. Studies by Woodside and King (2001) and Hyde (2004) also showed that accommodation choices are made early on in the planning of a trip. In fact, the choice of accommodation is a high priority for most overseas travellers as they are planning their travel (Sohrabi et al., 2012). Accommodation is a fundamental element of the tourism product (Sharpley, 2000) and accounts for a significant share of total tourism spending (Masiero, Nicolau, & Law, 2015). In addition, accommodation characteristics directly affect the success of the industry as a whole, particularly tourist destination development (Sharpley, 2000).

2.2. The sharing economy and Airbnb

Hall and Pennington (2016) describe the sharing economy as an economic activity centred around online platforms and is based on the sharing of underused assets or services between peers for free or for a fee. According to Zervaset, Proserpio and Byers (2016), the sharing economy refers to a new type of business model that enables individuals to collaboratively make use of under-used inventory via fee-based sharing. The sharing economy consists of a variety of online businesses that use internet technology as a platform for lending, borrowing, gifting, swapping or renting consumer products and services (Molz, 2013). Airbnb is one of the most well-known P2P accommodation sharing organizations (Marchi & Parkeh, 2015). Airbnb was founded in 2008 for hosts to list their spare rooms or residences to potential guests, and it is one of the most prominent businesses in the sharing economy (Levendis & Dicle, 2016).

2.3. The Airbnb accommodation service and how it differs from other accommodations services

Mody, Suess and Lehto’s (2017) study found that Airbnb appears to be leveraging eight dimensions (entertainment, education, escapism, aesthetics, serendipity, localness, communitas and personalization) to a greater extent than hotels. In addition, unique local experiences (Tussyadiah & Pesonen, 2016) and meaningful social encounters (Cheng, 2016) differentiate P2P accommodation, such as that provided through Airbnb, from that provided by traditional accommodation services. Moreover, Tussyadiah and Zach, 2017 study shows that P2P rental reviews put more emphasis on the hospitality of the hosts (i.e. the experience of being welcome in someone’s home) and the locale, with guests highlighting quiet neighbourhoods within short walking distances of local restaurants and only minutes by bus to the city centre. However, hotel offerings include conveniences such as airport shuttle services for guests with early morning flights, free parking, good breakfast options and in-room services. Thus, their study indicates that hotels are better at providing functional services and P2P accommodation services are better at building relationships. A recent study by Belarmino, Whalen, Koh and Bowen (2017) that compared the key attributes of peer-to-peer accommodation and hotels from the perspective of guests found that reviews for P2P accommodation showed different themes than hotel reviews. Conversation with the hosts emerged as a major theme. For the hotel reviews, room amenities emerged as the predominant theme, including food, beverage and odour. Peer-to-peer

guests discussed neighbourhoods and local businesses, while hotels mentioned their proximity to attractions. Contrary to hotels, Guttentag (2017) regards Airbnb's appeal to its users as an illustration of MacCannell's (1999) argument that travellers purposefully seek out local and authentic spaces. Similarly, it has been claimed that P2P accommodation provides a unique and authentic experience compared to traditional forms of accommodation (Prayag & Ozanne, 2018). In summary, guests of Airbnb experience a community-focused and social atmosphere at their host's house and may even gain local connections with the host's help (Kim, Yoon, & Zo, 2015). Overall, Airbnb offers an alternative to the traditional accommodation types (Varma et al., 2016).

2.4. The components of a memorable tourism experience (MTE)

In the tourism scene, studies have been conducted to investigate the factors that make an experience memorable. However, the findings are contradictory—for example, Tung and Ritchie (2011) identified four key dimensions of MTEs (affect, expectations, consequentiality and recollection). Here, affect is linked to the positive emotions associated with the experience—for example, happiness and excitement—while expectations are related to the fulfilment of intentions and/or descriptions of surprises encountered during the trip that exceeded planned agendas. Consequentiality refers to an outcome from the trip that is personally perceived as important. Recollection is related to the efforts made and actions taken to remember the tourism experience and/or reflect back on the trip. They concluded that practitioners can increase the likelihood of tourists developing MTEs by delivering on promises, providing surprises or unexpected pleasures, and promoting memory points to encourage must-see, and desire to purchase memorabilia, for example, souvenirs.

A study by Chandralal et al. (2015) employed travel blog narratives and identified numerous experiential dimensions of MTEs: local people, life and culture, personally significant experiences, shared experiences, perceived novelty, perceived serendipity, professional guides and tour operator services, and affective emotions. Other studies have indicated that the dimensions of education, aesthetics, entertainment, escapism, involvement, hedonism and local culture influence tourists' memories significantly (Ali, Hussain, & Ragavan, 2014; Quadri-Felitti & Fiore, 2013). A recent study by Sthapit (2017) identified three components that contribute to a memorable hotel experience: the friendly attitude of hotel staff, a delicious breakfast with plenty of choice and a good restaurant service at the hotel, and a comfortable bed. It can be seen from these studies that there is little consensus regarding what constitutes an MTE (Chandralal et al., 2015).

Kim et al.'s (2012) study showed that MTEs can be categorised according to seven dimensions (hedonism, novelty, local culture, refreshment, meaningfulness, involvement and knowledge). Hedonism is a consumption experience that relates to the pleasurable, multi-sensory, imaginative and emotive elements perceived by the consumer (Hirschman & Holbrook, 1982). Novelty refers to a psychological feeling of newness that comes from having a novel experience (Farber & Hall, 2007). Local culture refers to the traveller's positive impression of the local people and a close experience of the local culture (Kim et al., 2012). Refreshment refers to an escape from one's routine and stressful environments (Mannell & Iso-Ahola, 1987). People often feel happier, healthier and more relaxed after a leisure trip (Uysal, Perdue, & Sirgy, 2012). Meaningfulness refers to a sense of great significance attached to a trip as a result of doing something important and valuable (Wilson & Harris, 2006). Involvement is defined as the extent to which tourists are interested in an activity and the extent to which their affective responses are aroused by the activity (Manfredo, 1989). Knowledge can be defined as the cognitive aspect of a tourist's experience and involves learning and education (Morgan & Xu, 2009).

In the remainder of the paper, there is a presentation of the methodology and discussion of the results. In the last section, the authors

draw conclusions and discuss the managerial implications, limitations of the study and future research directions.

3. Method

3.1. Research design and sample selection

The goal of the current study was to explore the central elements of a memorable accommodation experience using the stories that travellers told about their recent Airbnb experiences. The study employed a qualitative approach and used data that was collected through semi-structured interviews. The sampling criterion for selecting participants was individuals who had stayed in an Airbnb accommodation within the past 12 months. Participants were identified through a criteria-based snowball sampling technique. Snowball sampling relies on referrals from initial subjects, which then generates additional subjects (Breakwell, Hammond, & Fife-Schaw, 2000). The first informants were recruited using a personal contact who fulfilled the sampling criterion. Once interviewed, the participants were asked whether they knew of anyone else with the required characteristics.

3.2. Pilot interviews, final interview guide, theoretical saturation and trustworthiness

In September 2017, we initially recruited eight participants for semi-structured pilot interviews. The pilot interviews lasted 50–60 min and aimed to identify key themes and issues related to where, when and why participants chose to stay at an Airbnb accommodation. These pilot interviews led to the development of an interview guide for the final phase of data collection.

Based on these individual pilot interviews, the final interview guide was developed. Consisting of three sections, the final interviews consisted of open-ended questions that were semi-structured in nature. The first section focused on demographic details such as gender, age, marital status, occupation and nationality. The second section consisted of nine questions and focused on the interviewees' Airbnb experiences. The third section related to the interviewees' memorable accommodation experiences in the context of Airbnb. The interview guide can be found in Appendix A. All interviews were conducted in Spanish and English between September and October 2017, and each lasted 50–60 min. Notes were taken during the conversations. It was felt that theoretical saturation was achieved with the twentieth participants' narratives. Saturation is crucial when making sample size decisions in qualitative research (Mason, 2010). Marshall (1996) suggested that researchers should be pragmatic and flexible in their approach to sampling and that an adequate sample size is one that sufficiently answers the research question (Kvale, 1996). Beraux (1981) suggested that 15 is the smallest acceptable sample for qualitative studies, while Creswell (1998) suggested 20 to 30 interviews for grounded theory and 5 to 25 interviews for phenomenology. In addition, the trustworthiness standard in qualitative research differs from the conventional, positivistic criteria of internal and external validity, reliability and objectivity (Denzin & Lincoln, 1994; Lincoln & Guba, 1985). In this study, trustworthiness techniques such as member checks, negative case analysis and thick description of phenomena were used.

3.3. Data analysis and coding: open, axial and selective coding

In terms of data analysis, the grounded theory research design (Glaser & Strauss, 1967) was used to develop a conceptual framework that can explain the central elements of a memorable Airbnb hospitality experience. Grounded theory is an inductive research approach that intends to inform and develop a theory that is 'grounded' in participants' data (Charmaz, 2004). Based on Strauss and Corbin's (1990) study, we adopted three steps for a grounded theory approach. The initial step involved scanning the gathered data to develop a broad

Table 1

Open coding (line-by-line coding) example.

Participants Views (Extracted From Transcripts)	Open Coding (Line-by-Line Coding)
"The host was the key factor in our trip to Toledo. He made our stay really comfortable and enjoyable providing us really good recommendations and entertainment stuff at the flat, we didn't expect that, it was a pleasantly surprised play to video games and table games in an Airbnb experience".	Host, key factor
"I think the feeling to be in an exclusive part of the city center of Paris without paying a lot of money for that. On the other hand, the fact that the host spoke our maternal language give the opportunity to share more useful information to enjoy the city deeply".	Exclusive part of the city, host, share more useful information
"The host was very warm and kind. He gave us a lot of advices to discover the city. It was located in the city center where there is a lot of night life, bars and restaurants. We met a lot of Spanish people and we went to a bar with our host one night. It was a very good memory and experience".	Host was very warm and kind, located in city center

understanding of it. This was followed by analysing the interviews and listing the components that contributed to a memorable Airbnb experience. Last, three types of coding were manually undertaken: open coding, axial coding and selective coding (Strauss & Corbin, 1990).

Table 1 illustrates how open coding was done in practice.

Through axial coding, it was possible to describe the tourists' Airbnb experiences and the components that contributed to a memorable Airbnb experience. Two subthemes were identified; these were categorised as 'attitude and social interactions with the host' and 'the location of the accommodation' (**Table 2**). Selective coding followed axial coding. During selective coding, the transcripts were read multiple times, the coding choices were reviewed, as well as comparing the ideas and concepts derived from the literature (Creswell, 2007).

4. Results

4.1. Overall profile of interviewees

Among the 20 participants, 14 were female, and six were male. Their ages ranged from 23 to 46 years old. The respondents' occupations were diverse, ranging from unemployed to student, data analyst, administrative staff, manager, restaurant worker and technical staff. The household structure of participants varied and included single and married people. The participants represented five nationalities: Spanish (13), German (3), Mexican (2), Finnish (1) and French (1) (**Table 3**).

In response to the question 'Where and when did you go for your last Airbnb experience?', the responses included numerous tourism destinations, ranging from Salamanca in Spain to Brooklyn in the United States, while the stays took place between January and October 2017. Most of the respondents travelled with their friends (15), while some travelled with their family members (2), partners (2) or both family members and friends as a group (1). The number of people in the

travel party ranged from two to seven. Numerous participants (18) stated that they made their reservations for the accommodation through Airbnb. In addition, they also had their own Airbnb accounts. This is further highlighted by the responses of two participants: 'Actually yes, I was in charge of the reservation. I did it through the Airbnb website. I created my Airbnb profile specifically for this trip. It was my first and unique Airbnb experience till now' (Laura, female, Spanish). Another said, 'I used my Airbnb web account. It was not my first time with Airbnb because I did another reservation the same year for another destination' (Alejandro, male, Spanish).

In response to the question 'What was your motivation to book an Airbnb accommodation?', most of the respondents mentioned the price and location of the accommodation. **Table 4** illustrates the interpretive codes that indicate the significance of price and location for booking accommodation through Airbnb.

This is highlighted by the responses of three participants. One said, 'When we were looking for an accommodation close to the city centre Airbnb showed to us the better prices, and we wanted to be all together in the same place. The hotels near to the city centre looked good, but the prices and the limitations to be three in the same room were decisive for our selection' (Isa, male, Spanish). Another participant said, 'We considered Airbnb because in Paris, to be in the city centre is so expensive, the hotels normally have an excessive price according to our budget. In this occasion, Airbnb gave us the opportunity to stay at the city centre, close to the place of la Bastille, with an acceptable price' (Silvia, female, Spanish). Finally, a participant stated, 'We required an accommodation for seven people. In Airbnb it is easy to find these kinds of flats or houses with several rooms. According to the price, we found Airbnb as the best option for our trip to Toledo' (Daniel, male, Spanish).

The findings support studies that indicate that consumer motivations for booking P2P accommodation include receiving better price by booking entire apartments instead of multiple hotel rooms (Harrington,

Table 2

The coding process in practice.

Open Coding (Line-by-Line Coding)	Subthemes (Axial Coding)	Main Themes (Selective Coding)
"Host was very warm and kind", "host very kind and resolved all our questions", "share more useful information", "host was the key factor in our trip", "attitude of the host", "hosts attention and attitude", "sunny disposition of the host", "the relationship with the host", "welcoming attitude of the host and her mother", "very friendly host", "host was very nice", "He (host) gave lot of advice to discover the city", "quick response from the host", "host was our personal guide", "good interaction and communication with host", "kindness of the host", "seamless communication with the host", "very friendly host", "hosts attitude", "direct and quick response of the host", "real contact with host", "a great host".	Attitude of host, helpful host, friendly host, responsive host, communicative host, social interaction with the host	Attitude and social interaction with the host and location of the accommodation as contributing to a memorable Airbnb experience
"Exclusive part of the city", "located in city center", "house surrounded by nature and animals", "superb view of the city", "no hotel or hostel can provide you something like that", "accommodation with a good view", "convenient location", "located next to tourist attractions", "public transportation and grocery stores", "located in the city center and near sightseeing".	Accommodation with good view and convenient location	

Table 3Profile of respondents (*n* = 20).

No.	Interviewees	Gender	Age	Marital Status	Occupation	Nationality	Destination Visited
1	Laura	Female	30	Single	Data Analyst	Spanish	Salamanca
2	Ariana	Female	28	Single	Administrative coordinator	Spanish	San Sebastian
3	Anne	Female	32	Single	Assistant Professor	German	Cadiz
4	Daniel	Male	26	Single	Administrative Staff	Spanish	Toledo
5	Luisa	Female	32	Single	Administration Staff	Spanish	Porto
6	Isa	Male	36	Married	Public Administration	Spanish	Toulouse
7	Marco	Male	46	Married	Public Administration	Spanish	La Palma
8	Silvia	Female	29	Single	Unemployed	Spanish	Paris
9	Alejandro	Male	30	Single	Technical Staff	Spanish	London
10	Angela	Female	29	Single	Psychologist	Spanish	Budapest
11	Ana	Female	28	Single	University Student	Spanish	La Rioja
12	Christina	Female	28	Married	Technical Staff	Spanish	Cantabria
13	Elena	Female	28	Single	Public Administration	Spanish	Brooklyn
14	Anahi	Female	29	Single	Category Manager	Mexican	Havana
15	Ira	Female	29	Single	Manager	Finnish	Palermo
16	Adelina	Female	26	Single	Restaurant Staff	German	Rome
17	Mark	Male	23	Single	University Student	German	Malaga
18	Claire	Female	23	Single	University Student	French	Lisbon
19	Carmen	Female	36	Single	Nurse	Spanish	Vila do Conde
20	Eduardo	Male	24	Single	University Student	Mexican	Copenhagen

2015). In addition, Airbnb is primarily a low-cost option for guests (Guttentag, 2013; Liang, 2015). From a guest's perspective, besides a more authentic local experience, the economic benefits (i.e. cheaper prices for accommodation) are a crucial factor (Guttentag, 2015). In addition, the convenience of the accommodation's location led many tourists to prefer P2P accommodation than that of the traditional hotel industry (Pappas, 2017).

While most studies suggest that Airbnb guests want a unique and novel experience, the findings of this study suggest they also want the comforts of home. This suggests that some of the participants sought familiarity—i.e. the ontological comfort of home (Quan & Wang, 2004)—and might not be categorised as novelty seekers. There is evidence that not all tourists behave in a hedonistic manner to the same degree (Carr, 2002); some may exhibit similar behaviour in their homes and holiday environments and across different time and spatial environments (Chang & Gibson, 2011). The findings further support Uriely's (2005) post-modern perspective on the tourist experience, which suggests that the experience of everyday life cannot be differentiated from tourist experiences. The findings can also be linked to Burch's (1969) spillover concept, which states that some individuals may want to participate in similar behaviours and activities in both their homes and holiday environments (Shaw & Williams, 2004). In addition, tourism is never entirely separate from the habits of daily life, and some habits are carried over from one's home environment and life

(Sthapit & Björk, 2017)—in this context, Airbnb, preparing meals while on holiday.

In response to the question 'How would you describe the overall Airbnb experience (reservation, check-in, stay and check-out)?', most of the respondents reported positive experiences, but there were also some negative experiences; the following responses highlight this. One participant mentioned:

The overall experience was great. The host replied quick to our suggestions for renting the apartment ... From there, we were in direct contact with the host ... Then, when we were there, the apartment met the expectations. The several pictures of the apartment on the Airbnb website were consistent with the reality. It was very clean, with a good decoration, like we saw from the website. (Laura, female, Spanish).

Another said:

The overall experience was incredible, the host was very enjoyable, she received us in person. She introduced us to the city ... the apartment was very comfortable, we found something to eat, drink and read. The host left there some maps and tourism books about what to visit. (Luisa, female, Spanish)

Another participant stated, 'All the things in my last Airbnb were really awesome. I recommend him and his apartment. He is very

Table 4

Codes indicating the significance of price and location for booking accommodation through Airbnb.

Open Coding (Line-by-Line Coding)	Subthemes (Axial Coding)	Main Themes (Selective Coding)
"Price for the house reservation seemed right for us", "reasonable price", "according to the price", "we found Airbnb as the best option", "acceptable price", "Airbnb showed to us the better prices", "cheaper and more convenient solution than staying in a hotel downtown", 'for the price and the location in the city', 'my principal motivation was the price', "more cheaper than a hotel and more comfortable than a hostel", "most economical means for an overnight stay", "price and proximity to where I have to be", "a cheap, private and central accommodation", "value for money", "it was cheaper", "costed about the same as the simplest hotels", "allows you to save in other aspect of the trip", "save money in terms of accommodation costs", "reasonable price", "better price", "competitive price", "preferable in term of money", "price was acceptable", "cheaper than a hotel room", "really attractive price and save money", "cheaper", "save more money", "price of the accommodation", "Airbnb gives discounts on my bookings and price-quality balance"	Price of the accommodation	Price and location as the motivation for booking accommodation through Airbnb
"A place on the heart of the city and with a good price", "could be on the centre so you don't have to use taxi or metro you can walk", "good view of the city centre and all for a reasonable price", "awesome view of the city from the flat", "the Airbnb locations are also very interesting", "often in the heart of the city centre"	Location of the accommodation	

kind and friendly' (Anahi, female, Mexican). In relation to negative Airbnb experiences, one mentioned the following:

We had some communications problem with our host. During our stay, our shower was broken. We notified that to the host via WhatsApp, but he said that we have to wait a day to solve this situation. Next day, the host did not appear there, so at the end, we continued with a problem in the shower all our stay. In addition, on the last day, the host wrote us to say that we have to leave the apartment at a specific hour of the day. (Anne, female, German).

Others mentioned, 'The negative aspect was the cold welcome. We thought that we are going to meet the host as a part of our experience. At the end, it was not possible and for us was a disappointing part of the visit' (Angela, female, Spanish). Another participant said the following:

The host had sent her friend to handle the check-in and we didn't like that. She should have come herself. We weren't happy with the stay even though I usually have got very good experiences in Airbnb. The beds were so hard that my friend slept on the sofa. We also found a bug and were terrified. The neighbourhood felt a bit shady, and no wonder—it was near the train station. (Ira, female, Finnish).

Negative evaluations primarily concerned inconveniences suffered due to poor communication, not being able to meet the host and the sub-standard state of the apartment. In some cases, these negative incidents results in unexpected resource losses—in time, money and experience. For example, hosting on Airbnb involves communicating with guests, and when the interviewees felt that their hosts were uncommunicative, they had a negative experience. Pine and Gilmore's (1998) study indicated that poor service easily converts an encounter into a negative experience. Negative experiences have a harmful impact on customer loyalty and influence word-of-mouth. Nowadays, tourists can easily share their positive and negative holiday experiences with tens of thousands of potential customers through social media (Tarssanen, 2007).

In response to the question 'What factors do you consider vital for a good experience with Airbnb?', most of the participants mentioned that communication with the host and their attitude was vital. This was further highlighted by three respondents. One said, 'In my case, I think a good communication with the host is critical. The host has to watch out constantly if the visitors need something or be there for any problem that can be produced during the stay' (Anne, female, German). Another said, 'It is seamless communication with the host. In our travel to Toulouse, we had some problems because the different languages, especially to specify check-in hour. We notified the host that we arrived around 9:00 am, but he opened the apartment for us around 10:45 a.m.' (Isa, male, Spanish). One participant stated, 'My host has to be young and open minded because it is important to me that he understand that probably I will arrive at 4 am because I went to a nightclub or a party' (Anahi, female, Mexican).

Besides appealing to guests physically, emotionally and intellectually, on-site accommodation experiences also contain a social component, as they foster interpersonal interaction (Prebensen & Foss, 2011). According to the existing literature, one of the benefits that guests seek from Airbnb accommodation experience is social interaction (Stollery & Jun, 2017). The desire for social interaction is often seen as the main driver behind the growth of Airbnb (Gansky, 2010). Here, social interaction refers to a feeling of connection and group identity with local people (Kim et al., 2012). According to Williams and Soutar (2009), interaction with other people such as host, staff and other customers creates social benefit in the tourism context. As Airbnb accommodation consists of the homes of ordinary people, it gives travellers the opportunity to interact with the host or their neighbours (Guttentag, 2015). Moreover, communication can establish trust between the host and guest and minimise uncertainty (Guttentag, 2015).

The following comments are from responses to the question 'Compared to a hotel or bed and breakfast, what is different about the

Airbnb experience?'. Most participants mentioned that price, comfort, convenience, location, close interaction with the host and having a local experience makes an Airbnb experience different from a hotel or bed and breakfast. This is further highlighted by the following five respondents. One respondent reported:

I can point out two aspects. The first one is about the host. In Airbnb, you can be in a close and personal contact with the host ... The second aspect is that normally Airbnb provides accommodation from local people, not a typical representation of a hotel room or a commune sharing areas in hostels. In addition, for groups, Airbnb offers better prices and more possibilities for a good location. (Ariana, female, Spanish).

One participant said:

I consider that Airbnb facilitates you to travel and enjoy the experience like a local. On the other hand, normally the price for an accommodation in Airbnb close to the city centre is cheaper than a hotel room. In addition, an apartment of Airbnb gives you more value in terms of comfort ... (Isa, male, Spanish).

A participant stated, 'Basically, the prices for four persons in hotel rooms in the city centre of Paris exceeded our budget. Airbnb is really valuable in that aspect; you can find a place at the heart of the city with a good price' (Silvia, Female, Spanish). Another stated, 'There are a lot of differences between both. Airbnb allowed me to be at the city centre with a really attractive price for various persons. In economic terms, also you can save money cooking at your accommodation instead of paying for a restaurant every day during your stay' (Angela, female, Spanish).

Finally, one participant said the following:

To me Airbnb is a better option than a hotel or bed and breakfast because you can understand the lifestyle of a native person of the country. They should recommend you places to visit or eat. It is cheaper, and you can prepare your breakfast to save more money, and it could be in the centre, so you don't have to use a taxi or metro, you can walk. (Anahi, female, Mexican).

As mentioned earlier, some studies have indicated that compared to traditional forms of accommodation, such as hotels and bed and breakfast, Airbnb is a low cost accommodation option (Guttentag, 2013; Liang, 2015) and also offers convenient locations (Pappas, 2017), social interaction with hosts (Cheng, 2016; Guttentag, 2017; Mody et al., 2017) and local experience (Belarmino et al., 2017; Kim et al., 2015; Prayag & Ozanne, 2018; Tussyadiah & Pesonen, 2016; Tussyadiah & Zach, 2017).

5. Central elements contributing to a memorable Airbnb experience

5.1. Attitude and social interactions with the host and the location of the accommodation

In response to the question 'What made your recent Airbnb experience memorable?', many of the respondents mentioned that the attitude of the host, social interactions with the host and the location of the accommodation contributed to a memorable Airbnb experience. Table 5 illustrates the interpretive codes that indicate the significance of the attitude of the host, social interactions with the host and the location of the accommodation in the participants' positive memorable Airbnb experiences.

This is further highlighted by five positive responses. The positive participants stated the following:

The host was the key factor in our trip to Toledo. He made our stay really comfortable and enjoyable providing us really good recommendations and entertainment stuff at the flat—we didn't expect that. I was a pleasantly surprised to play to video games and table games in an Airbnb experience. (Daniel, male, Spanish).

I think the feeling to be in an exclusive part of the city centre of Paris

Table 5

Codes indicating the significance of attitude and social interactions with the host and location of the accommodation in the participants' positive memorable Airbnb experiences.

Open Coding (Line-by-Line Coding)	Subthemes (Axial Coding)	Main Themes (Selective Coding)
"host was very warm and kind", "host was very kind and resolved all our questions", "shared useful information", "host was the key factor in our trip", "attitude of the host", "hosts attention and attitude", "sunny disposition of the host", "the relationship with the host", "welcoming attitude of the host and her mother", "very friendly host", "host was very nice", "kindness of the host", "very friendly host", "hosts attitude", "a great host", "He (host) gave lot of advice to discover the city", "quick response from the host", "host was our personal guide", "good interaction and communication with host", "seamless communication with the host", "direct and quick response of the host", "real contact with host" "Exclusive part of the city", "located in city centre", "house surrounded by nature and animals", "superb view of the city", "no hotel or hostel can provide you something like that", "accommodation with a good view", "convenient location", "located next to tourist attractions", "public transportation and grocery stores", "located in the city centre and near sightseeing"	Attitude of the host Social interaction with the host Location of the accommodation	Attitude and social interactions with the host and location of the accommodation contributed to a positive memorable Airbnb experience

without paying a lot of money for that. On the other hand, the fact that the host spoke our maternal language give the opportunity to share more useful information to enjoy the city deeply. (Silvia, female, Spanish).

The host was very warm and kind. He gave us a lot of advice to discover the city. It was located in the city centre, where there is a lot of night life, bars and restaurants. We met a lot of Italian people, and we went to a bar with our host one night. It was a very good memory and experience. (Adelina, female, German).

Our host Ivan made our experience very memorable. He helped us with our luggage despite arriving two hours early. He gave us a mobile phone. He was very kind and resolved all our questions. In fact, we could have called him by phone to ask him something about the airport. He was available for us at all times. He suggested night clubs, parties, restaurants, activities. (Anahi, female, Mexican).

All were positive memories, especially because the accommodation gave us all we needed. It was close to the metro so for us was it was very easy to go from Brooklyn to another place in NY. (Elena, female, Spanish).

Some studies have indicated that the role played by the host determines guests' overall experience and intentions to return (Wang & Nicolau, 2017). The way that a host provides the service to the guests is called hospitality hosting behaviour. Hosts are responsible for providing an environment in which the guests feel secure and comfortable (Arriffin, Nameghi, & Zakaria, 2013). Good hospitality hosting behaviour develops a strong bond between the tourist and the accommodation and enhances the emotional value of the experience (Arriffin & Maghzi, 2012; Arriffin et al., 2013). A recent study by Guttentag and Smith (2017) indicated the significant role played by hosts when choosing an Airbnb accommodation over traditional types of accommodations. Studies show that tourists value the distinct role of the host, the host's efforts and the accompanying intimacy (Tussyadiah, 2016) and want to return to a similar type of accommodation setting (Guttentag et al., 2017). Tussyadiah and Zach, 2017 study also indicated that feeling welcome was consistently linked to higher rating scores, signifying its important effect on guest satisfaction and positive electronic word-of-mouth.

As mentioned earlier, social interaction drives many customers to choose P2P accommodations over any other type of accommodation (Guttentag, 2015; Tussyadiah, 2015). Social interactions are a central part of tourism experiences (Cutler & Carmichael, 2010), and the interplay between individuals plays an important role in influencing the experience (Walls, Okumus, Wang, & Kwun, 2011). Social interactions fulfil tourists' social-psychological needs, namely the experience of

positive feelings and emotions (Choo & Petrick, 2014), and is one of the means of improving experience memorability (Brunner-Sperdin, Peters, & Strobl, 2012; Moscardo, 1996).

Tussyadiah and Zach, 2017 study found that location is one of the attributes linked to customers' satisfaction in the context of Airbnb. Location is a commonly accepted factor that is proven to affect Airbnb listing prices; it can be represented as the distance from the city centre, from highways, or from local attractions (Lei, Jie, Jing, Wen, & He, 2011). Studies indicated that Airbnb location patterns confirm it has a stronger relationship with areas in the city centre that attract tourism (Gutierrez, Garcia-Palomares, Romanillos, & Salas-Olmedo, 2017).

6. Conclusion, managerial implications, limitations and future research

6.1. Conclusion

Three main conclusions can be drawn from the research. First, respondents reported their overall Airbnb experiences as positive.

Second, among the reasons for booking an Airbnb accommodation was the price and location. The findings support studies that indicate utilitarian factors, such as price, have a demonstrable influence on tourists' participation in collaborative accommodation initiatives (Stors & Kagermeier, 2015; Tussyadiah & Pesonen, 2016). In addition, tourists tend to stay in places close to areas where the main sights and other tourist attractions are situated. There is a strong association between the location of the accommodation and the areas of the city that are of interest to tourists (Gutierrez et al., 2017). The current study found that Airbnb is used as a suitable substitute for existing accommodation, such as hotels, when travelling with friends.

Third, social interactions and the attitude of the host emerged as dominant factors in a good Airbnb experience. Social interactions that involved the Airbnb host sharing stories or emotions were interpreted as expressions of openness and mutuality. In addition, the social interaction dimension can also be linked to maintaining trust between the host and guest (Guttentag, 2015); as one of the participants mentioned, 'It is about feeling confident' (Marco, Male, Spanish). Although trust is gained through the direct communication between hosts and guests over the Internet, the findings show that the physical presence of the host and the social interactions between the host and the guest are dominant factors when building trust.

Finally, the current study provides a comprehensive analysis of the central elements of a memorable Airbnb experience. It is the first attempt to analyse Airbnb experiences using a grounded theory approach. The findings are classified into two main elements: (1) attitude and social interactions with the host and (2) the location of the

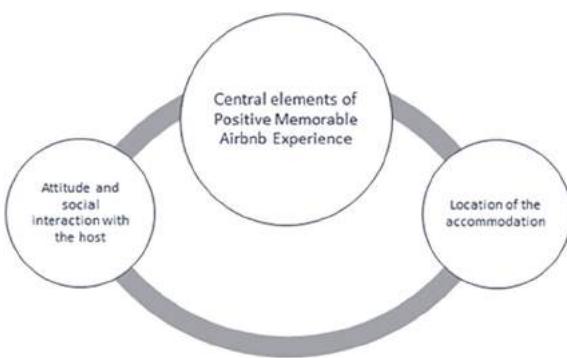


Fig. 1. The framework of the central elements of a positive memorable Airbnb experience.

accommodation (Fig. 1). The findings can be linked to only one dimension of Kim et al.'s (2012) MTE scale: local culture. This supports studies that indicate that the experience of local culture contributes to a unique and memorable holiday experience (Kim et al., 2012; Sthapit, 2017). Social interaction can be further linked to the co-creation of an experience (Shaw, Bailey, & Williams, 2011). One component of co-creation is interactions during an experience (Campos, Mendes, Oom do Valle, & Scott, 2016). Such interactions play a key role in attentional responses and involvement in experiences (Kuhl & Chun, 2014; Mathisen, 2013) and contribute positively to memorability (Campos et al., 2016; Chun & Turk-Browne, 2007).

6.2. Managerial implications, limitations and future research

From a practical point of view, the results of the current study offer important managerial implications. The main motives driving people to stay in Airbnb accommodation includes price and location, therefore, Airbnb hosts should focus on offering an affordable price and write a clear description of the proximity of the accommodation to tourist attractions. In addition, some of the guests wanted the comforts of a home while staying in an Airbnb accommodation, therefore, hosts should offer the basic amenities and make them feel like home. Moreover, given that memorable Airbnb experiences were related to the social interactions with the host, the attitude of the host and the location of the accommodation, this study calls for a shift in the Airbnb host's role from offering cheap rental accommodation to being memorable experience co-creators. For example, hosts should actively interact with the guests, check them in and answer questions linked to the accommodation. Airbnb hosts should consider interaction as a resource that helps guests to have a memorable stay and should provide information about sightseeing, restaurant options and transportation. This will help the guests to make the optimum use of the time spent at the destination and increase the value. To create a more memorable experience, hosts should treat their guests in a friendly manner throughout their stay. Furthermore, hosts should resolve any unexpected problems faced by the guest that are linked to the accommodation—for example, the cleanliness of the apartment or the quality of the bed—to avoid a negative Airbnb hospitality experience. On the contrary, those hosts who welcome guests to empty homes with no time to interact during their stay and are poor communicators should not host on Airbnb. Lastly, Airbnb accommodation that is not located in prime areas should consider providing transportation services to and from airports to attract guests. To compete with Airbnb properties, traditional hotels should create more opportunities for memorable guest experiences. For example, hotel staff should welcome guests with generosity and show respect and the desire to please them. Hotel guests should feel that the host is welcoming. Some studies have indicated that perceived hospitality during a trip experience also contributed to visitors' memorable experiences (Sthapit, 2017). During low seasons, hotels may offer

packages with low prices to attract Airbnb guests. In addition, hotels located in areas with a high Airbnb presence should include Airbnb in their competitive sets and regularly track Airbnb demand and supply dynamics.

Despite the theoretical contribution and managerial implications that have been outlined, the study has some limitations. The sampling criteria did not include accommodation type (private rooms or entire home/apartment) or whether the stays were hosted or not. The authors acknowledge that this as a major limitation, particularly as social interaction was found to be a central element of a memorable Airbnb experience. The participants were mainly from Western countries, and only 20 interviews were conducted. In addition, the data was collected post-visit, and reliance on variable periods of memory was required from the respondents (up to nine months before the interview, in some cases). The memory reconstruction framework indicates that when a past experience is recalled, the memory is not merely a reproduction of a past experience but also consists of information that the individual knew before the actual experience and what they learned afterward (Bartlett, 1932). Thus, the memory of previous experiences is modified by post-experience information (Schacter, 1995). The current study acknowledges that there may be incongruence between remembered experiences and on-site experiences; thus, future studies should interview tourists immediately after their Airbnb experiences.

Future research on Airbnb should also examine the emotions associated with such accommodation experiences while at the destination by applying the concept of savouring. The rationale is that a positive emotional state of activation during a trip contributes to the creation of memories (Tung & Ritchie, 2011). Thus, exploring the emotional impact of an Airbnb experience, both positive and negative, on memorability and its subsequent influence on attachment to place and behavioural intentions could give further insight into the predictive power of consumption emotions. Furthermore, memories of holidays have been shown to contribute to individuals' subjective wellbeing (Sthapit & Coudounaris, 2017). Thus, future studies should examine tourists' Airbnb experiences and the impact these have on their subjective wellbeing.

Acknowledgements

This work of Erose Sthapit was supported by Jenny and Antti Wihuri Foundation; The work of Jano Jiménez Barreto was supported by Spanish Ministry of Economy, Industry, and Competitiveness: [Grant Number ECO2015-69103-R].

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tmp.2018.08.006>.

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Impacts of Peer-to-Peer Accommodation Use on Travel Patterns

Journal of Travel Research
DOI: 10.1177/0047287515608505

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Abstract

As a result of the phenomenal growth of the sharing economy in the travel industry, investigating its potential impacts on travelers and tourism destinations is of paramount importance. The goal of this study was to identify how the use of peer-to-peer accommodation leads to changes in travelers' behavior. Based on two online surveys targeting travelers from the United States and Finland, it was identified that the social and economic appeals of peer-to-peer accommodation significantly affect expansion in destination selection, increase in travel frequency, length of stay, and range of activities participated in tourism destinations. Travelers' desires for more meaningful social interactions with locals and unique experiences in authentic settings drive them to travel more often, stay longer, and participate in more activities. Also, the reduction in accommodation cost allows travelers to consider and select destinations, trips, and tourism activities that are otherwise cost-prohibitive. Implications for tourism planning and management are provided.

Keywords

collaborative consumption, peer-to-peer accommodation, sharing economy, travel pattern, travel behavior

Introduction

The sharing economy has emerged as a new socioeconomic system that allows for shared creation, production, distribution, and consumption of goods and resources among individuals. Facilitated by online social network platforms, people easily share access to resources sitting idle, such as transportation (i.e., ride shares), accommodation (i.e., short-term rentals), food (i.e., peer-to-peer dining), and skills (i.e., task shares), with one another. The sharing economy has entered the travel and hospitality industry, giving ways to successful startup businesses offering peer-to-peer accommodation and peer-to-peer transportation, such as Airbnb, 9Flats, Uber, and Lyft (Ferenstein 2014). These new startup companies are starting to grow at a phenomenal rate and change the travel industry. For example, for the full year of 2014 alone, Airbnb served 18 million guests (100% growth compared to the previous year), 75 million room nights, and \$5.5 billion in bookings (Melloy 2015), indicating the disruptive force of the sharing economy. At this rate, according to World Travel Market (WTM) London (2014), alternative accommodation and peer-to-peer sharing will continue to dominate the global travel trend in 2015.

In addition to the advancement of technology, the emergence of sharing economy is believed to be driven by economic and societal pressures (Botsman and Rogers 2010; Owyang 2013). Literature suggests that because of the economic recession, people are more mindful about their spending and continuously try to be more resourceful

(Botsman and Rogers 2010; Gansky 2010). The practice of collaborative consumption (Belk 2014), which implies various forms of resource redistribution among individuals, is viewed as an alternative consumption mode that offers value with less cost (Botsman and Rogers 2010; Gansky 2010; Lamberton and Rose 2012; Sacks 2011). In the context of travel, travelers use peer-to-peer accommodation rentals as a low-cost alternative to hotels. Indeed, according to Quinby and Gasdia (2014), better value for money was stated as one of the top reasons for travelers to use peer-to-peer accommodation along with more space. Likewise, Balck and Cracau (2015) suggest that cost reduction was stated as the main reason for consumers to choose peer-to-peer accommodation instead of hotels. Additionally, the sharing economy is also driven by people's desire for a stronger community (Botsman and Rogers 2010). Participating in collaborative consumption allows people to create and maintain social connections. That is, by using peer-to-peer accommodation, travelers are able to have direct interactions

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with hosts (i.e., local residents) and to connect with local communities (Guttentag 2013). Therefore, peer-to-peer accommodation appeals to travelers socially as it provides an opportunity to have unique local experiences.

The exponential growth of peer-to-peer accommodation calls for further investigation to assess the potential impacts of this business model on the accommodation sector, the travel industry in general, as well as tourism destinations. While peer-to-peer accommodation has been shown to positively impact local hosts (in income generation), local neighborhoods, and tourism destinations (in tourism spending), it is also believed to generate induced travels and create changes in travel patterns and behaviors (e.g., see Airbnb 2015b). That is, the advantages of using peer-to-peer accommodation stimulate more people to travel, increase travel frequency, and increase length of stay at the destinations. Consequently, these might lead to further rounds of economic, social, and environmental impacts (e.g., more spending, overcrowding, frictions with local residents, etc.), prompting the need for policy development and regulation. Additionally, the continued growth of peer-to-peer accommodation affects the competitive landscape in the accommodation sector, with budget hotels directly competing for similar market segments (Economist 2014; Zervas, Proserpio, and Byers 2014). Hence, in order to estimate the broader impacts of peer-to-peer accommodation on tourism destinations and the travel industry, it is important to assess how the use of peer-to-peer accommodation affects travel patterns among tourists. To that end, the goal of this research is to assess the influences of the use of peer-to-peer accommodation on travel patterns, which include destination choice set, travel frequency, length of stay, and activity participation. To accommodate the global phenomenon of peer-to-peer accommodation, this study was designed to capture responses from adult travelers residing in the United States and Finland. The contrast between the United States and Finland in terms of market penetration (i.e., Airbnb was introduced to the U.S. market first and European market later) and market sizes (i.e., U.S. population is 318.9 million, Finland is 5.4 million) for peer-to-peer accommodation provides opportunities to assess the potential impacts of peer-to-peer accommodation on travel patterns that apply in different contexts.

Collaborative Consumption

Collaborative consumption can be traced back to the well-established form of resource exchanges in our socioeconomic system. Leismann, Schmitt, Rohn and Baedeker (2013) refer to the terms “new utilization concept” and “product-service systems” (e.g., Baines et al. 2007; Tukker 2004; Varian 2000) emphasizing “using rather than owning” model as alternative modes of consumption. These concepts highlight the shift toward resource-saving consumption culture (Leismann et al. 2013), where consumers put less value on ownership in favor of renting, bartering, and exchange. Indeed, Chen (2009) suggests that

ownership is no longer considered the ultimate expression of consumer desire, especially in experience consumption contexts such as appreciation for art. Hence, as suggested by Bardhi and Eckhardt (2012), consumers who could not afford to own or choose not to own due to space or environmental concerns are acquiring access to products and services and, in cases of market-mediated access, willing to pay a price for gaining that access. They refer to it as access-based consumption, emphasizing that the market-mediated transaction does not come with a transfer of ownership (Bardhi and Eckhardt 2012). The alternative mode of consumption is believed to provide an answer to economic challenges for natural resource conservation and efficiency (Leismann et al. 2013).

In order to formally define today’s sharing economy practices, Belk (2014) challenges an early definition of collaborative consumption suggested by Felson and Speath (1978) that focused on joint activities involving consumption (e.g., drinking beer with friends, a group of people watching a sports game together), but not necessarily captured the sharing aspects of the consumption (i.e., distribution of resources to others for their use). He further asserts that a too broad definition of sharing (e.g., sharing, bartering, lending, trading, gifting, swapping, etc.) does not characterize the new collaborative consumption practices either. Collaborative consumption, he suggests, involves “people coordinating the acquisition and distribution of a resource for a fee or other compensation” (p. 1579). This definition highlights the importance of market mediation (i.e., systems of exchange) and the power of social network effects (i.e., peer-to-peer sharing enabled by social technologies) that allow this type of consumption to grow in scale (Cusumano 2015). This translates well with Airbnb’s practices in creating a seamless platform connecting supply and demand in hospitality (Conley 2015; Zervas, Proserpio, and Byers 2015). Hence, while Airbnb and similar networked hospitality exchange systems can be considered collaborative consumption, couchsurfing and other free, non-compensated peer-to-peer hosting models are excluded from this definition.

As an alternative mode of accommodation, peer-to-peer accommodation rentals have the potential to induce changes in travel behavior. Indeed, Airbnb (2015a) reported significant differences in length of stay and local spending between Airbnb travelers and those staying at conventional commercial accommodation. This is likely due to the benefits of peer-to-peer accommodation offering lower cost compared to hotels (Balck and Cracau 2015; Botsman and Rogers 2010; Gansky 2010; Guttentag 2013; Lamberton and Rose 2012; Owyang 2013; Sacks 2011) and opportunities to meet people (Kohda and Matsuda 2013) and connect with local communities (Botsman and Rogers 2010; Gansky 2010; Guttentag 2013). Furthermore, most of Airbnb listings are located outside the central hotel districts and, thus, providing access to what MacCannell (1973) refers to as “back regions,” offering tourists with intimacy of relationships and unique experiences in authentic settings (Guttentag 2013). Airbnb (2015a) also reported that many of the hosts use the rental income to pay their mortgage (i.e., to

stay in their current property) and regular living expenses. As a result, peer-to-peer accommodation systems contribute to the local economy and generate income that is crucial to local residents (Geron 2012).

While collaborative consumption has been suggested as a more sustainable model of economic organization against the backdrop of energy crises, environmental degradation, and economic recession (Botsman and Rogers 2010), the business model comes with considerable complexity that potentially leads to negative impacts for the society at large. For example, Zervas, Proserpio, and Byers (2014) suggest that the rise of peer-to-peer accommodation presents challenges to existing business models as well as the social fabric that makes up the communities. They estimated that the increase in Airbnb listing causes a decrease in quarterly hotel revenues in the state of Texas, mainly with budget hotels being affected. Further, they also assert that the sharing economy might contribute to nonparticipant externalities, where local residents subjected to noise, cleanliness, and public safety issues resulting from the rise in short-term rentals in their neighborhoods. Therefore, peer-to-peer accommodation practices may contribute negatively to the sense of community (Zervas, Proserpio, and Byers 2014). Furthermore, the sharing economy continues to evolve in legal grey areas, where laws concerning zoning, taxes, insurance, health and public safety, and employment that regulate commercial hotels are not fully considered as barriers in peer-to-peer sharing systems. A better understanding of the potential impacts of peer-to-peer accommodation on traveler behavior will provide relevant supports to “level the playing field” (Cusumano 2015) for accommodation businesses and to assess further impacts on the travel industry and tourism destinations.

Trends and Changes in Travel Patterns

Collaborative consumption is the latest addition to numerous developments and trends in the marketplace that have substantially transformed traveler behavior and disrupted the industry dynamics. For example, the Internet changed the landscape of travel distribution (Barnett and Standing 2001; Novak and Schwabe 2009; Tse 2003) by causing changes in the strategic practices among different players in the travel distribution channels (Bitner and Booms 1982; Connolly, Olsen, and Moore 1998; Law, Leung, and Wong 2004; Werthner and Klein 1999). The internet also directly affected traveler behavior, including the ways travelers search for information and make purchase decisions. Further, facilitated by the emergence of social media, the proliferation of user-generated information containing personal tourism experiences affected travelers' choice of information sources during trip planning processes as well as the evaluation and sharing of experiences after the trip (Ayeh, Au, and Law 2013; Parra-López et al. 2011; Xiang and Gretzel 2010).

The boom of low-cost carriers as a result of the liberation of air transport regulations was another development that transformed traveler behavior and caused changes in the travel industry. Low-cost carriers provide almost the same

services (about 80% of service quality) with drastically reduced cost (about 50% of cost) (Franke 2004), thanks to their operational efficiency achieved through a lean business model (i.e., low cost structure with point-to-point network and no frills services) and supported by internet technology (i.e., online booking and e-ticketing). The reduction in transportation cost stimulates travelers who would not have otherwise traveled to fly, resulting in an increase in passenger traffic (Bennett and Craun 1993; Windle and Dresner 1995). Rebollo and Baidal (2007) stated that low-cost carriers contributed positively to the growth of international passengers to Spain, with a growth rate of 15.2% from 2001 to 2005. Additionally, as low-cost carriers often open new routes and use secondary airports, they induce more travel to destinations formerly not included in travelers' consideration set. However, studies also show that lower transportation cost and access to more destinations encouraged travelers to take multiple short vacations, the behavior associated with a progressive decline in the overall length of stay at tourism destinations (Mason and Alamdari 2007).

Similarly, the introduction of collaborative consumption in the travel and hospitality industry has the potential to induce changes in travel patterns. The reduction in accommodation cost, which leads to reduction in the overall trip cost, may yield similar impacts as those of low-cost carriers. These may include induced travels (i.e., those who would not have traveled otherwise), increase in travel frequency, and longer stay. Indeed, previous studies suggest that accommodation types typically associated with lower cost, such as villas and apartments (Alegre and Pou 2007), and campsites and rented homes (Martínez-García and Raya 2008), lead to longer stays and eventually to the range of activities they participate in the destinations. Further, the experiential appeal of peer-to-peer accommodation (i.e., access to experiences in local neighborhoods not typically exposed to tourists) opens up opportunities for travelers to consider many more destinations to travel to. The following subsections are dedicated to explore the potential impacts of peer-to-peer accommodation on travelers' destination choice set, travel frequency, length of stay, and activity participation.

Destination Choice Set

Destination selection is an important issue in tourism, and destination choice set is a central component of destination selection models (Crompton 1992; Sirakaya and Woodside 2005; Um and Crompton 1990). The concept of destination choice set suggests that potential travelers develop an early consideration set of possible destinations, reduce the number of destinations to form late consideration set, and make a final decision (Crompton 1992; Crompton and Ankomah 1993). In making destination selection, Crompton and Ankomah (1993) further argue that travelers evaluate alternatives in the early consideration set based on the relative merits of the destination attributes and later use the constraints of each destination alternative to evaluate those in the late consideration set. According to Mansfeld (1992),

while passing through these stages, potential travelers are influenced by both the utilitarian (i.e., functional, such as cost) and emotional (e.g., family and friends) elements. Indeed, Nicolau (2011a) argues that price is one of the most influential factors for consumers to make travel-related decisions, including destination selection. However, he further asserts that in a hedonic consumption context such as tourism, high prices do not always act against demand (Nicolau 2011a, 2011b). He found that tourists motivated by cultural interests are less reluctant to pay more than expected for the enjoyment of the cultural traits of destinations (Nicolau 2011a).

According to literature (e.g., Botsman and Rogers 2010; Gansky 2010; Guttentag 2013; Kohda and Matsuda 2013), the advantages of peer-to-peer accommodation include low cost and social experiences. These appeals can support certain destinations to be included in travelers' early and late consideration sets and, finally, selected. That is, the reduction in accommodation cost (i.e., low price) as well as the opportunity to experience and interact with local communities in neighborhoods outside of the typical tourism settings (i.e., sociocultural attractions) will add to the attributes of destinations for positive evaluation in the early consideration set. Further, the use of peer-to-peer accommodation has the potential to enable destinations in the late consideration set that are otherwise cost-prohibitive (i.e., price as a constraint) to be selected. Therefore, it can be argued that the use of peer-to-peer accommodation expand travelers' choice set to include destinations otherwise not considered possible. The following hypothesis is suggested:

Hypothesis 1: The economic (1a) and social appeals (1b) of peer-to-peer accommodation affect changes in destination choice set.

Travel Frequency

Travel frequency (i.e., the number of trips individuals take in a period of time) is a critical factor to predict tourism demand (Alegre and Pou 2006; Alegre, Mateo, and Pou 2009). At a macro level, travel frequency represents the number of trips generated from areas of origin to destinations, which is strategically associated with the management with regards to flow of people (i.e., volume) and spending (i.e., value). According to Eugenio-Martin's (2003) five-stage process of tourism decision, decisions on travel frequency and length of stay are made after individuals have made decisions on travel participation (i.e., whether or not to travel) and budget constraint (i.e., how much to spend for travel). Hence, the availability and size of tourism budget determine how many trips to take in a period of time and how long to stay during each trip. Following the model, given predisposed travel budget, the reduction in the trip cost (e.g., due to lower prices) may generate a larger trip frequency. More specifically, the decisions on travel frequency and length of stay depend on the combination of fixed cost (e.g., for transportation) and variable cost (e.g., for accommodation and activities) that make up the total trip cost. When

combined with high fixed cost (e.g., transportation cost for international tourism), lower accommodation cost may result in longer stay, but less frequent, trips. However, lower accommodation cost also leads to a reduction in the total trip cost (i.e., makes travel more affordable), allowing the travelers' budget to accommodate more trips. Therefore, it can be suggested that the low prices of peer-to-peer accommodation induce more travel.

An introduction of new tourism attractions and facilities typically alerts potential tourists to their existence and, eventually, generates visitation to the destinations. Previous studies have emphasized this in the contexts of tourism resort development (Prideaux 2000), the opening of new tourism routes for rural development (Briedenhann and Wickens 2004), the sacralization of local heritage sites into cultural theme parks (Teo and Yeoh 1997), and the development of what Sharpley (1994) referred to as the selling of local places to tourists. Considerably, as tourists are searching for new, authentic experiences in areas of cultural riches (Briedenhann and Wickens 2004), alternative attractions and activities have great potentials to generate visitation. Comparably, as the use of peer-to-peer accommodation opens pathways to unique experiences with local social landscapes, a certain extent of novelty, which is a basic motive for leisure travel (Bello and Etzel 1985), is attached to collaborative consumption experiences. Additionally, staying in "common places" outside of the designated hotel areas may appeal to tourists who seek variety in their experiences. Therefore, it can be argued that the social appeal of collaborative consumption has the potential to attract interests, induce more travels, and lead to an increase in travel frequency. The following hypothesis is suggested:

Hypothesis 2: The economic (2a) and social appeals (2b) of peer-to-peer accommodation affect changes in travel frequency.

Length of Stay

Length of stay is an important tourism indicator as a result of its strategic policy and business implications for tourism destinations and the travel industry. Length of stay represents the "quantity" of vacation "purchased" by travelers as it has direct implications to tourist spending and, consequently, income generated for tourism destinations. The impacts of accommodation types on length of stay have been suggested in previous research (Alegre and Pou 2007; Barros, Butler, and Correia 2009; Gokovali, Bahar, and Kozak 2006; Martínez-García and Raya 2008; Nicolau and Más 2009; Woodside and Dubelaar 2002). Studying length of stay among golf tourists, Barros, Butler, and Correia (2009) found that the types of hotel affect tourists' length of stay. Consistent with Alegre and Pou (2007) as well as Woodside and Dubelaar (2002), Martínez-García and Raya (2008) showed that nonhotel accommodation such as campsites, bed and breakfasts, apartments, and rented homes lead to longer stays. They further argued that this effect is associated with the accommodation prices; travelers who stay at

accommodation with lower prices stay significantly longer than those staying at hotels. Likewise, Nicolau and Más (2009) identified that travelers staying at rented apartments or chalets (i.e., with lower price per day compared to hotels) tend to stay longer in the destination. Staying in peer-to-peer accommodation benefits travelers economically from reduction in accommodation cost (Botsman and Rogers 2010; Guttentag 2013). Therefore, consistent with the findings from previous research regarding the positive effects of low-cost accommodation on length of stay, it can be suggested that the use of peer-to-peer accommodation leads to longer stay. Indeed, Airbnb (2015a) suggests that Airbnb guests stay longer than hotel guests in San Francisco (5.5 nights and 3.5 nights on average, respectively), New York (6.4 nights and 3.9 nights, respectively), and Berlin (6.3 nights and 2.3 nights, respectively).

Furthermore, length of stay is also associated with meaningful social interactions between tourists and local residents. Previous studies show the relationship between length of stay and the intensity of tourist–host social interactions (e.g., Gomes de Menezes, Moniz, and Cabral Vieira 2008; Seaton and Palmer 1997). For example, travelers visiting friends and relatives tend to stay longer in order to optimize their social “contact” (Gomes de Menezes, Moniz, and Cabral Vieira 2008; Yang, Wong, and Zhang 2011). Studying social interactions among backpackers, Murphy (2001) suggests that choosing backpacking as a means of traveling is linked to its social aspects (e.g., opportunities to meet people, to obtain “real” experiences) as well as the extension of trip length. Su and Wall (2010) suggest that travelers interact with local residents in order to understand local culture and local life, acquire more local knowledge, and make friends. Staying at peer-to-peer accommodation implies sharing personal experiences with local residents who often possess rich knowledge of local environments and attractions and have the experience and ability to deal with local issues. Eventually, Su and Wall (2010) found that guest–host interactions affect length of stay. Therefore, it can be suggested that the experiential and social appeal of peer-to-peer accommodation will lead to travelers staying longer at the destinations to create and maintain social connections with local communities. Therefore, the following hypothesis is suggested:

Hypothesis 3: Economic (3a) and social appeals (3b) of peer-to-peer accommodation affect changes in length of stay.

Activity Participation

The economic and social appeals of peer-to-peer accommodation potentially affect the range of activities that tourists partake at destinations, ranging from dining out at restaurants and bars to visiting museums, etc. Activity participation is often associated with the level of tourist expenditures during the trip (e.g., Kastenholz, Davis, and Paul 1999; Loker and Perdue 1992; Masiero and Nicolau 2012; McKercher et al. 2002; Nicolau and Masiero 2013;

Perales 2002). Indeed, Masiero and Nicolau (2012) suggest that while travelers obtain pleasure from leisure activities at the destinations, they balance this pleasure with the amount of money they need to spend for participating in these activities. That is, price is considered a dissuasive factor in the choice of activities, even though its effects vary among travelers (Masiero and Nicolau 2012; Nicolau and Masiero 2013). Therefore, it can be suggested that the reduction in accommodation cost due to the use of peer-to-peer accommodation rentals allows for the distribution of predisposed expenditures for other trip components, including on-site activities.

Nicolau (2011b) further suggest the monetary and nonmonetary efforts that travelers make in order to participate in certain activities at the destination. He identified significant relationships between accommodation types and these efforts. While travelers staying at hotels make higher monetary efforts (i.e., pay higher prices), travelers staying at alternative accommodation make bigger nonmonetary efforts (e.g., traveling further distances), driven by their interest in taking part in specific activities at a destination (e.g., visiting family and friends). In the context of peer-to-peer accommodation use, staying with locals in nontouristic areas offers new types of activities, potentially leading to the attainment of niche tourism experiences, which, according to Robinson and Novelli (2005), include tourism activities in an authentic setting. Indeed, according to Airbnb (2015a), besides wanting to live like locals, 80% of guests visiting Paris, 85% of guests visiting London and Edinburgh, as well as 96% of guests visiting Barcelona were motivated to explore a specific neighborhood (outside of tourist areas), often characterized with unique attractions and activities. Also, about 98% of Airbnb hosts in Sydney reportedly suggest local restaurants, cafes, bars, and shops in their local neighborhoods to their guests, helping them discover less-visited locales in tourism destinations. Therefore, peer-to-peer accommodation is suggested to grow and diversify tourism activities, appealing to tourists seeking for authentic and personal experiences (Airbnb 2015a). The following hypothesis is suggested:

Hypothesis 4: Economic (4a) and social appeals (4b) of peer-to-peer accommodation affect changes in range of tourism activities.

Peer-to-Peer Accommodation Use

While the practices of peer-to-peer sharing and renting are not new (Belk 2014), present-day peer-to-peer accommodation business models entered the market with the introduction of Airbnb in 2008. Peer-to-peer accommodation services are introduced as innovative business models offering alternative solutions to travelers wanting experiences unique to the standard hotel services and, hence, are novel to most. However, the rapid growth of the business model (i.e., in number of listings, number of guests served, and revenues generated) indicates that the rate of adoption of this alternative accommodation among travelers is relatively

high. Indeed, according to PricewaterhouseCooper (2015), 44% of American adults are familiar with the sharing economy. However, Travel Weekly (2014) also shows that only about 8% of adults in North America (and 11% in Europe) have rented peer-to-peer accommodation as of the first quarter of 2014. Therefore, it is expected that there are varying levels of use experience among peer-to-peer accommodation users, including those who were new to the services and those who are more experienced users.

The difference in the levels of use may cast a direct influence on behavioral changes among travelers. That is, the impacts of peer-to-peer accommodation on the behavior of travelers who used it once are expected to be different from those who have used it multiple times. With a higher level of use of peer-to-peer accommodation (i.e., implying that users become more experienced), travelers may recognize higher cost-savings or heightened experiences and broadened social connections, which, in turn, will influence their travel behavior more. Therefore, it is suggested that the use levels of peer-to-peer accommodation among travelers contribute positively to the expansion in destination choice sets (hypothesis 1c), increase in travel frequency (hypothesis 2c), increase in length of stay (hypothesis 3c), and increase in activity participation (hypothesis 4c).

Traveler Characteristics

Collaborative consumption is associated with the sociodemographic characteristics of its users. For example, studies suggest that the sharing economy appeals to younger demographics. Based on a national survey in the United States, Olson (2013) reported that 32% of Gen Xers and 24% of Millennials find collaborative consumption “very appealing,” in contrast to only 15% of Baby Boomers (65% of both Gen Xers and Millennials find collaborative consumption appealing, while 53% of Boomers do). A study in San Francisco and Oakland, United States, also confirms that younger respondents (25–30 years of age) are more open to a peer-to-peer car sharing program (Ballús-Armet et al. 2014). Likewise, based on a study in Berlin and Trier, Germany, it was found that younger respondents are more willing to participate in ride sharing, peer-to-peer accommodation, peer guided tours, etc. (Stors and Kagermeier 2015). This is due to the tendency that younger consumers, who were born in the era of social technology and are accustomed to online sharing behavior, can easily translate their online sharing behavior offline (Gaskins 2010; John 2013). Further, Olson (2013) also demonstrates that consumers with higher income levels are more likely to participate in collaborative consumption, which is the contrary to the view that the sharing economy appeals primarily to low-budget consumers. This is consistent with the findings from Mander (2014) that 60% of respondents in the top 25% of income reported willing to rent rooms from Airbnb, compared to about 47% of those in the bottom 25% of income among internet users. PricewaterhouseCooper (2015) found respondents with annual household income between \$50,000 and \$75,000 (the U.S. national average is

\$51,939) are most excited to use services such as Airbnb and Uber. Finally, Mander (2014) also found that the proportion of male and female respondents who reported interest in renting from Airbnb-style platforms is comparable (51% male, 47% female). Therefore, in analyzing the impacts of peer-to-peer accommodation use, it is important to consider travelers’ demographic characteristics as predictors of changes in their travel patterns.

Indeed, previous studies suggest that destination selection is influenced by personal characteristics of the travelers (Lang, O’Leary, and Morrison 1997; Moscardo et al. 1996; Um and Crompton 1990) in addition to trip characteristics, destination-related attributes, and marketing variables. That is, sociodemographic characteristics (i.e., age, income, education, etc.) count for the individual differences in the ways travelers evaluate alternatives and make destination selection. For example, Guillet et al. (2011) found that travelers’ age is a significant predictor of destination choice among Hong Kong residents. Studying destination choice among American college students, McIntosh and Goeldner (1990) linked destination choice with income, suggesting that students travel to nearby destinations due to income restrictions. Lang, O’Leary, and Morrison (1997) identified the influences of income and education levels on destination choice of Taiwanese tourists, differentiating between within-Asia and out-of-Asia destination choice groups. However, the effects of age and gender were not found in their study. Most recently, Park, Nicolau, and Fesenmaier (2013) identified significant influences of age and income on decisions to visit a destination. Previous studies also found that cultural contexts (i.e., nationalities) influence tourist behavior (e.g., Pizam and Jeong 1996; Pizam and Reichel 1996; Pizam and Sussman 1995), including destination choice.

Travel frequency is also linked to the sociodemographic characteristics of tourists in previous studies. For example, Woodside, Cook, and Mindak (1987) identified that the heavy traveler segment (i.e., those who travel very frequently) in the United States can be distinguished from less frequent travelers by their socioeconomic characteristics. Also, Pearce and Lee (2005) identified that travelers with high and low travel experience differ from each other regarding sociodemographic characteristics such as gender, education, age, and nationality. Littrell, Paige, and Song (2004) found that senior tourists travel more frequently, taking an average of 4.8 trips annually. Tsotsou (2006) identified income to play an important role in predicting ski resort customers’ behavior and especially visit frequency.

Literature also shows that the demographic characteristics of travelers influence length of stay, including nationality, age, income, and education (Alegre and Pou 2007; Becken and Gnoth 2004; Martínez-García and Raya 2008). Fleischer and Pizam (2002) found that level of income and age significantly influence length of stay. Alegre and Pou (2007), on the other hand, did not find age to be a relevant factor but identified that nationality matters. Gokovali, Bahar, and Kozak (2007) found the positive effects of nationality and level of income on length of stay, as well as the negative effect of level of education. However, they also did not find

age as a relevant factor. Finally, Martínez-García and Raya (2008) identified nationality, age, and level of education as relevant explanatory factors of length of stay, with older travelers and those with lower levels of education showing a tendency to stay longer.

Finally, sociodemographic characteristics of tourists have been identified as factors affecting their participation in activities while visiting a destination. While previous studies segmenting tourists based on their activity preferences argued that demographic characteristics are not the most accurate predictors of activity participation (e.g., McKercher and du Cros 2003; Perales 2002; Prentice, Witt, and Hamer 1998), researchers found age (e.g., McKercher et al. 2002; Kastenholz, Davis, and Paul 1999), income (e.g., Kastenholz, Davis, and Paul 1999), education (e.g., McKercher et al. 2002), and tourist origins (e.g., McKercher et al. 2002) as significant factors that distinguish activity-based tourist segments. Although Perales (2002) did not identify education and income to be significant in distinguishing between modern and traditional rural tourists to Spain, McKercher et al. (2002) found education to be significant among culture tourists to Hong Kong. Also, Kastenholz, Davis, and Paul (1999) showed that there are differences in terms of expenditure per person per day, which is associated with purchasing power, as well as the nationalities among different rural tourist segments to Portugal. Finally, McKercher et al. (2002) identified that different tourist origins led to different culture tourism segments to Hong Kong: Western tourists are likely to engage in activities that include general cultural attractions, as well as exploration of Colonial and Sino-Colonial heritage, while Asian tourists are likely to be incidental culture tourists engaging in exploration of iconic Chinese heritage. Based on these findings from previous research, this study proposes the variables of gender, age, education, income, and nationality as predictors of expansion in destination choice sets (*hypotheses 1d–h*), increase in travel frequency (*hypotheses 2d–h*), increase in length of stay (*hypotheses 3d–h*), and increase in activity participation (*hypotheses 4d–h*) among travelers due to the use of peer-to-peer accommodation.

Methodology

This study was designed to identify if peer-to-peer accommodation affects changes in traveler behavior. More specifically, the study seeks to verify and test the impacts of economic and social appeals of peer-to-peer accommodation use on the expansion of destination choice sets (*hypothesis 1*), travel frequency (*hypothesis 2*), length of stay (*hypothesis 3*), and activity participation (*hypothesis 4*) among users residing in the United States and Finland. To achieve the objectives of the study, a questionnaire was designed to capture respondents' behavior with regard to the use of peer-to-peer accommodation. First, respondents were given an explanation of peer-to-peer accommodation following the definition of collaborative consumption from Belk (2014): "Peer-to-peer accommodation rentals are accommodation

services where you pay a fee to stay at someone's property (such as *Airbnb*), but excluding free accommodation services (such as *Couchsurfing*)."¹ The first part of the questionnaire captures the patterns of peer-to-peer accommodation use, including levels of use (i.e., how many times travelers have used peer-to-peer accommodation before) and reasons for using peer-to-peer accommodation. To measure the latter, various motivations for collaborative consumption derived from relevant literature (see Botsman and Rogers 2010; Gansky 2010; Guttentag 2013; Kohda and Matsuda 2013; Owyang 2013) were summarized into 12 statements representing the appeals (i.e., advantages) of using peer-to-peer accommodation. As this study is partly exploratory in nature, bipolar scale was used to examine both negative and positive aspects of the statements (Dolnicar 2013). The statements were presented as a five-point Likert-type scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) (see Appendix). An exploratory factor analysis was performed to identify the underlying factors that explain these motivations, resulted in two factors: economic and social appeals. In the second part of the questionnaire, respondents were asked to rate their agreement on the statements representing how peer-to-peer accommodation has influenced their travel (i.e., in a five-point Likert-type response format: strongly disagree, disagree, neither agree nor disagree, agree, strongly agree). The statements include impacts of peer-to-peer accommodation on expansion in destinations they consider visiting, increase in travel frequency, increase in length of stay, and increase in activities participated at a destination. The last part of the questionnaire captures sociodemographic characteristics of travelers, including gender, age, education, and income levels. Respondents' origins (i.e., United States and Finland) were used as a dummy variable representing nationality. It is acknowledged that nationality can cause cross-cultural differences in survey response patterns (Dolnicar and Grün 2007), but these limitations are addressed in data analysis by examining nationality separately as a dummy variable. In order to ensure readability and to test for face validity, two experts in tourism and eight 3rd and fourth-year undergraduate students enrolled in a hospitality management program read and tested the English version of the questionnaire. To gather responses from Finnish travelers, two bilingual tourism experts translated the questionnaire into Finnish language. First, the experts translated the questionnaire from English to Finnish independently. Then, the translated questionnaires were compared and once an agreement was achieved, the Finnish questionnaire was translated back into English to ensure that the meanings of the questionnaire stayed the same through the translation process. The questionnaire was distributed through Amazon Mechanical Turk (mturk.com) to target adults residing in the United States in August 2014 and sent to the M3 Online Panel (m3research.com) members in Finland in December 2014. The data collection efforts resulted in 799 responses from the United States (155 of them have used peer-to-peer accommodation before) and 1,246 responses from Finland (295 of them were users). To analyze the impacts of peer-to-peer accommodation on travel patterns, only

responses from those who have used peer-to-peer accommodation were included in this study (a total of 450 respondents).

Table 1. Characteristics of Respondents ($N = 450$).

Characteristics	United States ($n = 155$)		Finland ($n = 295$)		Total ($N = 450$)	
	n	%	n	%	n	%
Gender						
(0) Male	90	60.8	171	58.9	261	59.6
(1) Female	58	39.2	119	41.0	177	40.4
Age						
(1) 24 years or younger	25	16.9	40	13.8	65	14.8
(2) 25–34 years	86	58.1	76	26.2	162	37.0
(3) 35–44 years	23	15.5	60	20.7	83	18.9
(4) 45–54 years	12	8.1	37	12.7	49	11.2
(5) 55–64 years	2	1.3	19	6.5	21	4.8
(6) 65 years or older	0	0	58	20.0	58	13.2
Education						
(1) Less than high school	1	0.1	71	25.1	72	16.7
(2) High school	14	9.4	49	17.3	63	14.6
(3) Post-high school education	45	30.4	37	13.1	82	19.0
(4) Bachelor's degree	56	37.8	76	26.8	132	30.6
(5) Master's degree	28	18.9	45	15.9	73	16.9
(6) Doctoral degree	4	2.7	5	1.8	9	2.1
Income						
(1) Under \$20,000 (Under €15,000)	16	10.8	24	8.7	40	9.4
(2) \$20,000–\$39,999 (€15,000–€29,999)	68	45.9	63	22.9	131	31.0
(3) \$40,000–\$59,999 (€30,000–€44,999)	45	30.4	60	21.8	105	24.8
(4) \$60,000–\$79,999 (€45,000–€59,999)	19	12.8	43	15.6	62	14.6
(5) \$80,000–\$99,999 (€60,000–€74,999)	0	0	34	12.4	34	8.0
(6) \$100,000–\$119,999 (€75,000–€89,999)	0	0	17	8.2	17	4.0
(7) \$120,000 or more (€90,000 or more)	0	0	34	12.4	34	8.0
Peer-to-peer accommodation use						
(1) Once	52	35.1	78	28.9	130	31.1
(2) 2–5 times	87	58.8	85	31.5	172	41.1
(3) More than 5 times	9	.1	107	39.6	116	27.8

The characteristics of respondents are presented in Table 1. Respondents from both countries are predominantly male (60%). While American respondents are mostly younger (i.e., with an overrepresentation of respondents between the ages of 25 and 34 years [58%] and underrepresentation of older respondents), the ages of Finnish respondents are more evenly distributed with more representation from senior travelers (20% of them were 65 years or older), which is reasonable for age distribution of the population in Finland. The majority of

respondents receive post-high school education (i.e., some college experiences in the United States and vocational/university experiences in Finland). While the majority of respondents earn less than US\$60,000 in the United States (88%) and less than €45,000 in Finland (66%), around 20% of Finnish respondents are in higher income levels, earning more than €60,000 annually.

In order to test the hypotheses, ordinal regressions with polytomous universal model (PLUM) procedure were identified for four dependent (outcome) variables:

expansion in destination selection, increase in travel frequency, increase in length of stay, and increase in activities participated. Each dependent variable was estimated by the factors of gender, age, levels of education, levels of income, and nationality as well as covariates representing social and economic appeals of peer-to-peer accommodation. The regression analyses were performed using IBM SPSS Statistics 19 software.

Table 2. Peer-to-Peer Accommodation Use ($N = 450$).

Factors	Factor Loadin g	Eigenvalue	Cumulative Percent	Cronbach's Alpha
Social Appeal (SA)		3.97	49.62%	.86
... I would like to get to know people from the local neighborhoods.	.86			
... I would like to have a more meaningful interaction with the hosts.	.82			
... I would like to get insiders' tips on local attractions.	.75			
... I would like to support the local residents.	.74			
... it was a more sustainable business model.	.73			
Economic Appeal (EA)		1.53	68.85%	.82
... it saved me money.	.89			
... it helped me lower my travel cost.	.89			
... I would like to have higher quality accommodation with less money.	.72			

Results and Discussion

An exploratory factor analysis (i.e., principal components analysis with varimax rotation) was utilized to explore the reasons for travelers to use peer-to-peer accommodation. The analysis revealed two factors that drive the use of peer-to-peer accommodation among respondents: Social Appeal and

Economic Appeal (see Table 2). The two factors explain 68.85% of the total variance. The Kaiser–Meyer–Olkin measure of sample adequacy (.83) and Bartlett's test of sphericity ($\chi^2 = 1554.10$, $df = 28$, significance = .00) indicated that factor analysis is appropriate for this data. The Cronbach's alpha of .70 or more supports the reliability of both scales (i.e., Social Appeal $\alpha = .86$; Economic Appeal $\alpha = .82$). The two factors suggest that the use of peer-to-peer accommodation among respondents was driven by (1) the social motivation to get to know, interact, and connect with local communities in a more meaningful way; to experience tourism destinations as a local; and to contribute to local residents, as well as (2) the motivation to get quality accommodation with lower cost. These factors are consistent with suggestions from literature regarding the societal drivers and the low-budget appeal of collaborative consumption (Botsman and Rogers 2010; Gansky 2010; Guttentag 2013; Lamberton and Rose 2012; Owyang 2013; Sacks 2011). In order to identify significant differences between respondents from the United States and Finland in terms of peer-to-peer accommodation use and travel behavior variables, independent-samples t -tests were conducted. A significant difference in means was found in terms of economic appeal of peer-to-peer accommodation ($t = 7.04$, significance = .00), with American travelers rated significantly higher (mean = 4.24, $SD = .58$) on economic appeal compared to their Finnish counterparts (mean = 3.71, $SD = .82$). No significant difference was found in the social appeal factor.

The correlation matrix between dependent and independent variables used in this study is presented in Table 3. Among the independent variables, strong correlation was observed between social appeal and economic appeal of peer-to-peer accommodation ($r = .428$, $p < .001$) as well as between nationality and age ($r = -.498$, $p < .001$). However, the correlation coefficients were below the cutoff point of .80 to indicate concerns for multicollinearity in the subsequent regression analyses. No other strong correlations were observed among predictor variables.

Expansion in Destination Selection

The majority of respondents agreed that peer-to-peer accommodation expands their selection on places to visit, with 45.5% respondents selecting "agree" and 21.7% "strongly agree" to the statement. Significant differences were found between U.S. and Finnish respondents ($\chi^2 = 50.84$, $df = 4$, $p < .001$), with U.S. respondents showing a larger proportion in agreement. Gender difference was also significant ($\chi^2 = 15.17$, $df = 4$, $p < .005$), with female respondents more in agreement. No significant differences were identified among respondents in terms of their age, levels of education, income, and use of peer-to-peer accommodation. The results from ordinal logit regression revealed significant chi-square statistic ($\chi^2 = 193.99$, $df = 22$, $p < .001$), and the final model shows a significant improvement over the baseline model, suggesting a good model fit with the data. The Nagelkerke pseudo- $R^2 = .413$

suggests that predictor variables explain a significant proportion (41.3%) of the variation between perceived expansion in destination consideration set. To demonstrate the relationship between the dependent and independent variables, parameter estimates are presented in Table 4a.

The results show that the economic appeal of peer-to-peer accommodation use significantly contributes to the expansion of destinations to select from, the odds of respondents selecting higher agreement rating increased by 4.96 (95% confidence interval [CI], 3.56 to 6.92) for every unit increase in economic appeal (Wald $\chi^2 = 89.60$, $df = 1$, $p < .001$), indicating significant effects. This suggests that the lower accommodation cost allow travelers to expand destination selection as more become more affordable. The social appeal of peer-to-peer accommodation also contributes to the expansion of destination selection. The odds that respondents would select higher agreement ratings on expansion of destination selection were 1.48 times (95% CI, 1.14 to 1.92) higher for every unit increase in social appeal (Wald $\chi^2 = 8.61$, $df = 1$, $p < .005$). This indicates that the desire for social connection allows travelers to consider more destinations in their choice set. In terms of demographic characteristics, respondents in the age group of 55–64 years had 3.45 times (95% CI, 1.18 to 10.09) higher odds compared to the reference age group of 65 plus to select higher agreement ratings (Wald $\chi^2 = 89.60$, $df = 1$, $p < .001$). Finally, in terms of levels of education, the odds of respondents with some college experience perceiving that peer-to-peer accommodation expands their selection of

destinations to visit were 3.84 times higher (95% CI, 1.08 to 13.60) than the reference group of those with doctoral degrees (Wald $\chi^2 = 89.60$, $df = 1$, $p < .001$). No other relationship is significant in the regression model.

Increase in Travel Frequency

A bigger proportion of respondents agreed that peer-to-peer accommodation increases the frequency of their travel (compared to those who disagreed), with 30% respondents selecting “agree” and 11% “strongly agree” to the statement. Significant differences were found between U.S. and Finnish respondents ($\chi^2 = 14.32$, $df = 4$, $p < .01$), with a greater proportion among U.S. respondents leaning toward agreement. No significant differences were found among respondents in terms of their gender, age, levels of education, income, and use of peer-to-peer accommodation. The results from ordinal logistic regression revealed a significant chi-square statistic ($\chi^2 = 165.41$, $df = 22$, $p < .001$), suggesting that the final model shows a significant improvement over the baseline model, which indicates a good model fit with the data. The Nagelkerke pseudo- $R^2 = .358$ suggests that predictor variables explain a significant proportion (35.8%) of the variation between perceived increase in travel frequency. To demonstrate the relationship between the dependent and independent variables, parameter estimates are presented in Table 4b.

Table 3. Correlation Matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Dependent variables													
Expand Choice Set (1)	1												
Increase Travel Frequency (2)	.426**	1											
Longer Stay (3)	.303**	.589**	1										
More Activities (4)	.413**	.509**	.553**	1									
Independent variables													
Social Appeal (SA) (5)	.375**	.514**	.334**	.493**	1								
Economic Appeal (EA) (6)	.558**	.335**	.275**	.401**	.428**	1							
Gender (7)	.165**	n.s.	n.s.	n.s.	n.s.	.195**	1						
Age (8)	n.s.	n.s.	n.s.	n.s.	n.s.	-.125**	.077**	1					
Education (9)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	.107**	1				
Income (10)	n.s.	n.s.	n.s.	n.s.	n.s.	.124*	-.092**	n.s.	.230**	1			
Nationality (11)	.178**	n.s.	n.s.	.101*	.101*	.323**	-.094**	-.498**	n.s.	.234**	1		
P2P Use: Once (12)	n.s.	-.139**	n.s.	n.s.	-.164**	n.s.	n.s.	-.103**	n.s.	n.s.	n.s.	1	
P2P Use: 2–5 times (13)	n.s.	n.a.	n.s.	.099*	n.s.	n.s.	n.s.	-.050**	.095**	.086**	.073**	-.079**	1
P2P Use: More than 5 times (14)	n.s.	n.s.	.118*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	-.157**	-.064**	-.075**

Note: Significant at ** $p < .01$ level, * $p < .05$ level; n.s. = not significant.

Table 4. Ordinal Regression Models: Destination Selection and Travel Frequency.

Variables	a. Expansion of Destination Selection				b. Increase in Travel Frequency					
	B	SE	Wald (df)	Sig.	Exp(B)	B	SE	Wald (df)	Sig.	Exp(B)
SA	0.39	0.13	8.61 (1)	0.00	1.48	1.30	0.14	86.02 (1)	0.00	3.67
EA	1.60	0.17	89.60 (1)	0.00	4.96	0.35	0.15	5.89 (1)	0.02	1.42
[Gen=0]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Gen=1]	0	.	.	.	1	0	.	.	.	1
[Age=1]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=2]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=3]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=4]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=5]	1.24	0.55	5.11 (1)	0.02	3.45	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=6]	0	.	.	.	1	0	.	.	.	1
[Edu=1]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=2]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=3]	1.35	0.65	4.35 (1)	0.04	3.84	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=4]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=5]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=6]	0	–	–	–	1	0	–	–	–	1
[Inc=1]	n.s.	n.s.	n.s.	n.s.	n.s.	1.16	0.49	5.68 (1)	0.02	3.19
[Inc=2]	n.s.	n.s.	n.s.	n.s.	n.s.	1.00	0.42	5.79 (1)	0.02	2.72
[Inc=3]	n.s.	n.s.	n.s.	n.s.	n.s.	0.87	0.41	4.43 (1)	0.04	2.38
[Inc=4]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=5]	n.s.	n.s.	n.s.	n.s.	n.s.	1.20	0.49	5.96 (1)	0.02	3.33
[Inc=6]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=7]	0	–	–	–	1	0	–	–	–	1
[Nat=0]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Nat=1]	0	–	–	–	1	0	–	–	–	1
[Use=1]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Use=2]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Use=3]	0	–	–	–	1	0	–	–	–	1

Note: Sig. = significance; EA = economic appeal; SA = social appeal; Gen = gender; Edu = education; Inc = income; Nat = nationality; Use = frequency of use; n.s. = not significant.

Compared to the regression on choice set expansion, an increase in travel frequency can be attributed mainly to the social appeal of using peer-to-peer accommodation. The odds of selecting higher agreement on the increase in respondents' travel frequency was 3.67 times (95% CI, 2.78 to 4.82) higher for every unit increase in social appeal (Wald $\chi^2 = 8.61$, $df = 1$, $p < .005$). That is, travelers' desire to connect and develop meaningful relationships with local communities drives travelers to take more trips. The appeal of staying with locals in common places opens new experience opportunities for travelers, stimulates interests, and hence, generates more travels. While smaller compared to the social appeal, the economic appeal of peer-to-peer accommodation use also significantly contributes to the increase in travel frequency. The odds of respondents strongly agreeing on increase in travel frequency were 1.42 times (95% CI, 1.07 to 1.89) higher for every unit increase in economic appeal (Wald $\chi^2 = 5.89$, $df = 1$, $p < .05$). The ability to reduce trip expenditure (i.e., as a result of the cost savings from accommodation) allows travelers to stretch their travel budget to include more trips.

Importantly, the levels of income contributes to the change in travel frequency with respondents in lower income levels showing high odd ratios of agreeing to the statement that they travel more often because of the availability of peer-to-peer accommodation. Specifically, the odds of respondents with an annual income less than \$20,000 agreeing to increase in travel frequency were 3.18 times (95% CI, 1.23 to 8.26) higher than the reference group with an annual income of \$120,000 or more (Wald $\chi^2 = 5.67$, $df = 1$, $p < .05$). The odds ratios gradually decreased as the annual income increased, which can mean that travelers in the higher income brackets are less sensitive to the reduction in trip costs that would allow them to take multiple trips. However, the income group of \$80,000–\$99,999 had an odds ratio 3.33 times (95% CI, 1.27 to 8.75) higher than the reference high-income group (Wald $\chi^2 = 5.96$, $df = 1$, $p < .05$).

Increase in Length of Stay

About 29% respondents agreed that peer-to-peer accommodation increases the length of stay at the destination and 12% strongly agreed to the statement. A significant

percentage of respondents (38%), however, stated that they neither agreed nor disagreed to the statement. Significant differences were found between U.S. and Finnish respondents ($\chi^2 = 14.24$, $df = 4$, $p < .01$), with proportionally higher tendency toward agreement among U.S. respondents. No significant differences were identified among respondents in terms of their gender, age, education, income, and use of peer-to-peer accommodation. The results from ordinal logistic regression revealed significant chi-square statistic ($\chi^2 = 87.65$, $df = 22$, $p < .001$). The final model shows

a significant improvement over the baseline model, suggesting a good model fit with the data. The Nagelkerke pseudo- $R^2 = .208$ suggests that predictor variables explain a proportion (20.8%) of the variation between perceived increase in length of stay, which is lower than the two previous models. To demonstrate the relationship between the dependent and independent variables, parameter estimates are presented in Table 5a.

Table 5. Ordinal Regression Models: Length of Stay and Activity Participation.

Variables	a. Increase in Length of Stay					b. Increase in Activity Participation				
	B	SE	Wald (df)	Sig.	Exp(B)	B	SE	Wald (df)	Sig.	Exp(B)
SA	0.66	0.13	26.44 (1)	0.00	1.93	1.12	0.14	64.83 (1)	0.00	3.06
EA	0.61	0.15	17.48 (1)	0.00	1.85	0.83	0.15	29.66 (1)	0.00	2.30
[Gen=0]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Gen=1]	0	—	—	—	1	0	—	—	—	1
[Age=1]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=2]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=3]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=4]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=5]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Age=6]	0	—	—	—	1	0	—	—	—	1
[Edu=1]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=2]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=3]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=4]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=5]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Edu=6]	0	—	—	—	1	0	—	—	—	1
[Inc=1]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=2]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=3]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=4]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=5]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=6]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Inc=7]	0	—	—	—	1	0	—	—	—	1
[Nat=0]	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
[Nat=1]	0	—	—	—	1	0	—	—	—	1
[Use=1]	n.s.	n.s.	n.s.	n.s.	n.s.	1.12	0.14	64.83 (1)	0.00	3.06
[Use=2]	n.s.	n.s.	n.s.	n.s.	n.s.	0.83	0.15	29.66 (0)	0.00	2.30
[Use=3]	0	—	—	—	1	n.s.	n.s.	n.s.	n.s.	n.s.

Note: Sig. = significance; EA = economic appeal; SA = social appeal; Gen = gender; Edu = education; Inc = income; Nat = nationality; Use = frequency of use; n.s. = not significant.

The effects of both social and economic appeals of using peer-to-peer accommodation on the increase in length of stay are proportional; both appeals contribute almost equally to travelers staying longer in the destinations. The odds of respondents strongly agreeing on the increase in length of stay were 1.85 times (95% CI, 1.38 to 2.46) higher for every unit increase in economic appeal (Wald $\chi^2 = 17.48$, $df = 1$, $p < .001$) and 1.93 times (95% CI, 1.50 to 2.48) for one unit increase in social appeal of peer-to-peer accommodation (Wald $\chi^2 = 26.44$, $df = 1$, $p < .001$). The cost-savings from staying at peer-to-peer accommodation allow travelers to

stretch the trip budget to accommodate longer stays. Additionally, the unique local experiences in atypical tourist neighborhoods drive tourists to explore the destinations more by staying longer. No other variables were found to have significant effects on the dependent variables.

Increase in Activity Participation

Slightly more than 40% of the respondents agreed that peer-to-peer accommodation increased the range of activities they participate at the destination, while 13% stated they strongly

agree with the statement. Significant differences were found between U.S. and Finnish respondents ($\chi^2 = 14.41, df = 4, p < .01$), with a proportionally higher tendency toward agreement among U.S. respondents. No significant differences were found among respondents in terms of their gender, age, levels of education, income, and use of peer-to-peer accommodation. The results from ordinal logit regression revealed significant chi-square statistic ($\chi^2 = 158.43, df = 22, p < .001$); the final model shows a significant improvement over the baseline model, suggesting a good model fit with the data. The Nagelkerke pseudo- $R^2 = .350$ suggests that predictor variables explain a proportion (35%) of the variation between perceived increase in length of stay, which is comparable to the effects in the first two models. To demonstrate the relationship between the dependent and independent variables, parameter estimates are presented in Table 5b.

Similar to the regression model on the increase of travel frequency, the increase in the range of activities participated in the destinations was caused mainly by the social appeal and slightly lesser by the economic appeal of using peer-to-peer accommodation. The odds of selecting higher agreement on the increase in the range of activities participated at a destination is 3.06 times (95% CI, 2.33 to 4.01) higher for every unit increase in social appeal (Wald $\chi^2 = 64.83, df = 1, p < .001$). The social interactions with local hosts as well as the authenticity of experiences outside of touristic places allow tourists to engage in an array of activities typically accessible only to locals. Insider tips and local recommendation may direct tourists to visit local restaurants, cafes, and bars as well as engage in local events and festivities. Additionally, the odds of respondents strongly agreeing on the increase in length of stay were 2.30 times (95% CI, 1.70 to 3.10) higher for every unit increase in economic appeal (Wald $\chi^2 = 29.66, df = 1, p < .001$). That is, the cost savings from staying at peer-to-peer accommodation allow travelers to afford more activities in their travel budget. Interestingly, the more respondents use peer-to-peer accommodation, the less likely they are to perceive an increase in activity participation. Travelers who used peer-to-peer accommodation once have the highest odds of strongly agreeing to the increase in activity participation with 3.06 times (Wald $\chi^2 = 64.83, df = 1, p < .001$). This may be due to the diminishing value of the novelty and uniqueness of the sharing economy as users become more familiar with the service and exposed to varying experiences.

Based on the four regression models, it can be suggested that, with varying degrees, peer-to-peer accommodation affects changes in travel patterns of their guests. The motivations of using peer-to-peer accommodation to save cost lead travelers to consider more destinations in their choice set (i.e., as destinations become more affordable), allow them to stay longer, and participate in more activities. To a smaller extent, the economic appeal of peer-to-peer accommodation also influences travelers to take more trips as reflected in the increase of travel frequency. The social appeal of peer-to-peer accommodation contributes significantly to the increase in travel frequency and range of activities participated in the destinations. This signifies the suggestion that the experience of

staying with locals in an authentic setting induces more travels, especially among those seeking for new, unique, and authentic travel experiences. The availability of peer-to-peer accommodation in common places (i.e., in neighborhoods outside of tourist areas) also offers unique settings for a variety of tourism activities to take place. This confirms the potentials of collaborative consumption to generate diversified tourism services and experiences that, eventually, support local businesses and create vibrant local communities. Finally, the social appeal of peer-to-peer accommodation affects length of stay at the destination, confirming findings from Airbnb (2015a, 2015b), as well as the number of destinations considered in travelers' choice set, with more destinations becoming more attractive as a result of their social experiences. Therefore, all hypotheses pertaining the effects of peer-to-peer accommodation use on changes in travel patterns are supported.

The demographic characteristics of travelers were not found to be significant predictors of changes in travel patterns, except for the effects of age and education on expansion of destination choice set and the effects of income on increase of travel frequency. Consistent with previous studies suggesting moving away from using demographic variables in tourism segmentation (e.g., McKercher and du Cros 2003; Perales 2002; Prentice, Witt, and Hamer 1998), this result suggests that demographic variables may not be accurate to predict traveler behavior as a result of collaborative consumption trend in the marketplace. Therefore, other variables that explain personal characteristics from cognitive, psychographic perspectives, such as values, lifestyle, and attitudes, may better explain their behavior with regards to the use of peer-to-peer consumption in the travel context.

Conclusion and Implications

Because of the explosive growth of tourism and hospitality businesses adopting the sharing economy model, assessing the impacts of collaborative consumption models will provide relevant bases for the travel and hospitality industry as well as tourism destinations to respond to the growing trend with relevant management decisions and policies. The results of this study show that the use of peer-to-peer accommodation stimulates changes in travel patterns. First of all, travelers use peer-to-peer accommodation largely because of two factors: cost savings (i.e., economic appeal) and desire for social relationships with local community (i.e., social appeal). Verified by the regression models in this study, these factors are significant predictors of changes in travel patterns, stimulating expansion in destination choice set, increase in travel frequency, length of stay, and range of activities participated in the destinations. It is also suggested that demographic characteristics are not accurate to predict changes in travel behavior in the context of sharing economy, indicating that future studies should capture other personal and behavioral characteristics to explain these behaviors.

First, the use of peer-to-peer accommodation leads to an increase in the number of destinations in the choice set (i.e., expands travelers' selections of places they could go to). Specifically, the economic appeal of peer-to-peer

accommodation contributes significantly to more destinations being considered in the choice set, while social appeal contributes in a smaller degree. Following the concept of destination choice set (Crompton 1992; Crompton and Ankromah 1993; Mansfeld 1992), it can be interpreted from the results that the social and economic appeals of peer-to-peer accommodation add to the overall merit of destinations to be included in the consideration set. Additionally, the reduction in accommodation cost leads to elimination of price constraints in some destinations, which results in more destinations being considered by travelers. However, it is not just the reduction of prices that is changing the travel behavior as low-cost accommodation has been available in majority of destinations even before collaborative consumption technology in the form of budget hotels and hostels. Peer-to-peer accommodation platform such as Airbnb is able to match a variety of different accommodation services with customers that really value them by not only providing tourists with budget options but efficiently matching tourists with accommodation that best satisfies their various needs (Zervas, Proserpio, and Byers 2015). It is noted as a limitation that this study does not differentiate between early and late consideration sets. Therefore, in order to further elaborate the dynamics of destination selection involving peer-to-peer accommodation, future studies should address this issue.

The expansion of destination choice set as a result of peer-to-peer accommodation use causes important implications to tourism destinations. For less-developed tourism destinations having limited accommodation facilities and capacity, the availability of peer-to-peer accommodation may support and strengthen their chance to attract potential travelers. The impacts of collaborative consumption are likely similar to those from opening new routes and hubs (i.e., exposure of alternative destinations) in the case of low-cost carriers. As long as carrying capacity is not a concern, these destinations might benefit from collaborative consumption in terms of attracting more visitors. On the other hand, for well-established destinations that are characterized with higher prices (i.e., price is a constraint), induced travels due to lower accommodation cost will likely result in spillover activities to neighborhoods that are not zoned for tourism (e.g., residential areas). While the spillover tourism activities may contribute economically to local businesses, they may generate social issues, such as health and public safety, likely from nonparticipant externalities (Zervas, Proserpio, and Byers 2014). Future studies should address this issue to explain further rounds of impacts of peer-to-peer accommodation.

Second, the use of peer-to-peer accommodation also affects travel frequency (i.e., allows travelers to take more trips). The social appeal of collaborative consumption contributes significantly to the increase in travel frequency, confirming that perceived new ways of traveling (i.e., staying with locals) stimulate more travels. Moreover, the cost savings from this alternative accommodation, which results in reduction of the total trip cost, makes taking more trips more affordable. In other words, referring to Eugenio-Martin's (2003) decision model, travelers could fit more trips

into their budget constraint. The increase in travel frequency (i.e., in volume) can be considered beneficial for tourism destinations because it potentially leads to more tourism spending (i.e., value). However, the main concerns associated with travel frequency increase are the environmental impacts of the induced travels. While the general practice of collaborative consumption is viewed as a greener, more sustainable consumption alternative that promotes efficient use of resources (Leismann et al. 2013), induced travels resulting from peer-to-peer accommodation may cause more environmental pressures and lead to resource exploitation and overcrowding in the destinations. As tourism destinations may anticipate that an increase in rental listings may generate more visitors, it is important to have a set of regulations to ensure that the induced travels are within the carrying capacity of the destination.

Third, the use of peer-to-peer accommodation leads to longer stay. Staying at peer-to-peer accommodation implies intense interactions between guests and local hosts. Because local hosts have rich information regarding cultural traditions and local environments, having access to this knowledge will enable travelers to explore and stay longer in the destinations. This confirms Su and Wall's (2010) findings regarding the effects of host–guest interactions on length of stay, with social appeal of peer-to-peer accommodation identified as significant in the regression models in this study. The increase in length of stay is also influenced by the reduction in accommodation cost, with travelers being able to spread their trip budget to include more days. An increase in length of stay, combined with more meaningful interactions with local hosts (i.e., more than just brief exposure and superficial image), is often associated with a deeper understanding and result in travelers developing a strong emotional attachment to the destinations. That is, the more travelers feel they are integrated with the local community, the more they will develop favorable attitude toward the community and the destination (Pizam, Uriely, and Reichel 2000; Su and Wall 2010). This will eventually lead to satisfaction, positive evaluation, and return intention (Pizam, Uriely, and Reichel 2000). Longer stay often translates into more spending, which is beneficial for local businesses and the destination. However, the potential negative consequences of travelers staying longer include conflicts due to travelers' use of resources and facilities developed to accommodate residents, crowding, and other nonparticipant externalities mentioned before. Eventually, it is important for destination managers and policy makers to ensure that collaborative consumption practices are not threatening the social fabric of the local communities.

Finally, the use of peer-to-peer accommodation causes travelers to participate in more activities while experiencing tourism destinations. Both economic and social appeals of peer-to-peer accommodation lead to travelers participating in more activities, with social appeal contributing in a higher degree. The savings from lower accommodation cost can be distributed to other activities, leading to increased intensity and variety in activity participation. Additionally, interactions with hosts and local community, where travelers engage in casual conversations and various activities

involving locals, can be considered new and unique destination experiences. Therefore, the unique experiences offered by staying at peer-to-peer accommodation diversify tourism products and encourage niche tourism experiences. Eventually, this will enrich destination attributes and add to the competitiveness of destinations.

In summary, this study contributes to the better understanding of the potential impacts of collaborative consumption model in tourism by assessing how the different motivations of using peer-to-peer accommodation affect changes in travel patterns. The results of this study confirm that the new trend has the potential to transform traveler behavior, impacting the hospitality sector and tourism destinations. This study provides support for better tourism planning and management to anticipate further impacts of this alternative accommodation. This study has several limitations. First, this study does not consider the temporal dimension of traveler behavior to assess if the impacts of peer-to-peer accommodation use on travel behavior are immediate (i.e., short-term) or prolonged. Therefore, in order to differentiate between short-term and lasting impacts of collaborative consumption, future studies should take the temporal dimension of consumption and travel behavior into consideration (e.g., time period, distance between first use, and time of analysis). Second, this study captured changes in travel behavior as perceived by the travelers (i.e., via self-reported agreement rating) but did not capture the actual behavior or the magnitude of these changes (e.g., increase in length of stay by how many days, how many more activities, etc.), as it would require a longitudinal study. Previous studies have challenged the accuracy of results from self-report measures in questionnaires due to memory errors (e.g., memory decay, lack of motivation to recall) and motivational biases from leniency and social desirability (e.g., Podsakoff et al. 2003; Tarrant et al. 1993). The latter can be influenced by the cultural backgrounds (e.g., Chen, Lee, and Stevenson 1995; Hui and Triandis 1989) and personal characteristics of respondents (e.g., Austin et al. 1998; Donaldson and Grant-Vallone 2002), albeit small and insignificant in some cases. However, despite these limitations, the use of self-report measures in behavioral research is favored for its persuasive advantages due to easy interpretability, information richness, and practicality, thus continuing to yield important, useful, and valid findings (e.g., Paulhus and Vazire 2007). In this study, these concerns were addressed in the design of the questionnaire by making its statements easy to comprehend (i.e., easing the cognitive task) and in the data processing through the detection and elimination of outliers from the analysis. While it was consistently shown that there are differences between U.S. and Finnish respondents in terms of their agreement with the dependent variables, the inclusion of nationality (a dummy variable) as a factor variable in the regression models also assists in capturing the potential cultural bias, which was found insignificant. In light of the limitations from the study method, future studies should capture actual travel behavior comparing between those staying at hotels and peer-to-peer accommodation to measure the actual impacts. Third, this study treats peer-to-peer accommodation as an accommodation category by

contrasting it from hotels, but does not narrow down the category to capture different types of peer-to-peer accommodation services. For example, Airbnb and 9flats allow hosts to offer three types of accommodation: entire house or apartment, private room (often with shared facilities), and shared room. The social and economic appeals may vary according to these accommodation types. Renting a shared room may yield more cost-savings and more intense social interactions with the hosts when compared to renting an entire house or apartment, even though travelers may still enjoy the same benefits of staying in a desired nontouristy neighborhoods and having authentic tourism experiences. Therefore, future studies should consider these different types of peer-to-peer accommodation to capture its impacts.

Appendix

Measurement Items

1. Peer-to-peer accommodation:

“Peer-to-peer accommodation rentals are accommodation services where you pay a fee to stay at someone’s property (such as *Airbnb*), but excluding free accommodation services (such as *Couchsurfing*).”

2. Reasons to use peer-to-peer accommodation:

“I used peer-to-peer accommodation rentals because . . .
. . . I would like to get to know people from the local neighborhoods” (SA).
. . . I would like to have a more meaningful interaction with the hosts” (SA).
. . . I would like to get insider tips on local attractions” (SA).
. . . I would like to support local residents” (SA).
. . . it was a more sustainable business model” (SA).
. . . it saved me money” (EA).
. . . it helps lower my travel cost” (EA).
. . . I would like to have higher quality accommodation with less money” (EA).
. . . the location was convenient” (did not converge).
. . . it saved me time to search for accommodation” (did not converge).
. . . it was enjoyable to find the rental online” (did not converge).
. . . I did not want to support hotel enterprises” (did not converge).

3. Changes in Travel Patterns:

“The availability of . . .”
. . . peer-to-peer accommodation rentals expands your selection of places to go to.”
. . . peer-to-peer accommodation rentals increases the frequency of your travel.”

“... peer-to-peer accommodation rentals makes you take longer vacations.”

“... peer-to-peer accommodation rentals makes you do more activities while traveling.”

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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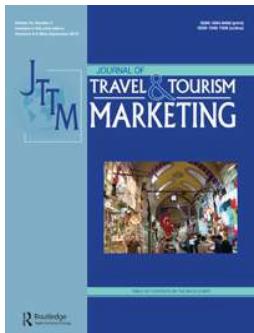
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To cite this article: Iis P. Tussyadiah & Florian Zach (2017) Identifying salient attributes of peer-to-peer accommodation experience, *Journal of Travel & Tourism Marketing*, 34:5, 636-652, DOI: [10.1080/10548408.2016.1209153](https://doi.org/10.1080/10548408.2016.1209153)

To link to this article: <https://doi.org/10.1080/10548408.2016.1209153>



Published online: 10 Aug 2016.



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Identifying salient attributes of peer-to-peer accommodation experience

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ABSTRACT

This study explores key content and themes from online reviews to explain major service attributes of peer-to-peer (P2P) accommodation sought by guests. The results from lexical analyses indicate that attributes frequently mentioned in guest reviews are associated with location (proximity to point of interest and characteristics of neighborhood), host (service and hospitality), and property (facilities and atmosphere). Reviews focusing on location and feeling welcome are consistently linked with higher rating scores, including accuracy, cleanliness, check-in, communication, value, and overall ratings. This confirms that P2P accommodation appeals to consumers who are driven by experiential and social motivations. Marketing implications are provided.

ARTICLE HISTORY

Received 28 January 2016

Revised 6 May 2016

Accepted 28 June 2016

KEYWORDS

Sharing economy;
collaborative consumption;
business analytics;
accommodation; consumer
review; text mining

Introduction

In a relatively short period of time, a new wave of businesses utilizing the concept of sharing economy, also known as collaborative consumption (Belk, 2014; Botsman & Rogers, 2011), has entered the tourism and hospitality marketplace with the introduction of peer-to-peer (P2P) accommodation services. The sharing economy is a socio-economic system where connected individuals organize the distribution of excess capacity or resources sitting idle in exchange for a fee or other compensation among each other (Belk, 2014). P2P accommodation services such as Airbnb and Roomorama create a platform that enables “regular people” (i.e. as opposed to business entities) to rent out their spare rooms or unoccupied houses and apartments and serve tourists. P2P accommodation services continue to grow at a phenomenal rate. In the summer of 2015, Airbnb served about 17 million guests worldwide, which is a 350% increase from 2010 (Airbnb, 2015a). At about 113% year-over-year, the revenue growth of Airbnb is far higher than publicly traded hotel companies, such as Marriott and Wyndham at 8% and 6% respectively (CB Insights, 2015). Furthermore, Airbnb has more rooms than any branded chain hotels (Freitag & Haywood, 2015), making it a formidable competition for hotels. Indeed, based on a study in the state of Texas, United States (US), Zervas, Proserpio, and Byers (2015a) found that an increase in Airbnb listing causes a decrease in hotel revenues, with budget hotels

and hotels not catering for business travelers being the most affected.

In order to conceptualize and assess the competitive advantages of P2P accommodation in comparison with the conventional accommodation services such as hotels, it is important to explore the aspects of P2P accommodation experience that really matter to guests. Previous studies extract key content from consumer reviews to explain the important attributes of accommodation services and how these attributes contribute to guest satisfaction (see for example Xiang, Schwartz, Gerdes, & Uysal, 2015; Zhou, Ye, Pearce, & Wu, 2014). However, it is largely unknown in tourism and hospitality management literature whether consumers expect the same aspects of service from P2P accommodation. Also, previous research has suggested various drivers of consumer participation in the sharing economy, including value (i.e. cost-saving), social relationship and sense of community, and authentic experience in non-tourist areas (see for example Botsman & Rogers, 2011; Guttentag, 2015; Tussyadiah, 2016; Tussyadiah & Pesonen, 2015), indicating that what guests seek in P2P accommodation experiences may be different from what they seek in a hotel stay. To that end, the goal of this study is to explore key service characteristics of P2P accommodation emerging from consumer reviews online. Knowing which attributes are important to guests will inform hosts regarding areas they need to

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This article was originally published with errors. This version has been corrected. Please see Erratum (<http://dx.doi.org/10.1080/10548408.2016.1235323>).

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pay more attention to in order to attract and satisfy more guests.

In many cities, the growth of P2P accommodation is faced with a variety of legal and regulatory challenges, mostly associated with restrictions for short-term rental of residential dwelling units. For example, in an attempt to safeguard affordable housing for its residents the city of Berlin in Germany imposes hefty fines on users who rent out entire properties on Airbnb (Kim, 2016). Similarly, it has been shown that most Airbnb rentals in New York City, US, violate the short-term leasing law in the State of New York (Gonen & Sutherland, 2015). Conversely, the city of Portland in Oregon, US, was among the first to introduce regulations for P2P accommodation rentals, including requirements for a business permit and registration, adherence to zoning law, taxes on short-term rentals and transient lodging, and property inspection (The City of Portland, 2015). Due to this major regulatory undertaking, Portland provides a unique context for this study because it "levels the playing field" for commercial and P2P accommodation providers, allowing its residents to serve the tourism market alongside the conventional lodging companies and, at the same time, providing infrastructure to protect both its residents and its visitors. In order to capture potential differences in terms of attributes considered important by guests in different areas, this study also analyzed samples of reviews from listings in New York, US, and London, United Kingdom (UK).

Conceptual framework

Attributes of accommodation services

Identifying operational and marketing dimensions that capture and retain guests and, in turn, inform management decisions to increase profits is critical in hospitality management. A better understanding of the relative importance of various attributes in driving value for guests will allow service providers to allocate resources more efficiently (Mattila, 1999), as well as tailor and develop offerings to achieve and maintain the highest possible occupancy (Lockyer, 2004). Indeed, various studies suggest that there are different features that guests evaluate and use as decision criteria in hotel selection process (see for example Clow, Garretson, & Kurtz, 1994; Lockyer, 2004). Different attributes influence guest satisfaction and post-purchase behavior associated with hotel stay, such as loyalty and electronic word-of-mouth (eWOM) behavior (see for example Albayrak & Caber, 2015; Xiang et al., 2015; Yen & Tang, 2015). Guest decision-making, which includes hotel selection, satisfaction, and post-purchase behavior, is a

result of a cognitive and affective response to hotel attributes (Westbrook, 1987), and the overall evaluation of accommodation services is a combination of guest judgments about these different attributes and benefits (Mattila, 1999).

Previous studies have identified and proposed different salient hotel dimensions in various research contexts, although common attributes were found in these studies. For example, Knutson (1988) found that business and leisure travelers consider factors of cleanliness and comfort, convenience of location, promptness and courtesy of service, safety and security, and friendliness of employees when selecting hotels for a first or repeat visit. Rivers, Toh, and Alaoui (1991) suggested that convenience of location and overall services are stated as the most important attributes for travelers when selecting hotels. Examining the factors of guest satisfaction and repeat patronage in Hong Kong, Choi and Chu (2001) suggested the factors staff service quality, room quality, general amenities, business services, value, and security. Studying the topic with participants in New Zealand, Lockyer (2005) identified price, location, cleanliness, facilities, and other. A meta-analysis of 21 studies by Dolnicar and Otter (2003) provides a comprehensive overview of what guests consider important by grouping 173 identified hotel attributes into the following categories: image, value/price, hotel, room, services, marketing, food and beverage, security, and location. They also identified top attributes from these groups with convenience of location being the most important criterion, followed by service quality, reputation, friendliness of staff, price, room cleanliness, and value for money (Dolnicar & Otter, 2003).

For hotel selection, previous studies identified various decision criteria (see for example Ananth, DeMicco, Moreo, & Howey, 1992; Atkinson, 1988; Lockyer, 2004, 2005; Stringam, Gerdes, & Vanleeuwen, 2010) that Alpert (1971) termed "determinant attributes". These are features that directly influence purchase intention and differentiate service offerings from competitors. Since intangible cues are very difficult to evaluate prior to patronage, consumers turn their attention to more tangible cues to make purchase decisions and to evaluate past performances (Bitner, 1990; Clow et al., 1994). For example, Clow et al. (1994) show that in order to evaluate service quality, consumers refer to their own experiences, staff behavior, price structure, WOM, and appearance of hotel facility. Additionally, Saleh and Ryan (1992) identified that guests consider tangible, physical components (particularly hotel appearance) as determinant factors in hotel selection.

Although the dimensions included in these studies are varied, attributes for hotel selection and evaluation

are well researched. However, knowledge about attributes to evaluate P2P accommodation is extremely limited. While human interactions (i.e. staff recognition, friendliness, attentiveness) have been considered an important hotel attribute, the different roles of hosts and hotel staff as well as the intimacy attached to the sharing practice (i.e. staying at someone's home) highlight the importance of social interactions in a P2P accommodation stay. From this point of view, P2P accommodation to some extent can be compared to a type of bed and breakfast (B&B) service, where (commercial) hosts (i.e. innkeepers) offer accommodation with homelike settings. Previous studies have identified a high level of satisfaction among guests in B&Bs (see for example Felix, Broad, & Griffiths, 2008; Scarinci & Richins, 2008; Zane, 1997) and suggested the top qualities of B&B services that guests consider important. These qualities (i.e. service attributes), while including facilities such as availability of private bathrooms, room size, and choice of bed sizes, are centered on hosts who go out of their way to make guests feel comfortable, give recommendations regarding attractions and restaurants, create a homelike atmosphere, and are non-intrusive and respect guests' privacy (Felix et al., 2008; Zane, 1997). Therefore, it can be suggested that when cohabitation occurs (i.e. hosts and guests stay in the same property) in homelike settings, guests of P2P accommodation would consider the friendliness and attentiveness of hosts as important.

Even though the basic services of P2P accommodation are comparable to hotels and B&Bs (i.e. room and board), P2P accommodation is characterized by a lack of standards (i.e. absence of star ratings or quality classification). Guests can choose from three types of accommodation through Airbnb: an entire house/apartment, a private room (often with shared facilities), or a shared room. The features of these listings vary greatly (e.g. shared or private bathroom, kitchen, internet access, and other room amenities). Therefore, it is important to explore which features really matter to guests when evaluating P2P accommodation in order to better understand the factors that differentiate P2P accommodation from more established accommodation offerings, including hotels and B&Bs. While still in its infancy, recent studies on P2P accommodation have suggested cost-savings (i.e. value for money) and social motivations (e.g. desire for community and social interactions) to drive the use of P2P accommodation in the US and Finland (Tussyadiah, 2015; Tussyadiah & Pesonen, 2015). Based on a questionnaire distributed to Airbnb users (including both hosts and guests) in Germany, Möhlmann (2015) identified cost-savings, familiarity (with the system), trust (amongst users and

in the system), and utility (quality of service as compared with other alternatives) to be the significant factors of satisfaction in P2P accommodation marketplaces. In terms of providers, Karlsson and Dolnicar (2016) suggested three motivations for participation in P2P accommodation: income (80%), social interaction (31%), and sharing (14%). Finally, based on a questionnaire responded to by P2P accommodation guests in the US, Tussyadiah (2016) identified the factors of enjoyment, amenities, and cost-savings as positively influencing satisfaction (in order of significance), with social benefits only found significant among those who rent private rooms. However, location, which is one of the most important hotel attributes (see for example Lockyer, 2005; Rivers et al., 1991), was not significant in influencing guests' satisfaction or behavioral intention to use P2P accommodation (Tussyadiah, 2016). The limited literature on evaluation criteria for P2P accommodation is one of the motivations for this research.

User-generated content and text analytics

Previous studies have applied different methodologies to assess the relative importance of hotel attributes among consumers, many focusing on importance ratings of different attributes through interviews with and questionnaires distributed to consumers (see for example Clow et al., 1994). More recently, through development in mobile devices and social network technologies consumers leave traces of their consumption patterns online through pictures, check-ins, statuses, and reviews. Lipsman (2007) suggests that more than 87% of consumers rely on online user-generated content (UGC) to make purchase decisions for hotels. UGC, when appropriately managed and analyzed, amounts to significant consumer intelligence valuable for tourism and hospitality businesses. Indeed, business intelligence and analytics, and the related field of big data analytics, are considered critical in providing market insights and competitive analyses to assist business managers in making timely decisions (Chen, Chiang, & Storey, 2012). Therefore, UGC provides opportunities for tourism and hospitality decision makers to gain actionable insights into factors of guest experiences and satisfaction.

As a form of eWOM, online hotel reviews are valuable in predicting booking intention and guest satisfaction (see for example Stringam et al., 2010; Tsao, Hsieh, Shih, & Lin, 2015; Xiang et al., 2015; Zhou et al., 2014). By extracting frequently discussed attributes in online reviews, UGC can reveal the influence of different dimensions of hotel services on purchase decisions and evaluation. Several studies indicate the usefulness

of analyzing UGC to create knowledge and recognize patterns. Based on TripAdvisor reviews of hotels in Hong Kong, Li, Law, Vu, and Rong (2013) suggested six hotel selection criteria (value, location, sleep, room, cleanliness, and service) and demonstrated that evaluation differs based on travel type and traveler origin. Ramanathan and Ramanathan (2011) used online reviews to examine UK hotel performance and identified customer service, room quality, and quality of food as dissatisfiers. Most recently, analyzing 60,648 hotel reviews, Xiang et al. (2015) identified six dimensions in hotel reviews (hybrid, deals, amenities, family friendliness, core product, and staff) with varying degrees of influence on satisfaction, as measured through star ratings.

Key to analyzing UGC is to extract valuable nuggets of information and patterns from relatively large, highly unstructured human-authored text data. Manually scanning and analyzing such data is considered impractical for business decisions due to a high computational burden. Advances in computer science, especially in machine learning and natural language processing (NLP) resulted in text-mining techniques (also known as text analytics or knowledge discovery from textual database) that effectively extract knowledge from natural (human) language text documents. The overarching goal of text mining is to turn (unstructured, often messy) text into (structured, organized, labeled) data for analysis through application of NLP and other statistical models so high-quality (interesting, novel, relevant, and non-trivial) information can be extracted from the data. It typically involves such tasks as text categorization, text clustering, concept extraction, and document summarization. Text analytics target an automatic extraction of features from single documents and analyze feature distribution over the collection of documents to detect patterns and trends (Dörre, Gerstl, & Seiffert, 1999).

In tourism and hospitality marketing and management, text mining techniques can be valuable in handling voluminous text available online from online reviews, blogs, tweets, discussion forums, and so on. As travel consumers leave traces online during various travel experiences from information search to reflection (e.g. consumer feedback), a large amount of knowledge about tourist behavior and perception is available to tourism destinations and hospitality businesses (Fuchs, Höpken, & Lexhagen, 2014). Text-mining techniques are applied to extract important features (e.g. accommodation attributes, customer satisfaction factors) and surrounding patterns and trends in order to better understand what consumers want as well as the strengths and weaknesses of competitors.

Method

This study analyzes online reviews of Airbnb listings to extract salient attributes of P2P accommodation. The underlying assumption in this study is that attributes most frequently mentioned in guest reviews are indicative of guest satisfaction factors. Data were obtained from a third-party website, insideairbnb.com (Inside Airbnb, 2015), published under a Creative Commons Zero CC0 1.0 Universal (CC0 1.0) "Public Domain Dedication" (Creative Commons, n.d.). The data set contains information regarding property listings in Portland, Oregon, US, which was sourced from publicly available information on the Airbnb.com website on May 12 2015. After eliminating cases with missing information and reviews written in languages other than English, 41,560 reviews from 1617 property listings were included in the study. On average, each review contains five sentences (i.e. a total of 215,497 sentences in the data set). Data management and analyses followed several steps, which include preprocessing, lexical analysis, and visualization, facilitated by the text-mining software "KH Coder" (Higuchi, 2015).

Data preprocessing and descriptive statistics

In order to prepare the textual data for further analysis, the data set was preprocessed following these procedure (see an example in **Exhibit 1** in the Appendix): (1) tokenization (i.e. breaking a stream of text into words, phrases, symbols, and other meaningful elements called tokens); (2) eliminating stop words (i.e. removing frequently occurring non-context-bearing, common words, such as definite or indefinite articles and auxiliary verbs, including "a", "an", "and", "the", etc.); (3) part-of-speech (POS) tagging (i.e. assigning parts of speech to each word, such as noun, verb, adjective, and so on, based on both its definition and its context); and (4) lemmatization (i.e. conflating tokens to their root form, such as "staying" and "stayed" into "stay"). The preprocessing was conducted using the Stanford POS Tagger program, a Java implementation of the log-linear POS tagging approach as described in Toutanova, Klein, Manning, and Singer (2003). The data set contains 3,530,597 tokens and 33,059 word types. After exclusion of stop words, 1,473,197 tokens and 21,561 word types (i.e. representative terms) remained for analysis. **Figure 1** illustrates the distribution of the term frequency (TF, number of occurrences of words) in the data set. The mean TF is 45.57 (i.e. words appear 45 times on average) with a standard deviation of 484.58. As represented by the long tail in the distribution plot, about 99% of words appear less than 1000 times in the data set.

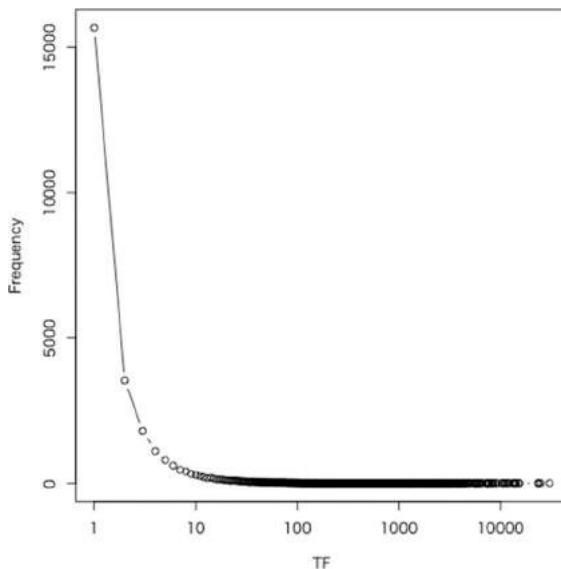


Figure 1. Term frequency (TF) distribution.

Automated term recognition

In order to obtain terms that are most relevant to P2P accommodation experience from the data set, important compound words (N -grams), which could be a two-word combination (bi-gram), a three-word combination (tri-gram), and so on, were identified using an automated term recognition (ATR) approach as explained in Nakagawa (2000) and Nakagawa and Mori (2002), facilitated by a TermExtract module included in the KH Coder program. It applies a termhood-based approach to measure the extent to which a candidate term (ct) is related to a domain-specific context (Korkontzelos, Klapafitis, & Manandhar, 2008), assuming that terms with a complex structure are made up of simple terms (Nakagawa, 2000; Nakagawa & Mori, 2002). Therefore, it measures the termhood of single tokens first and then uses it to measure the termhood of complex terms. Let $R(N)$ and $L(N)$ be two functions that calculate the number of distinct words that adjoin N or N adjoins respectively. For each candidate term $ct = N_1, N_2 \dots N_k$, an importance score (IMP) is calculated by:

$$IMP(ct) = \left(\prod_{i=1}^k ((R(N_i) + 1) * (L(N_i) + 1)) \right)^{1/2k} \quad (1)$$

It can be interpreted that the higher the importance score of a term in the data set, the more relevant it is to characterize P2P accommodation experience.

Word co-occurrence network

The distribution of high frequency keywords in the data set was examined by developing word co-occurrence networks to identify how words were used in connection with each other in one review. Each network consists of nodes and edges that connect the nodes. Nodes are frequently mentioned words. Edges are determined by the Jaccard Coefficient of word pairs. The Jaccard Coefficient is a statistical measure to compare the similarity between finite sample sets, which is defined as the size of the intersection divided by the union of the sample sets. The Jaccard Coefficient of a word pair A and B is:

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|} \quad (2)$$

The layout of the networks is determined by the Fruchterman and Reingold (1991) algorithm, which uses a force-based graph-drawing technique to present networks in an aesthetically pleasing way. The co-occurrence networks were developed using the *igraph* package in the *R* statistical program.

Cluster analysis

Agglomerative hierarchical cluster analysis was conducted to partition the data set into meaningful and coherent groups of similar reviews. Words with higher probability of appearance in a specific cluster (as indicated by its conditional probability score) give the cluster its distinctiveness from the rest. Reviews containing similar sets of words typically discuss the same topic. Therefore, in this study, cluster analysis assists in identifying groups of reviews that discuss similar topics, representing attributes of P2P accommodation. In order to consider whether reviews are similar or different, this study uses Jaccard Distance as a distance measure, which compares the sum weight of shared terms with the sum weight of terms that are present in either of the two documents (i.e. reviews) but are not the shared terms. Jaccard Similarity (SIM_j) of two reviews d_a and d_b , represented by their term vectors \vec{t}_a and \vec{t}_b , is:

$$SIM_j(\vec{t}_a, \vec{t}_b) = \frac{\vec{t}_a \cdot \vec{t}_b}{|\vec{t}_a|^2 + |\vec{t}_b|^2 - \vec{t}_a \cdot \vec{t}_b} \quad (3)$$

Jaccard Distance (D_j) or dissimilarity between the two reviews is:

$$D_j(\vec{t}_a, \vec{t}_b) = 1 - SIM_j(\vec{t}_a, \vec{t}_b) \quad (4)$$

Each review is initially assigned to its own cluster, producing a set of singleton clusters, and then the algorithm proceeds iteratively by merging the two most similar clusters at each stage until there is just a single cluster. The agglomerative method is Ward's (1963) linkage criterion (i.e. Ward's minimum variance method), which uses the error sum of squares to merge the pair of clusters. For optimum inclusion of data and interpretability of results, this study used words that appear at least 4000 times in the data set, generating a matrix with 51 columns and 41,560 rows. The cluster analysis was conducted using the *hclust* package in the *R* statistical program, resulting in each review being a member of a specific cluster.

Influence of reviews on ratings

Regression analyses were conducted using the SPSS statistical program to identify if different attributes of P2P accommodation mentioned in reviews influence rating scores. It is important to note that, unlike other online review platforms where individual rating scores are made visible for each review (i.e. a direct association between review and rating score can be made), only aggregate rating scores for each property are made available on the Airbnb website. Hence, no direct association between each review and rating score given by the reviewer could be made. Therefore, this study uses the share of cluster membership (i.e. the number of reviews belonging to Cluster 1, Cluster 2, etc.) at the property level as independent variables, and rating scores of the property as dependent variables in the regression models.

Results and discussion

High-frequency keywords

The 20 most frequent keywords for nouns (representing attributes), adjectives (representing assessment), and verbs (representing activities) were extracted from the data set (Table 1). Top nouns include general descriptors of the listing (e.g. "place", "house", "home") and host, specific attributes of the property (e.g. "location", "room", "bed"), and descriptors of overall experience (e.g. "stay", "time", "experience"). Top adjectives represent a positive evaluation directed towards physical property and room (e.g. "clean", "comfortable", "cozy"), host (e.g. "friendly", "helpful"), and overall experience (e.g. "great", "wonderful"). Top verbs represent guest actions (e.g. "stay", "enjoy", "arrive") and host actions (e.g. "welcome", "recommend", "accommodate").

The top 50 compound words (i.e. domain-specific terminologies) in the data set ranked by their importance score (see Equation 1) are presented in Table 2. The list is dominated by the positive assessment of property (e.g. "great place", "beautiful home"), host (e.g. "great host(s)", "wonderful hosts"), and experience (e.g. "great time", "great stay", "wonderful experience"). Additionally, specific attributes emerged from the list, such as location (e.g. "great location", "downtown portland", "quiet neighborhood"), convenience (i.e. "easy access", "public transportation", "short walk"), facilities in the neighborhood (i.e. "great restaurants", "coffee shops"), and amenities (i.e. "comfy bed", "living room"). All but one (#15, "first Airbnb experience") of the top 50 compound words are bigrams, mostly in the forms of adjective–noun and noun–noun combinations.

Table 1. Word frequency lists (Top 20).

No.	Nouns	Freq.	Adjectives	Freq.	Verbs	Freq.
1	Place	23770	Great	30387	Stay	24827
2	House	15400	Comfortable	13946	Make	11364
3	Host	15255	Clean	13277	Recommend	10348
4	Stay	14259	Nice	10222	Feel	8542
5	Home	13603	Easy	8133	Need	8242
6	Neighborhood	12222	Perfect	7639	Walk	7268
7	Location	11865	Wonderful	7357	Enjoy	6583
8	Room	10973	Beautiful	6082	Love	6576
9	Time	10918	Quiet	5921	Welcome	5585
10	Apartment	9141	Lovely	5691	Come	4481
11	Space	7642	Good	5628	Accommodate	4005
12	Bed	7556	Friendly	5589	Look	3928
13	Restaurant	7378	Helpful	5054	Provide	3851
14	Experience	6228	Cozy	4724	Visit	3810
15	Area	6099	Little	4433	Want	3749
16	Downtown	5808	Super	4405	Locate	3452
17	Night	5431	Amazing	3630	Leave	3380
18	Lot	4959	Spacious	3094	Use	3268
19	Day	4828	Close	3071	Meet	3230
20	Coffee	4600	Warm	3069	Arrive	2808

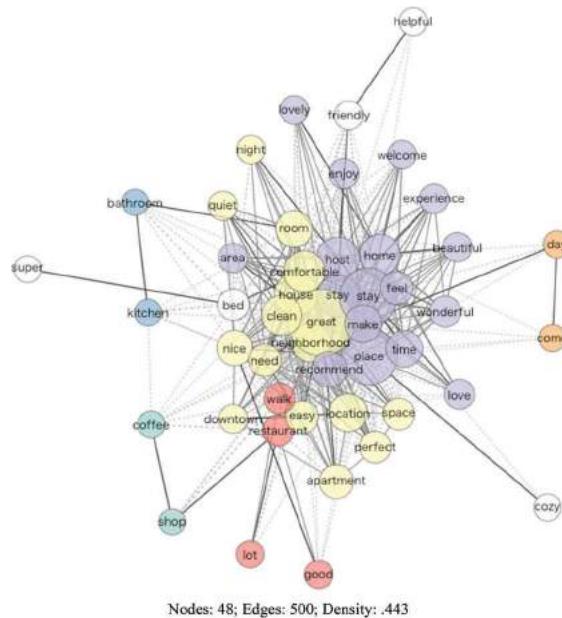
Table 2. Top 50 compound words.

No	Compound Words	No	Compound Words
1	Great location	26	Nice neighborhood
2	Great host	27	Nice place
3	Great place	28	Lovely home
4	Great time	29	Living room
5	Great neighborhood	30	Wonderful place
6	Great stay	31	Good location
7	Downtown portland	32	Great recommendations
8	Great experience	33	one night
9	Next time	34	Coffee shops
10	Great hosts	35	Perfect place
11	Great restaurants	36	Great area
12	First time	37	Wonderful hosts
13	Wonderful host	38	short walk
14	Quiet neighborhood	39	Great coffee
15	First airbnb experience	40	Perfect location
16	Portland area	41	Wonderful experience
17	Wonderful stay	42	Easy access
18	Great food	43	Excellent host
19	Wonderful time	44	First experience
20	Beautiful home	45	Great places
21	Alberta street	46	Comfy bed
22	Public transportation	47	street parking
23	Great space	48	Great spot
24	Great house	49	Beautiful neighborhood
25	Comfortable bed	50	Beautiful house

Word co-occurrence network

The top 500 pairs of high-frequency words based on their Jaccard Coefficients (as a measure of similarity) are presented in a word co-occurrence network (Figure 2). The minimum TF was set to 4000, allowing the network to be developed from a 51 (words) \times 41,560 (reviews) matrix. Size of nodes indicates word frequency; thickness of edges indicates strength of connections (i.e. extent of similarity) between word pairs; color indicates word communities in the network (i.e. densely connected sub-graphs), which are detected using random walk method (Pons & Latapy, 2005). The result shows that 48 of the selected 51 words make up the top 500 word pairs, indicating that they are not only important because they are frequently mentioned individually, but also in combination with each other. The network density is .443, which means that 44.3% of all possible edges are present in the network.

Two large word communities dominate the core of the network: one centered on “stay” and “place” (representing overall staying experience) and another on “house” and “neighborhood” (representing specific assessment regarding the property and its location). Both are strongly connected with the word “great”, the largest node (i.e. the most frequently mentioned word) in the network. These two word communities suggest that location and (interactions with) host are considered important attributes of P2P accommodation experiences. These attributes (and overall evaluation) are common to most reviews, as represented by the large node sizes (most

**Figure 2.** Word co-occurrence network.

frequently mentioned) and thick edges (frequently mentioned together). The smaller word communities capture more specific attributes, such as facilities and amenities, which are not linked to each other (i.e. these attributes appear together less frequently in the reviews). This indicates that while the majority of reviews contain general evaluation and locational attributes, they emphasize different features or characteristics that are most relevant to the guest experience. To better understand these different attributes, it is important to identify groups of reviews that share similar topics.

Review clusters

Hierarchical cluster analysis produced five review clusters that identify different themes: Cluster 1: Service (19,463 reviews), Cluster 2: Facility (4353 reviews), Cluster 3: Location (6890 reviews), Cluster 4: Feel Welcome (3451 reviews), and Cluster 5: Comfort of a Home (7263 reviews). Only a small fraction of reviews in the document (less than 1% of the data) does not belong to any of the clusters. As presented in Table 3, a majority of reviews in Service and Location (65% and 60% respectively) were written about experiences of staying in an entire home/apartment, while reviews in Facility, Feel Welcome, and Comfort of a Home were evenly distributed across experiences of staying in an entire home/apartment and a private room. Reviews for experiences of staying in a shared room are extremely small (1–2% of all reviews).

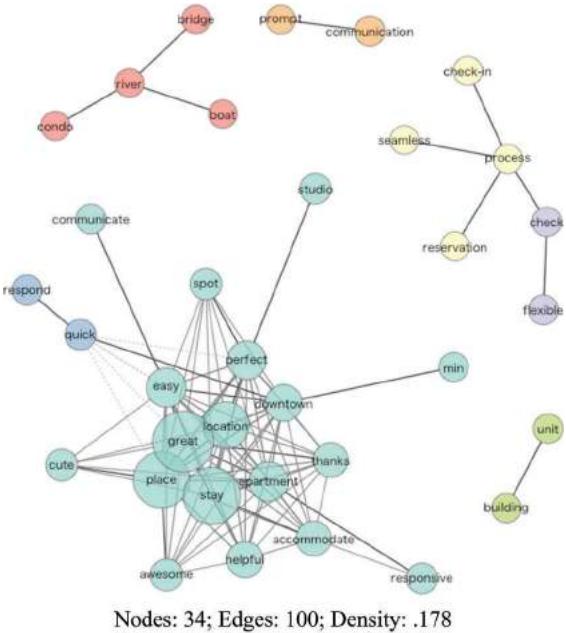
Table 3. Review cluster and room type.

Cluster	Entire Home/Apt		Private Room		Shared Room		Total
	Count	Percent (%)	Count	Percent (%)	Count	Percent (%)	
Service	12615	65	6608	34	240	1	19463
Facility	1768	41	2542	58	43	1	4353
Location	4142	60	2699	39	49	1	6890
Feel Welcome	1621	47	1774	51	56	2	3451
Comfort of a Home	3729	51	3441	47	93	1	7263
Total	23875	58	17064	41	481	1	41420

Service

Reviews in this cluster contain words that describe hosts' service characteristics. In particular, as can be seen in **Table 4** and **Figure 3** (top 100 word pairs), the descriptors of this review group include communication (i.e. easy communication with hosts), responsiveness (i.e. hosts respond quickly to inquiries, prompt communication), reservation process, and check-in and check-out time. In the word co-occurrence network, the largest word community also includes assessment of overall experience and location. Important differentiators are communities linked to the core as well as isolated communities around responsiveness (i.e. prompt communication) and convenience (i.e. reservation, flexible check-in).

In previous research on hotel attributes, service quality is consistently proposed as an important attribute of guest evaluation and typically attached to staff encounters (e.g. Choi & Chu, 2001; Knutson, 1988; Li et al., 2013; Shergill & Sun, 2004). Hotel guests appreciate promptness and courtesy in service from hotels (Knutson, 1988) and quality standards at check-in and check-out (Dubé & Renaghan, 1999), which is consistent with the theme in this cluster. In P2P accommodation, however, there is a role shift in service delivery from hotel employees to individual hosts. While the contact platform (e.g. Airbnb) can set quality standards for some service processes (e.g. ease of booking), hosts have a crucial role in delivering the service quality that meets guest expectation (i.e. promptness and flexibility).

**Figure 3.** Word co-occurrence network in service cluster.

Facility

Descriptors in this cluster focus on physical aspects of the property, including space (e.g. "room", "bathroom", "kitchen"), supporting goods (e.g. "bed", "towel"), and other amenities. As presented in **Table 5** and **Figure 4** (top 100 word pairs), frequently mentioned terms include clean room, comfortable bed, and private (or shared) bathroom, which are located in the largest word community within the network. A few isolated

Table 4. Top 20 keywords in service cluster.

No	Word	Jaccard ^a	Cond. Prob. ^b	No	Words	Jaccard ^a	Cond. Prob. ^b
1	Great	.34	.53	11	thanks	.09	.10
2	Place	.32	.45	12	Awesome	.06	.07
3	Stay	.30	.46	13	Cute	.05	.06
4	Location	.23	.30	14	Spot	.05	.05
5	Apartment	.16	.18	15	Quick	.04	.04
6	Easy	.15	.18	16	Responsive	.04	.04
7	Perfect	.14	.17	17	Studio	.04	.04
8	Downtown	.12	.14	18	Respond	.03	.03
9	Helpful	.11	.13	19	Communication	.03	.03
10	Accommodate	.10	.11	20	Communicate	.03	.03

^aJaccard Coefficient (similarity) with this cluster; ^bconditional probability of word to belong to this cluster.

word communities revolve around breakfast (i.e. "coffee", "tea") and pet (i.e. "dog", "cat").

Previous studies on hotel evaluation also cited physical property and facilities aspects (Lockyer, 2005), room (Choi & Chu, 2001; Li et al., 2013), cleanliness (Knutson, 1988; Li et al., 2013; Saleh & Ryan, 1992), and comfort (Knutson, 1988) as selection criteria influential for guest satisfaction and return intention. For hotel services studies differentiate between core (basic) services, general amenities, and add-on services (e.g. deals, "freebies") (see for example Saleh & Ryan, 1992; Xiang et al., 2015). Due to the shared and residential nature of most P2P accommodations, this cluster revealed that guests value clean rooms and comfortable beds and appreciate add-ons stemming from typical hotel experiences: private bathroom, access to (use) kitchen, hosts providing towels and toiletries and tea or coffee for breakfast. Compared with findings from previous studies on expectations of B&B

guests with regard to amenities, private bathroom was stated as most important (Felix et al., 2008; Zane, 1997). However, B&B guests also expect other amenities such as fireplace, TV, cooked meals for breakfast, and so on, that are perceived as influential with regard to satisfaction (Felix et al., 2008; Scarinci & Richins, 2008; Zane, 1997).

Location

This cluster is dominated by descriptions of location and characteristics of the neighborhoods where the properties are located. Reviews in this cluster also highlight locational advantages in terms of proximity to other points of interest (e.g. distances to shops and restaurants) and transportation convenience (i.e. walking distance, access to public transit) (Table 6). Figure 5 displays the word co-occurrence network within this cluster (top 100 word pairs). The two largest word communities in the network explain the property (i.e. "house", "home", "place") as part of a nice neighborhood and the amenities that the neighborhood provides (e.g. "restaurants", "shops"). An isolated community refers to convenience of having public transportation ("bus") to explore downtown.

Convenience of location has been consistently reported as one of the most important attributes for hotels (see for example Ananth et al. 1992; Dolnicar & Otter, 2003; Knutson, 1988; Lockyer, 2005; Rivers et al., 1991) as well as B&Bs (see for example Scarinci & Richins, 2008). In these studies, hotel location is often assessed as distance to city center, central business district, or main attractions. However, many P2P accommodation listings are located outside of traditional tourist (hotel) areas (Airbnb, 2015b). This implies the crucial role of neighborhood characteristics in addition to convenience in P2P accommodation evaluation. That is, since most P2P accommodations are not located in tourist areas, the vitality of the neighborhoods where these properties are located (abundance of restaurants and coffee shops within walking distance) becomes important for guest satisfaction. This also confirms previous studies which suggest that staying at P2P accommodation

Table 5. Top 20 keywords in facility cluster.

No	Word	Jaccard ^a	Cond. Prob. ^b	No	Words	Jaccard ^a	Cond. Prob. ^b
1	Room	.22	.55	11	Recommend	.08	.25
2	Bed	.19	.42	12	Kitchen	.07	.13
3	Comfortable	.17	.57	13	Helpful	.07	.13
4	Bathroom	.13	.22	14	Good	.07	.13
5	Clean	.12	.43	15	Night	.06	.13
6	Nice	.10	.28	16	Area	.06	.13
7	House	.10	.33	17	Private	.06	.10
8	Host	.10	.39	18	Coffee	.06	.11
9	Stay	.10	.48	19	Spacious	.06	.09
10	Friendly	.08	.17	20	Super	.06	.10

^aJaccard Coefficient (similarity) with this cluster; ^bconditional probability of word to belong to this cluster.

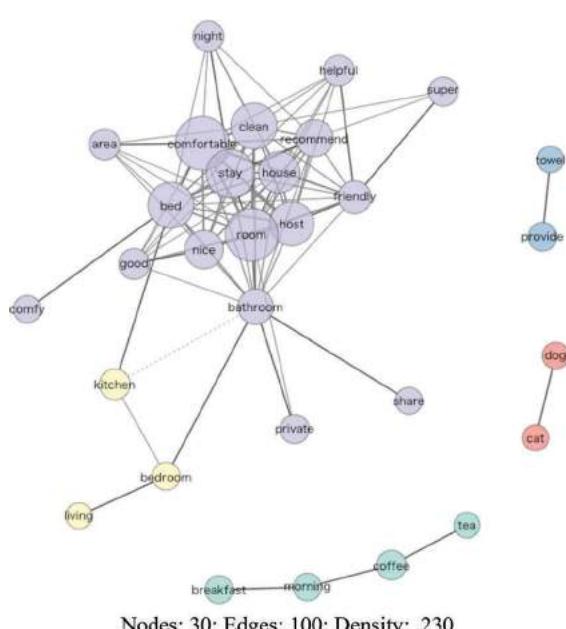


Figure 4. Word co-occurrence network in facility cluster.

Table 6. Top 20 keywords in location cluster.

No	Word	Jaccard ^a	Cond. Prob. ^b	No	Words	Jaccard ^a	Cond. Prob. ^b
1	Restaurant	.34	.51	11	Stay	.16	.53
2	Shop	.29	.35	12	Distance	.16	.22
3	Walk	.24	.37	13	Kitchen	.16	.23
4	Neighborhood	.23	.48	14	Bed	.16	.28
5	Coffee	.19	.26	15	Clean	.16	.40
6	Comfortable	.18	.44	16	Make	.16	.33
7	Home	.17	.36	17	Room	.15	.30
8	Great	.17	.59	18	Easy	.15	.26
9	Feel	.17	.30	19	Need	.15	.26
10	House	.17	.37	20	Nice	.15	.28

^aJaccard Coefficient (similarity) with this cluster; ^bconditional probability of word to belong to this cluster.

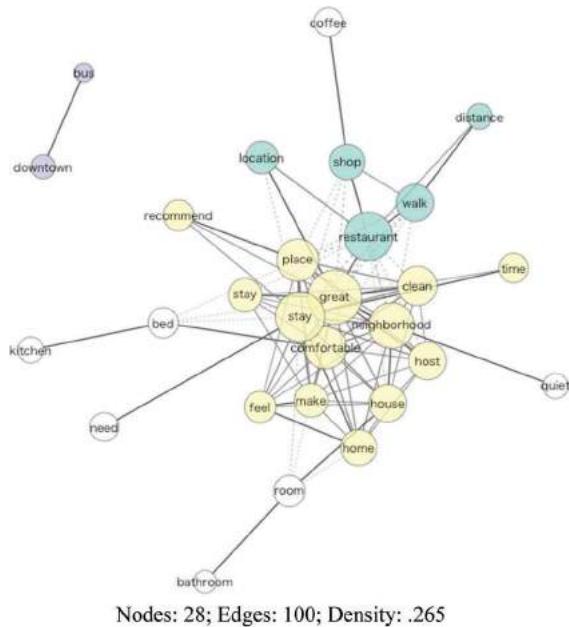


Figure 5. Word co-occurrence network in location cluster.

offers the experiential value of being in authentic, non-tourist settings (Guttentag, 2015; Möhlmann, 2015).

Feel welcome

The main descriptors in this cluster relate to feeling “at home” while staying in a P2P accommodation. Reviews in this cluster emphasize social interactions with hosts and hosts’ efforts to welcome and accommodate guests (Table 7). Figure 6 illustrates the word co-occurrence network for this review cluster (top 100 word pairs). The main word community describes how hosts make guests feel welcome. Noteworthy adjectives (e.g. “lovely”, “warm”, “wonderful”) support the positive emotions expressed by guests to describe their experience.

Studies found that hotel guests value courteous, friendly, and helpful staff or personnel as important satisfaction criteria (Clow et al., 1994; Dolnicar & Otter, 2003; Knutson, 1988). Similar to the role of individual hosts in delivering services in the Service cluster, hosts play a significant role in fulfilling customer expectation for courteous services prior to arrival, during stay, and after departure. Reviews in this cluster particularly focus on direct guest–host interactions during the stay. That is, the nature of P2P accommodation stays (51% in this cluster involve co-habitation) requires hosts to go beyond being courteous and helpful in a professional sense (i.e. staff–customer relations) by maintaining positive interactions in a social sense (i.e. host–guest relations). This is consistent with the expectation of B&B

Table 7. Top 20 keywords in feel welcome cluster.

No	Word	Jaccard ^a	Cond. Prob. ^b	No	Words	Jaccard ^a	Cond. Prob. ^b
1	Feel	.29	.70	11	Place	.08	.42
2	Make	.21	.65	12	Space	.07	.20
3	Home	.20	.66	13	Experience	.07	.18
4	Welcome	.13	.18	14	Host	.07	.36
5	Stay	.08	.49	15	Recommend	.07	.26
6	Comfortable	.08	.35	16	Sure	.06	.10
7	Wonderful	.08	.21	17	Love	.06	.14
8	Time	.08	.26	18	Trip	.05	.10
9	Welcome	.08	.19	19	City	.05	.10
10	Beautiful	.08	.19	20	lovely	.05	.13

^aJaccard Coefficient (similarity) with this cluster; ^bconditional probability of word to belong to this cluster

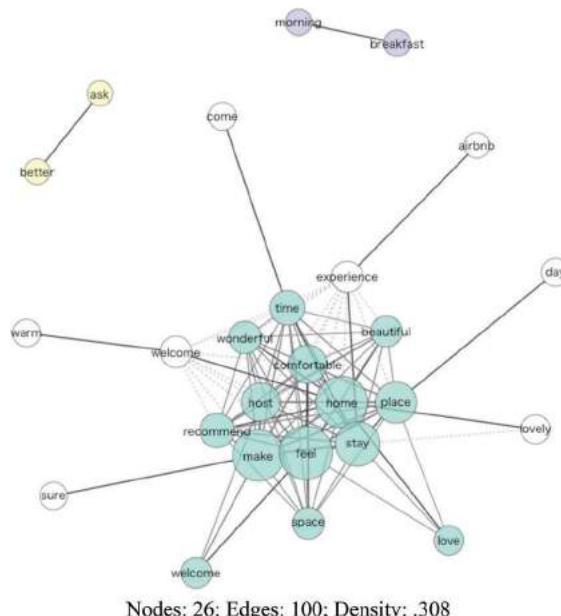


Figure 6. Word co-occurrence network in feel welcome cluster.

guests for friendly and welcoming hosts who create an inviting atmosphere (Felix et al., 2008; Scarinci & Richins, 2008; Zane, 1997). This also supports the argument that P2P accommodation appeals to customers due to its social dimensions (i.e. making friends, developing social relationships with hosts) (Guttentag, 2015; Tussyadiah, 2015; Tussyadiah & Pesonen, 2015).

Comfort of a home

The last cluster contains reviews emphasizing the uniqueness of enjoying the comfort of a home, including a homey and peaceful atmosphere and the hospitality of the hosts and their family. While the aspect of comfort is also discussed in reviews within the Facility cluster (e.g. comfortable bed), reviews in this cluster describe the general ambiance of staying at a residential property in a residential neighborhood. As

presented in [Table 8](#) and [Figure 7](#) (top 100 word pairs), reviewers highlight the charm of a beautiful home, full of character, with a backyard, garden, and outdoor patio. Adjectives used in this cluster ("peaceful", "lovely", "warm") capture the uniqueness of the servicescape that P2P accommodation provides and guests appreciate in this type of accommodation (i.e. "appreciate", "thank"). Finally, a word community connected to the core describes guests' intention to return to the property (i.e. "hope", "return"), making home atmosphere an important factor of return patronage for P2P properties.

While this is consistent with the studies on B&Bs (see for example [Felix et al., 2008](#); [Scarinci & Richins, 2008](#)), the theme surrounding the general atmosphere of a hotel has not been the subject of many hotel selection and satisfaction criteria studies, with some exceptions (see for example [Dubé & Renaghan, 1999](#)). Notably,

[Wilkins, Merrilees, and Herington \(2007\)](#) suggested a dimension called stylish comfort, which includes stylish atmosphere, relaxing ambiance, artifacts and size of facilities that suggest grandeur, as integral to the total quality of hotels. Instead of making reference to style and/or grandeur, P2P accommodation reviews in this cluster use similar components (i.e. "backyard", "garden", "patio") to signal a relaxing, peaceful atmosphere of a home. These add to the overall image of P2P properties and were suggested as important hotel attributes ([Dolnicar & Otter, 2003](#)).

Review clusters and ratings

In order to better understand how these different attributes contribute to guest satisfaction with P2P accommodation, the association between review clusters and rating scores was analyzed. The property ratings are presented in [Table 9](#), which include ratings for overall experience, accuracy (i.e. how online description accurately represents real condition of listings), check-in process, cleanliness (of property), communication (i.e. interaction with host prior to arrival and during stay), location, and value (for money). As suggested in previous research (see for example [Zervas, Proserpio, & Byers, 2015b](#)), rating scores on the Airbnb platform are positively skewed compared with other online review platforms. Therefore, it is important to note that the contribution of review clusters revealed in this study is based on small variations in the rating scores (i.e. note the relatively low standard deviations). However, since Airbnb employed a two-way review system (i.e. hosts and guests can review and rate each other) at the time of data collection, giving a negative review can be a disincentive for guests due to the inherent risk of possible retaliation that potentially damages their own reputation. Consequently, even a small deviation from a 5-point rating score can be an indication of lack of satisfaction. Therefore, the outcomes provide useful insights into aspects of P2P accommodation stay that contribute positively or negatively to guest satisfaction.

Regression analyses were performed using property with at least one review belonging to the five clusters as the unit of analysis ($N = 1,613$). The analyses were

Table 8. Top 20 keywords in comfort of a home cluster.

No	Word	Jaccard ^a	Cond. Prob. ^b	No	Words	Jaccard ^a	Cond. Prob. ^b
1	Stay	.23	.50	11	Warm	.06	.08
2	Enjoy	.17	.27	12	Thank	.05	.07
3	Home	.16	.33	13	Family	.05	.06
4	Host	.14	.36	14	Garden	.04	.05
5	Beautiful	.13	.21	15	Visit	.04	.05
6	House	.13	.29	16	Gracious	.03	.04
7	Lovely	.12	.19	17	Appreciate	.03	.04
8	Wonderful	.12	.21	18	Return	.03	.04
9	Welcome	.10	.16	19	Pleasant	.03	.03
10	Thanks	.07	.10	20	Cat	.03	.03

^aJaccard Coefficient (similarity) with this cluster; ^b conditional probability of word to belong to this cluster.

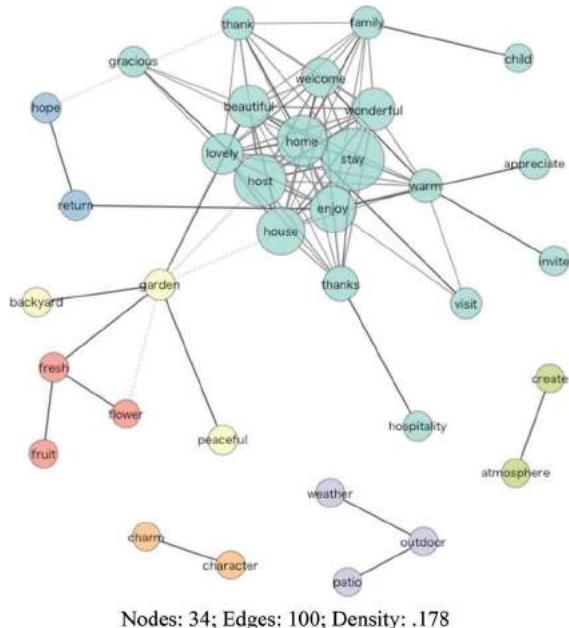


Figure 7. Word co-occurrence network in comfort of a home cluster.

Table 9. Property ratings ($N = 1613$).

Ratings	Minimum	Maximum	Mean	Std. deviation
Overall	2.00	5.00	4.769	.279
Accuracy	2.00	5.00	4.830	.339
Cleanliness	2.00	5.00	4.793	.379
Check-in	2.00	5.00	4.927	.250
Communication	2.00	5.00	4.922	.224
Location	3.00	5.00	4.757	.330
Value	2.00	5.00	4.737	.349

conducted separately for overall accuracy, cleanliness, check-in, communication, location, and value ratings. As presented in [Table 10](#), the results show that a higher proportion of Feel Welcome reviews (i.e. reviews belonging to the Feel Welcome cluster) contribute positively to higher scores in all ratings, except for Location rating. On the other hand, a higher proportion of Service reviews contributes negatively to all ratings. In order to better understand the negative impact of the prevalence of Service-related reviews on rating scores, reviews were carefully examined to identify negative terms associated with services that might indicate lower performance among P2P accommodation hosts. Instead of finding service-related issues, a pattern emerged that guests who are not fully satisfied with their stay due to the listing conditions (e.g. cleanliness, noise, lack of amenities) or problems during their stay (e.g. disturbances, miscommunication, etc.) tend to emphasize how hosts were quick to offer solutions to these problems (i.e. respond quickly to inquiries and demand). Therefore, it can be suggested that Service reviews are associated with lower scores not necessarily because hosts perform poorly in servicing the guests (i.e. occurrences of negative reviews are negligible), but many guests highlight the positive aspects of host services (especially responsiveness) when writing reviews to offset their dissatisfaction toward cleanliness, values, and, thus, overall stay. Since both clusters, Service and Feel Welcome, are associated with host-guest interactions, it can be suggested that staying with hosts who go beyond making service processes easier leading up to the stay (e.g. being responsive to inquiries, keeping guests well informed), but make guests feel at home during the stay is key to a satisfying stay in P2P accommodation. This signifies the importance of positive social relationships between hosts and guests during the stay.

The results also demonstrate the positive contribution of Location reviews on all ratings. Notably, Location reviews have a significantly large positive effect on Location rating, while Facility reviews contribute negatively to Location rating. It can be suggested that guests who are satisfied with the location of the P2P accommodation property (i.e. giving a higher rating for

Location) specifically emphasize the locational advantages in their reviews. On the other hand, guests staying at properties in less advantageous locations highlight other aspects (i.e. facilities) reflecting the benefits offered by the P2P accommodation. Akin to the pattern associated with the negative effect of Service on other rating scores, it might be due to guests not wishing to adopt a negative tone in their reviews by writing more of the positive aspects of their experience. The analyses revealed no significant effect of Comfort of a Home reviews on ratings.

Conclusion and recommendation

Critical for accommodation providers is to understand guests' needs and attributes that contribute to guest satisfaction. Knowing what matters enables management to allocate resources effectively to achieve the best return on investment, often in the form of repeat visits or positive (e)WOM. This study analyzed P2P accommodation reviews to contribute to the limited literature in this rapidly growing segment of the hospitality industry. Based on a cluster analysis of Airbnb reviews in Portland, Oregon, US, five accommodation attributes were identified: Service, Facility, Location, Feel Welcome, and Comfort of a Home. Some of these attributes are comparable with those identified in previous studies on hotels and B&Bs. For example, P2P accommodation and traditional hotel guests expect service quality (see for example Dubé & Renaghan, 1999; Knutson, 1988). However, with P2P accommodation, a greater emphasis was given to hosts making guests feel welcome in their homes. This indicates the focus on direct guest–host relations in social settings (i.e. beyond customer–staff relations in professional/commercial settings), confirming the social appeal of the sharing economy systems (Guttentag, 2015; Tussyadiah & Pesonen, 2015). Based on the association of these attributes and guest evaluation, feeling welcome was consistently linked to higher rating scores, signifying its importance on guest satisfaction and positive eWOM. Similarly, convenience of location was identified as important for hotel and B&B guests (see for

Table 10. Regression models: review clusters on rating scores.

example Ananth et al. 1992; Dolnicar & Otter, 2003; Knutson, 1988). However, P2P accommodation reviews emphasize the experiential characteristics of the neighborhoods, confirming that P2P accommodation guests appreciate staying in authentic (non-tourist) settings (Guttentag, 2015; Tussyadiah, 2015; Tussyadiah & Pesonen, 2015).

This study contributes to the literature in tourism and hospitality on key service characteristics that differentiate P2P accommodation, a new entrant to the competitive landscape of the hospitality industry, from other accommodation types. The P2P contexts present conceptual challenges due to the shift in service delivery from professional service providers to individuals. To date, there is limited research to recognize if this shift may cause an adjustment in customer expectation and evaluation of accommodation services. Additionally, from marketing and management points of view, the new business model poses some issues in conceptualizing business strategies for (non-business) individuals (i.e. hosts). Therefore, the findings in this study enrich the literature in two ways: (1) clarifying the difference between P2P accommodation and other types of accommodation by identifying the key service attributes and their relative importance for guests, and (2) explicating the roles of (individual) providers in P2P service contexts so that better marketing and management strategies can be formulated.

These findings provide several implications for academics and practitioners. Firstly, this study confirms the benefits of extracting market and competitive intelligence from large, unstructured human-authored text data to support marketing and management decisions in tourism and hospitality. The explosive growth of P2P accommodation users contributes to the extensive online content through its built-in reputation systems (i.e. allowing for a large amount of information from host and guest evaluation), emphasizing the increasing importance of big data analytics in hospitality management (e.g. as previously suggested by Xiang et al., 2015). For researchers, this study demonstrates the importance of applying different methodologies to summarize and interpret salient information emerging from large textual data to better understand and explain consumer behavior in service contexts that occur both online (i.e. reservation) and offline (i.e. during stay). For practitioners, the utilization of text analytics and visualization of a publicly available data set (i.e. online consumer reviews) provides an effective yet reasonable alternative or complementary market research tools such as customer surveys or guest comment cards to aid a

better understanding of the determinants of guest satisfaction and the strengths of their services relative to competitors.

Secondly, the results from this study provide both P2P accommodation hosts and service providers (commercial sharing platforms) with a greater understanding of what guests appreciate about their stay. More specifically, areas of continued investment to drive guest satisfaction and positive eWOM were identified: location (neighborhood characteristics) and feeling welcome. While some hosts would reap the benefits of the locational advantages of their property, those whose properties are in less advantageous locations (e.g. far from tourist attractions, fewer neighborhood amenities, limited access to public transportation) should provide accurate descriptions and communicate clearly with prospective guests to shape their expectations (e.g. targeting those who prefer quieter neighborhoods or bring their own cars). Alternatively, hosts can offer additional services, such as airport pick-ups and drop-offs, to add value for convenience. Most importantly, regardless of locations and facilities, making guests feel welcome is imperative to ensure satisfaction. For P2P accommodation platforms such as Airbnb, it is important to provide hosts with easy to use online tools to estimate competitive pricing and recommendation of value-added services based on locations (i.e. to compensate for locational values) as well as education and training for host competence.

Despite the aforementioned contribution, this study has several limitations stemming from the data. Firstly, while applying text analytics has proven to be beneficial for attribute and pattern extraction, there are concerns that valuable, often nuanced, information is lost in the data. Hence, a qualitative analysis of select samples of reviews will be beneficial to contribute to the accuracy of big data analysis. Furthermore, the size of the data set may have an influence on the results of regression analyses, making insignificant relationships significant. However, the significant relationships identified in this study are relevant to the aforementioned practical implications. Secondly, the bias towards positive reviews on Airbnb (consistent with Zervas et al., 2015b) allowed for identification of P2P accommodation attributes that are valued by guests. However, the lack of negative reviews did not allow the identification of common areas that require immediate improvements by P2P accommodation hosts. Thirdly, since Airbnb does not link individual reviews with their ratings on its website, it was not possible to make direct associations between reviews and ratings (aggregate ratings were used in this study). Future research should

identify different approaches to pinpoint keywords that add to or subtract from guest evaluation.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

The main purpose of comparing data across multiple locations is to diagnose if new attributes emerge from different data sets and to test the consistency of the identified themes in other contexts. Two data sets consisting of randomly selected 10,000 reviews (using a random number generator) from property listings in New York City, New York, US, and London, UK, available on *insideairbnb.com* were analyzed. As they are both large metropolitan areas and top international destinations, they serve as a contrast to Portland in Oregon, US, a smaller tourism destination. Following the same procedure, reviews written in languages other than English were eliminated first and pre-processing was applied to produce sentences, tokens, word types, and term frequency. **Table A1** presents descriptive statistics of the data sets.

New York City. The top 10 nouns, adjectives, verbs and compound words for New York City revolve around similar themes as in the main data set (**Table A2**). These are general assessments of listings (in particular, New York City reviews frequently mentioned “apartment” instead of “home”), hosts (e.g. “great host”, “wonderful host”), location (e.g. “great location”, “central park”, “times square”), and overall experience (e.g. “great stay”, “great time”). New terms include “subway” and “subway station” (substituting

“public transportation” and “bus”), which point to the importance of convenience and mobility to explore the big city.

Cluster analysis for New York City reviews produced four clusters: City Life (1356 reviews), Service (1181 reviews), Location and Facility (3195 reviews), and Feel Welcome (4194 reviews). The latter three clusters match the four clusters in Portland, with Location and Facility merging into one. Due to the nature of New York City and its listings (i.e. more apartments rather than individual homes), Portland’s Comfort of a Home cluster is replaced with experiencing the ambiance of big city living. Nevertheless, both clusters are the key aspects that represent the overall stay at the destination. As presented in **Table A3**, the theme within City Life focuses on ambience (e.g. “luxurious”, “fancy”, “cool”), property features (e.g. “loft”, “rooftop”, “balcony”), and easy access and neighborhood. The merging of Location and Facility indicates that the two aspects are frequently mentioned together, suggesting that they are considered equally valuable for P2P accommodation guests in New York City. Importantly, despite locational differences between New York City and Portland, the themes around Service and Feeling Welcome are consistent. Reviews in Service emphasize host responsiveness and flexibility, as well as smooth, seamless, uncomplicated transaction and booking process. Reviews in Feel Welcome highlight how

Table A1. Descriptive statistics of main dataset and comparison samples.

	Portland, OR (US) (main data set)	New York City, NY (US) (sample)	London (UK) (sample)
Reviews	41,560	9,999	8,831
Sentences	215,497	47,710	36,674
Tokens	1,473,197	302,776	252,371
Word types	21,561	12,150	11,245
Term frequency: Mean (St. D)	45.57 (484.58)	22.28 (156.09)	20.20 (133.51)

Table A2. New York City: top 10 words and compound words.

No	Nouns	Freq.	Adjectives	Freq.	Verbs	Freq.	Compound words
1	Apartment	7866	Great	6662	Have	8523	Great host
2	Place	5977	Clean	3944	Stay	4942	Great location
3	Host	3796	Nice	3414	Recommend	2816	Great time
4	Location	3481	Comfortable	2476	Do	2728	Great place
5	Stay	3249	Good	2275	Get	2444	Great stay
6	Room	3117	Easy	1838	Make	2385	Great experience
7	Time	2967	Perfect	1833	Need	2022	Central park
8	Subway	2769	Helpful	1704	Feel	1939	Subway station
9	Everything	2325	Friendly	1445	Go	1611	Great apartment
10	Neighborhood	2225	Wonderful	1103	Walk	1345	First time

Table A3. New York City: top 10 keywords in review clusters.

No	City Life			Service			Location & Facility			Feel Welcome		
	Words	Freq.	JC ^a	Words	Freq.	JC ^a	Words	Freq.	JC ^a	Words	Freq.	JC ^a
1	Place	840	.18	Location	566	.15	Have	1876	.30	Have	2793	.43
2	Recommend	435	.12	Host	594	.14	Great	1644	.26	Place	2210	.36
3	Neighborhood	368	.10	Apartment	630	.12	Apartment	1583	.25	Stay	2101	.36
4	Nice	315	.10	Helpful	254	.10	Stay	1078	.22	Apartment	2260	.33
5	Perfect	248	.09	Friendly	171	.07	Clean	1238	.22	Great	2087	.31
6	Easy	238	.09	Accommodate	117	.06	Host	1200	.22	Everything	1427	.30
7	Love	113	.05	Describe	64	.04	Location	1091	.20	Need	1330	.29
8	Super	96	.05	Responsive	50	.03	Comfortable	903	.20	Make	1367	.29
9	Access	70	.04	Flexible	48	.03	Subway	901	.18	Get	1336	.28
10	Anyone	66	.04	Listing	24	.02	Time	861	.18	Feel	1277	.28

^aJaccard Coefficient.

Table A4. London: top 10 words and compound words.

No	Nouns	Freq.	Adjectives	Freq.	Verbs	Freq.	Compound words
1	Flat	4033	Great	4588	Have	6804	Great location
2	Place	3816	Clean	3174	Stay	4048	Great host
3	Apartment	3767	Nice	3167	Recommend	2744	Central london
4	Host	3385	Comfortable	2208	Do	1891	Tube station
5	Location	3124	Good	2192	Make	1861	Great time
6	Room	3086	Helpful	1742	Get	1779	Great place
7	Stay	2984	Perfect	1573	Need	1633	Great stay
8	Time	2155	Lovely	1566	Feel	1553	Good location
9	Station	1765	Easy	1396	Go	1265	Center of london
10	House	1631	Friendly	1297	Walk	1215	Next time

Table A5. London: top 10 keywords in review clusters.

No	Location			Service			Feel Welcome			Facility		
	Words	Freq.	JC ^a	Words	Freq.	JC ^a	Words	Freq.	JC ^a	Words	Freq.	JC ^a
1	Flat	698	.26	Host	926	.20	Feel	518	.35	Have	2873	.48
2	Have	454	.12	Location	878	.20	Home	448	.32	Great	2051	.34
3	Stay	445	.10	Apartment	730	.18	Make	435	.24	Stay (N)	1928	.33
4	Great	405	.10	Nice	729	.17	Welcome (A)	278	.14	Stay (V)	1866	.32
5	Host	366	.10	Good	508	.14	Comfortable	274	.09	Clean	1830	.32
6	Location	359	.10	Helpful	475	.13	Lovely	264	.08	place	1765	.30
7	Clean	334	.09	Friendly	381	.11	Welcome (V)	215	.08	Room	1628	.29
8	Recommend	286	.09	Describe	109	.04	Host	206	.08	Recommend	1516	.26
9	Time	223	.09	Kind	88	.03	Stay	206	.08	Comfortable	1455	.25
10	Helpful	202	.08	Accommodation	73	.03	Wonderful	205	.07	Nice	1385	.25

^aJaccard Coefficient; (A): adjective; (V): verb; (N): noun.

Exhibit 1. Preprocessing.

Original text:	A great place to stay! The space is clean and comfortable. The hosts are warm and helpful.
Tokenization:	A /great /place /to /stay ! /The /space /is /clean /and /comfortable /. /The /hosts /are /warm /and /helpful /.
Elimination of stop words:	/great /place //stay ! //space //clean //comfortable /. //hosts //warm //helpful /.
Part-of-speech (POS) tagging and lemmatization:	great place stay ! space clean comfortable . host Adj Noun Verb ! Noun Adj . Noun warm helpful . Adj Adj .
Preprocessed text:	Great place stay ! space clean comfortable. host warm helpful.

hosts provide everything that guests need and make them feel at home.

London, UK. Similarly, based on the top 10 words and compound words for P2P accommodation in London (**Table A4**), reviews are dominated by the assessment of overall experience (e.g. "great time", "great experience"), host (e.g. "helpful", "great host"), and location (e.g. "central London", "center of London", "perfect location"). As for New York City, many reviews focus on staying in an apartment (i.e. "flat", "apartment") rather than a home. Key terms for convenience and access are also present but again adjust to the destination (e.g. "tube station", "bus").

Four clusters were identified: Facility (935 reviews), Service (2447 reviews), Feel Welcome (637 reviews), and Location (4732 reviews). They match the four clusters in Portland (**Table A5**), except for Comfort of a Home. It is noteworthy that the majority of London reviews belong to Location (54%)

and Service (28%), while Facility and Feel Welcome account for about 18% of the reviews. That is because descriptors in Location also include terms that represent broad categories of accommodation attributes. However, reviews in Service are consistent with those in Portland and New York City in representing hosts' service quality (e.g. "attentive", "helpful", "advice"). The presence of Service and Feel Welcome clusters confirms the importance of host-guest interactions prior to and during the stay.

The results from locational comparison with samples from New York City and London confirm that: (1) location of P2P properties is consistently included in the list of top keywords in guest reviews, regardless of locational contexts; (2) host-guest interactions are considered important, both for service delivery (e.g. facilitating reservation, responsive to requests, flexibility with check-in time, etc.) and for creating the positive feeling of being welcome; (3) locational differences shape the themes around P2P property characteristics, including facility and ambience. In particular, as shown in the main data set (Portland) and the sample from New York City, even though details of mentioned property features are different (i.e. charming home living in Portland versus loft living in New York City), guests value the experiences of staying with and embracing the lifestyle of local residents. It is important to note that while Portland is not considered a popular destination for international tourists, New York City and London are. Therefore, it is expected that more diverse international guests, most likely with different expectations regarding accommodation experiences, write reviews for P2P accommodation in New York City and London. Consequently, identifying consistent attributes among these different destinations signifies their salience.

MODERATING EFFECT OF TRUST ON CUSTOMER RETURN INTENTION FORMATION IN PEER-TO-PEER SHARING ACCOMMODATION

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The peer-to-peer sharing accommodation features a high level of asymmetric information and a series of uncertainties and risks. Therefore, trust plays a critical role in shaping consumer behavior. Previous studies have frequently emphasized the direct effect of trust during the prepurchasing stage while disregarding its role in shaping customer satisfaction/return intention at the postpurchasing stage. Based on the attribution theory, in this study, we model the formation of return intention by incorporating the moderating effects of trust. A sample of 500 peer-to-peer sharing accommodation participants in China was collected to test the extended model based on the moderated structural equation modeling. Furthermore, users of Airbnb and Chinese domestic platforms were compared. Results demonstrated the existence of the moderating role of trust for domestic platform users but not for Airbnb users.

KEYWORDS: peer-to-peer sharing economy; trust; value; return intention; moderated structural equation modeling, MSEM

INTRODUCTION

The sharing economy has revolutionized the tourism and hospitality industry with various online peer-to-peer (P2P) accommodation services. By 2019, Airbnb was offering accommodation in more than 34,000 cities worldwide, and the approximately 7 million rooms in its inventory render its service larger than any branded hotel chain (Airbnb, 2020). In China, the total revenue of P2P online accommodation rentals reached CNY22.5 billion (approximately US\$3.35 billion) in 2019 (State Information Center of China, 2020).

Authors' Note: The first author acknowledges the support from National Natural Science Foundation of China (NSFC; Grant No. 72004195).

Journal of Hospitality & Tourism Research, Vol. 47, No. 2, February 2022, 328–353
DOI: 10.1177/10963480211014249
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The sharing economy adopts a significantly different business model from that of conventional businesses, as reflected in P2P accommodation, which brings consumers together to avail of their excess property capacity (Tussyadiah, 2016). The avoidance of business-to-customer exchange can significantly change customer behavior patterns (e.g., expectation, attitude, and intention formation) in the P2P consumption setting (Tussyadiah, 2016; Tussyadiah & Pesonen, 2016). Therefore, despite being overexamined in conventional tourism businesses, the question of “*what factors drive customer satisfaction and return intention*” is still open to new insights in the sharing economy sector (Möhlmann, 2015).

Extant studies on the sharing economy have mostly relied on the classic *value–satisfaction–return intention* framework to model consumer behavior, where the perceived customer value is supposed to shape return intention through customer satisfaction (e.g., Hamari et al., 2016; Tussyadiah, 2016; Tussyadiah & Pesonen, 2016). However, this archetypical model exhibits deficiencies: although the model fully accounts for the determining effects of the cognition process of customers (i.e., perceiving and acknowledging service-related values), the attribution process (i.e., interpreting the causes of these values) is not considered. Attribution theory suggests that people’s attitudes and behavior are not only affected by their perception of others’ performance but also by their understanding and interpretation of the causes that underlie such performance (Weiner, 1986). Therefore, the *value–satisfaction–return intention* framework should be improved by incorporating other critical factors that can capture the effects of the attribution process.

One such factor is trust—believed to profoundly affect customer behavior in the sharing economy, which is prone to various risks such as financial loss and personal safety issues (Ert et al., 2016). These risks result from the high degree of information asymmetry, which is primarily caused by web mediation that sets barriers to prevent customers from gaining accurate information, thereby leaving room for deception, distortion, or misunderstanding (Hong & Cho, 2011), and are further enhanced by the intangibility and inseparability of service (Zeithaml et al., 2006).

Following the attribution theory, sociopsychologists and management researchers (e.g., Dirks & Ferrin, 2001; Innocenti et al., 2011; Neeraj, 2009) suggest that trust shapes the cognition process at “weak structure” situations (such as the prepurchase stage) where individuals lack clear perceived clues of others’ performance, and influences the attribution process during “moderately strong structure” situations (such as the postconsumption stage) where information about other’s behavior is available but the underlying meaning of the behavior (e.g., motivation, persistency) remains ambiguous. In this regard, trust can be modeled as either a direct effect (during the prepurchase stage) or a moderating effect (during the postpurchase stage). The direct effects of trust on customer attitude and purchase intention during the prepurchase stage have been widely confirmed in the extant literature on marketing, tourism, and sharing economy

(e.g., Agag & Eid, 2019; S. Ye et al., 2020). By contrast, the moderating role of trust during the postconsumption stage, although confirmed in micro-organizational behavior and social psychology studies (e.g., Innocenti et al., 2011; Neeraj, 2009; Wang et al., 2013), has received scant attention in consumer behavior research. Thus, whether trust can moderate the relationship between customer values, satisfaction, and return intention remains unknown.

In large economies such as China, the P2P accommodation market is typically dominated by both international giants (e.g., Airbnb) and local leading platforms (e.g., Xiaozhu.com, Tujia.com). Compared with local platforms, Airbnb features various accommodation products worldwide, offers exotic holiday experiences, and has a different business culture and market strategy, commonly found in international companies. The cultural gap can lead to Airbnb's less familiarity with the local consumers, especially given that it entered the local market several years after the local platforms had already established their market share. As such, consumers can behave differently when they use Airbnb versus local platforms. Therefore, it is necessary to investigate whether the formation of return intention and the role of trust differ between Airbnb and local platform users.

We aim to answer the aforementioned questions by examining the role of trust in the formation of return intention. A revised model where trust moderates the relationships among customer values, satisfaction, and return intention was tested via moderated structural equation modeling (MSEM), based on data collected from 500 Chinese P2P accommodation users. Furthermore, users of Airbnb and Chinese domestic platforms were compared to understand the likely different user patterns in these two settings.

LITERATURE REVIEW

P2P Sharing Accommodation

The sharing economy can be broadly defined as a socioeconomic system in which assets or services are shared between private individuals through the internet for free or for a fee (Finck & Ranchordás, 2016). It has emerged and gained momentum in the tourism marketplace, with various P2P accommodation services as its leading manifestations. Typical P2P accommodation comprises individuals with excess property capacity and tourists who need accommodation, with an online platform maintained by a third-party company (Tussyadiah, 2016). Recently, companies (and some individuals) have been found to purchase properties and rent them through a P2P platform intentionally for profit (Bakker & Twining-Ward, 2018).

Consumer behavior has been a central topic in P2P accommodation research, emphasizing motives and constraints to consumers' participation (De Canio et al., 2020; Pung et al., 2019), their experience, satisfaction, and repurchase behavior (S. Ye et al., 2020; Zhu et al., 2020). The use of P2P accommodation was found to be driven by its unique values. In this regard,

Hamari et al. (2016) suggested sustainability (e.g., environmental benefits) as a critical value created by the sharing economy. Zhang et al. (2018) distinguished between emotional value (e.g., enjoyment, relaxation), functional value (e.g., convenience), and social value (e.g., making friends). Zhang et al. (2019) added economic value (e.g., having a low price) as the fourth value. These customer values have been used to predict customer attitude/satisfaction and purchase/repurchase intention (Tussyadiah, 2016; S. Ye et al., 2020), engendering the popular *value–satisfaction–return intention* framework. However, this framework emphasizes the cognition process (i.e., how customers perceive and acknowledge values). The potential effects of the attribution process (i.e., how customers interpret the causes of these values) have not been incorporated.

Another critical issue for the sharing economy is trust. Researchers generally agree that the sharing economy involves various types and levels of risks, and thus, lack of trust can hinder consumer participation in the first place (Tussyadiah & Pesonen, 2016). Many studies have confirmed the direct effect of trust on consumer decision making during the prepurchasing stage (Agag & Eid, 2019; Pung et al., 2019; T. Ye et al., 2017). Therefore, the establishment of customer trust becomes another concern. For example, Park and Tussyadiah (2020) and Ert and Fleischer (2019) examined the formation and evolution of trust between hosts and guests. Furthermore, several studies also model the determinants and consequences of consumer trust at the prepurchase stage. For example, Ert et al. (2016) examined the impact of sellers' photographs on customer trust. T. Ye et al. (2017) and S. Ye et al. (2019) investigated the role of race similarity and social presence in shaping consumer trust. Agag and Eid (2019) proposed and tested a systematic model where consumer trust is shaped by website features, personality, interpersonal interaction, and institutional features, and can further affect purchasing intention. The effect of customer trust after purchase, however, has received extremely limited attention.

Customer Value: Experiential Perspective

Customer value has been one of the core concepts in economics, marketing, and management research. Gallarza et al.'s (2017) review summarizes four perspectives to derive customer value, namely, the trade-off perspective, dynamic perspective, means-end perspective, and experiential perspective (Table 1).

The experiential perspective provides the most comprehensive value model and has gained increasing acceptance (Leroi-Werelds et al., 2014). This perspective defines customer value as an interactive relativistic preference experience that involves hedonic/emotional and cognitive/economic dimensions (Holbrook & Corfman, 1985). Consequently, other functional and affective benefits are aligned with economic value (value for money) as the composition of value construct. In this regard, the most widely adopted PERVAL (perceived value) model (Sweeney & Soutar, 2001) specifies four value dimensions embedded

Table 1
Perspectives of Value Definition

	Trade-off Perspective	Dynamic Perspective	Means-end Perspective	Experiential Perspective
Definition of value	Value is the overall assessment of weighing between benefits and sacrifices.	Value comprises acquisition (value-in-use) and transaction (value-in-exchange) values.	Value consists of desired and undesired consequences evaluated relative to customer purpose.	Value is an interactive, relativistic preference experience that comprises economic and hedonic dimensions.
Assumed nature of value	Value is rational, functional, and relative.	Value is dynamic and can be generated during and (or) after purchase.	Value is created based on heterogeneous customer preferences.	Value is rational and emotional.
Theoretical underpinning	Utility theory	Microeconomic theory of value	Means-end theory	Experience theory
Operationalization and measurement	Unidimensional (or single-item) construct, relative metrics or overall assessment of “value for money”	Multidimensional measures	Multidimensional measures, evaluation relative to the perceived importance level	Multidimensional measures
Sources	Zeithaml (1988)	Grewal et al. (1998)	Woodruff (1997)	Holbrook and Corfman (1985)

into a market offering: (1) emotional value, created through feelings or affective states; (2) social value, created through the ability to enhance an individual's social self-concept; (3) functional value, provided through expected performance and perceived quality; and (4) economic value (price/value for money), evaluated by weighing utility over costs.

The experiential view of value can be adapted to different contexts (including tourism) by adding or removing dimensions (e.g., Pura, 2005; Tussyadiah, 2016). In this study, we adopt the experiential definition of customer value because it overcomes the excessive focus on the economic value that is evident in tradeoff-based perspectives, echoes the growing relevance of emotions in consumer behavior research (Sánchez-Fernández et al., 2009), and is more valid for capturing the conceptual richness of customer perceived value (Sweeney & Soutar, 2001).

General consumer studies commonly suggest that at the postpurchasing stage, an increase in perceived value may lead to the emotive state of satisfaction, which results in future repurchasing intention (Pandža Bajs, 2015). By adopting the experiential perspective, the multiple value dimensions suggested by the PERVAL model (i.e., economic, social, emotional, and functional values) can be incorporated as determinants into the *value–satisfaction–return intention* framework, with each value contributing to customer satisfaction and future behavior in varying degrees (Pura, 2005). Similar modeling efforts can be found in the general sharing economy literature (e.g., Kim et al., 2015; Möhlmann, 2015) and in several P2P accommodation studies (e.g., Hamari et al., 2016; Tussyadiah, 2016).

Trust as the Moderator: The Attribution Process

Trust is typically defined as a psychological state that "leads one to assume that the trustee's actions will have positive consequences for the trustor's self" (Bakker et al., 2006, p. 598). Social psychologists and management researchers generally model the impacts of trust on human attitude and behavior as either a direct effect or a moderating effect (Dirks & Ferrin, 2001). The direct effect model suggests that trust can reduce risk perception, thereby directly increasing consumer's attitudes and intention to engage with the seller. By contrast, the moderating effect model suggests that trust serves as a conditional factor that will enhance/weaken the causal relationship between cognitive determinants and attitudinal/behavioral outcomes.

Dirks and Ferrin (2001) cited attribution theory as the foundation for the moderating effect, which suggests that people's behavior and attitude are not only affected by their perception of others' behavior (the cognition process) but also by their understanding and interpretation of the causes that underlie such behavior (the attribution process; Weiner, 1986). On this basis, Dirks and Ferrin (2001, p. 456) provided two further explanations for the moderating effect: (1) "trust affects how one assesses the future behavior of another party,"

and (2) “trust also affects how one interprets the past (or present) actions of the other party, and the motives underlying the actions.”

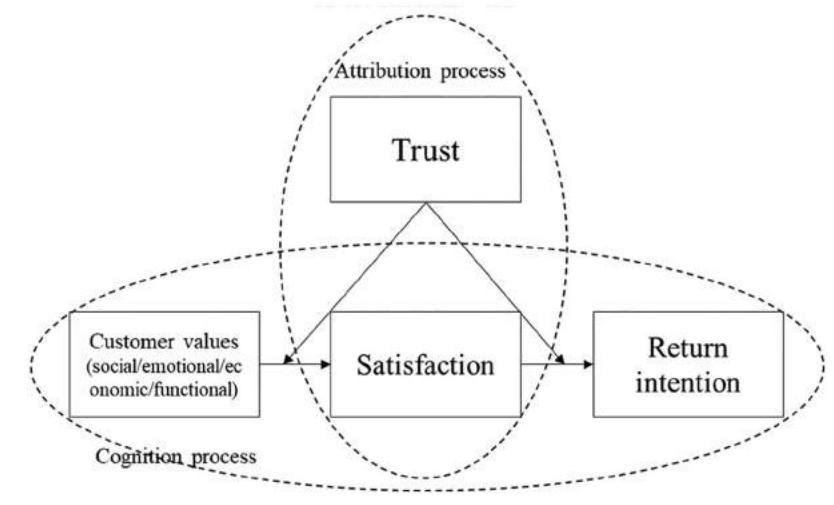
In particular, in high-trust situations, an individual tends to attribute the causes of good performance to the internal characteristics of the other party (e.g., capability, goodwill) and bad performance to external situational characteristics (e.g., environment, luck, or chance); whereas in low-trust situations, a good action tends to be attributed to external factors and a bad action to the characteristics of the other party (Jones & Nisbett, 1971). In this regard, the present causal relationships among perceived performance, attitude, and behavior toward another party can be strengthened by increasing trust and weakened by decreasing trust. Wang et al. (2013) agreed that the trustor tends to be more sensitive to the performance of the trustee when they hold the latter in high trust; by contrast, the trustor will bother less about the trustee’s performance if they hold the latter in low trust.

Dirks and Ferrin (2001, p. 461) further suggested that the role of trust is contingent on the present “situational strength.” Trust functions as a direct effect in “weak structure” situations where individuals lack clear guidance or other perceived clues regarding others’ performance because trust beliefs in such situations can fill in information gaps, reduce uncertainty, and eventually cause attitudinal or behavioral outcomes. The moderating effect of trust is activated in “moderately strong structure” situations where informational clues about others’ performance are well perceived, but the underlying meaning of the other party’s behavior remains ambiguous (motivation, persistency, and future behavior). In such situations, trust can shape the attribution process and serve as the lens through which these factors are interpreted.

In the entire consumption process, most postconsumption stages can be regarded as “moderately strong structure” situations where consumers have already collected abundant clues regarding the performance of the seller/service but are yet to be certain about the underlying causes/meanings of the service performance (Dirks & Ferrin, 2001). In other words, even a consumer encountering good service performance may not doubt the performance itself, but they can pose questions such as: Is the performance out of goodwill? Is the good service quality accidental? Will other P2P accommodation offer a similar level of services?

Therefore, trust is likely to play a moderating role during the postconsumption stage where the cognition of customer values is present to directly affect satisfaction (and consequently, return intention). Specifically, trust can strengthen relationships in the *value–satisfaction–return intention* model through the attribution process (Figure 1). Customers with higher trust tend to attribute the values provided by P2P accommodation (e.g., better value for money, better entertaining experience) to its internal capabilities such as more advanced technology, and professional operation and management, thereby enhancing their satisfaction level that has been formed based on the cognized value. By contrast, low-trust customers tend to attribute those good values to

Figure 1
Theoretical Framework



situational factors (e.g., chance, good luck), and thus, will be concerned about receiving low-quality products or services in the subsequent consumption (Hershberger, 2012). Accordingly, cognized value cues may not be transferred fully to attitude change and return intention (Chang & Wong, 2010). Similarly, satisfied customers with high trust in sellers tend to relate the reason for their satisfaction to the latter's good performance, and thus, will be more willing to return than satisfied customers with low trust.

HYPOTHEZED MODEL

The hypothesized model is proposed based on the aforementioned theoretical framework. Return intention is operationalized as customers' tendency to reuse P2P accommodation (rather than other forms of accommodation such as hotels and motels). A thorough literature review identifies four customer value dimensions that can account for customer satisfaction and return intention in the P2P sharing economy: economic benefits, social connection, enjoyment, and sustainability.

Economic benefit (economic value) refers to deriving good value for money. Many experts believe that the sharing economy is an appealing alternative to consumers because it enables them to acquire a desired product or service at a lower price (Guttentag, 2015; Möhlmann, 2015). *Social connection* (social value) refers to the experience of building social relationships or becoming integrated into local communities by availing of P2P accommodation (Guttentag, 2015). *Enjoyment* (emotional value) represents the extent to which P2P consumption (e.g., staying at a P2P accommodation unit) is perceived as personally

enjoyable. Scholars believe that customers can perceive enjoyment in sharing activities and find the use of P2P accommodation interesting. *Sustainability* (environmental value) refers to the degree to which customers perceive that P2P services can benefit the sustainable development of human society by reducing consumption-induced resource depletion. The sharing economy features sharing, bartering, and other exchanges of idle assets, and thus, decreases the development of new products and the consumption of raw materials.

The aforementioned quaternary dimensionality of P2P customer value reflects the PERVAL model and has already been applied to predict customer satisfaction and return intention in various models in extant sharing economy research (e.g., Tussyadiah, 2016; Tussyadiah & Pesonen, 2016). Therefore, the following hypotheses are formulated:

Hypothesis 1₀: Perceived enjoyment (EN) does not affect P2P accommodation user satisfaction (SA).

Hypothesis 1_a: Perceived enjoyment (EN) positively affects P2P accommodation user satisfaction (SA).

Hypothesis 2₀: Perceived sustainability (SB) does not affect P2P accommodation user satisfaction (SA).

Hypothesis 2_a: Perceived sustainability (SB) positively affects P2P accommodation user satisfaction (SA).

Hypothesis 3₀: Perceived economic benefit (EB) does not affect P2P accommodation user satisfaction (SA).

Hypothesis 3_a: Perceived economic benefit (EB) positively affects P2P accommodation user satisfaction (SA).

Hypothesis 4₀: Perceived social connection (SC) does not affect P2P accommodation user satisfaction (SA).

Hypothesis 4_a: Perceived social connection (SC) positively affects P2P accommodation user satisfaction (SA).

Hypothesis 5₀: P2P accommodation user satisfaction (SA) does not affect return intention (RI).

Hypothesis 5_a: P2P accommodation user satisfaction (SA) positively affects return intention (RI).

Trust in web-based exchange contexts (including the P2P sharing economy) can be operationalized as either a unidimensional or multidimensional construct. As a multidimensional construct, trust can be divided into trust on the vendor, platform, and product/service (e.g., Han et al., 2016; Tussyadiah & Pesonen, 2016), based on the type of trustees. As a unidimensional construct, trust can represent a general, combined attitude of optimism about the goodwill and capability of the exchange partner, platform, or technology (as a whole) to fulfill his or her promised obligations (McKnight & Chervany, 2001; Mittendorf, 2016). For simplicity, the model used in this study follows the unidimensional approach and regards trust as a combined impression, which can be reflected as

the trust toward a host, platform, and service. The unidimensional approach has been adopted by many e-business researchers, such as Leonard and Jones (2009), and Yoon and Occeña (2015), and has been used in organization studies that model the moderating effect of trust.

Extant sharing economy studies have mostly emphasized the direct effect of trust during the prepurchase stage (e.g., Guttentag, 2015; Keymolen, 2013). By contrast, the moderating effect model during the postconsumption phase has received relatively scant attention, and most empirical studies on this topic have focused on organizations and social settings (e.g., Innocenti et al., 2011; Neeraj, 2009; Wang et al., 2013). Although few scholars have noted the moderating effect of trust in the e-commerce setting (Chang & Wong, 2010; Riemenschneider et al., 2009), empirical evidence remains scarce. Therefore, the following hypotheses concerning this effect are proposed:

Hypothesis 6₀: Trust (TR) does not moderate the effect of perceived enjoyment (EN) on P2P accommodation user satisfaction (SA).

Hypothesis 6_a: Trust (TR) positively moderates the effect of perceived enjoyment (EN) on P2P accommodation user satisfaction (SA).

Hypothesis 7₀: Trust (TR) does not moderate the effect of sustainability (SB) on P2P accommodation user satisfaction (SA).

Hypothesis 7_a: Trust (TR) positively moderates the effect of sustainability (SB) on P2P accommodation user satisfaction (SA).

Hypothesis 8₀: Trust (TR) does not moderate the effect of economic benefit (EB) on P2P accommodation user satisfaction (SA).

Hypothesis 8_a: Trust (TR) positively moderates the effect of economic benefit (EB) on P2P accommodation user satisfaction (SA).

Hypothesis 9₀: Trust (TR) does not moderate the effect of social connection (SC) on P2P accommodation user satisfaction (SA).

Hypothesis 9_a: Trust (TR) positively moderates the effect of social connection (SC) on P2P accommodation user satisfaction (SA).

Hypothesis 10₀: Trust (TR) positively does not moderate the effect of P2P accommodation user satisfaction (SA) on return intention (RI).

Hypothesis 10_a: Trust (TR) positively moderates the effect of P2P accommodation user satisfaction (SA) on return intention (RI).

Trust can strengthen/weaken the relationship between value, satisfaction, and return intention because it can shape how people interpret the P2P accommodation service performance (Chang & Wong, 2010; Riemenschneider et al., 2009). However, such moderating effects of trust are contingent on the situational strength (Dirks & Ferrin, 2001). In other words, the moderating effects of trust may not exist in weak structures where a customer is much less familiar with the vendor/platform. The P2P accommodation market in China has witnessed the rise of various domestic platforms (e.g., Tujia, Xiaozhu), as well as the entry of international giants such as Airbnb. The domestic and international platforms

can operate very differently; consumers may be more familiar with domestic than foreign platforms, rendering the latter as “weak structures.” Therefore, it is reasonable to hypothesize the following:

Hypothesis 11₀: The moderating effects of trust are insignificant for either domestic platforms or foreign platforms.

Hypothesis 11_a: The moderating effects of trust are significant for domestic platforms but do not exist for foreign platforms.

METHODOLOGY

Instrumentation, Sample, and Data

All constructs were measured using items adapted from previous scales (see Appendix 1 in the online supplement). The English items were translated into Chinese by two native Chinese speakers. The English items of the questionnaire designed for this research were translated into Chinese by two native Chinese speakers. The two versions were then compared and mismatches were identified and subsequently modified. Last, a panel that comprised a professor and several students majoring in hotel and tourism management assessed the validity of the questionnaire. All confusing expressions were addressed before data collection.

Data were collected through an online survey conducted on a Chinese survey platform, *Sojump* (www.sojump.com). *Sojump* is currently the largest online survey platform targeted at Chinese respondents with more than 26 million users. The platform has a panel of survey respondents, which has millions of members. The profile of the survey panel can be found on its official website (<https://www.wjx.cn/sample/service.aspx>). To ensure that the participants' memory of the P2P accommodation experience is not distorted over time, the survey was targeted at tourists who had used P2P accommodation in the previous three months.

To familiarize participants with the concept of P2P accommodation, the questionnaire provided its definition and characteristics in the introduction and listed three of the most popular platforms as examples, namely, Airbnb, Xiaozhu.com, and Tujia.com (State Information Center of China, 2020). The main body of the questionnaire comprised three parts. Part A included screening questions to identify a target sample (“Have you ever used a P2P accommodation?” and “When was your most recent visit to a P2P accommodation?”). Respondents without a P2P accommodation experience in the past 3 months were excluded automatically by the system. Respondents were also required to indicate the specific platform used. Part B included questions that measured all related constructs on a 5-point Likert-type scale. The participants were asked to answer these questions based on their most recent P2P accommodation experience. Last, Part C comprised a series of questions on the sociodemographic and trip attributes of the participants.

A pilot test was conducted on August 17 and 20, 2016. A total of 30 participants were recruited through the internet to complete the questionnaire and assess its quality. Feedback was collected and the design of the questionnaire was slightly revised accordingly. The main survey was conducted over 3 weeks (September 3-25, 2016). The questionnaire was pushed to the panel member respondents randomly by the online survey platform. A total of 500 valid questionnaires were collected and enrolled into data analysis.

MSEM and Interaction Terms

Previous studies have commonly assessed the moderating effects of latent variables by either using regression analysis with product terms generated from the summed indicants of independent variables or multiple group SEM, which divides cases into subgroups using the summed indicants of moderators and then tests for significant coefficient differences among the groups. However, product term regression analysis has been criticized for its lack of statistical power for latent variables that are measured with errors (Aiken & West, 1991), while, multiple group SEM has been criticized for its information loss and power reduction when detecting interaction effects (Type II errors) resulting from artificial grouping.

To address these concerns, MSEM has been suggested as a substitute. MSEM creates latent interaction variables using the products of indicants (Kenny & Judd, 1984). Measurement errors can be controlled, the continuous nature of the moderator can be retained, and the underestimation problem can be rectified. Ping (1995) proposed a simplified MSEM approach that generates only one indicant for each interaction term, and thus, avoids creating excessive additional variables that produce convergence problems and infeasible solutions in large models. This study follows the three-step approach proposed by Cortina et al. (2001) based on Ping's work (1995) to create a single-indicant interaction term. The calculation of interaction terms, as well as their path coefficients and error terms, is presented in online supplement Appendix 2.

Common Method Bias

Data were collected from a single source in this study; thus, the occurrence of the common method bias should be determined. Several recommendations were followed during the research design and data analysis phases (Podsakoff et al., 2012). First, the total anonymity of the survey was assured. Second, we randomly placed anchor questions, such as "if you are reading this question, then please select agree to a very large extent," to ensure the quality of responses of the online survey. Responses that did not pass these test questions were counted as invalid and automatically excluded. Third, the survey questions in Part B were divided into four subsections: antecedents (customer value dimensions), moderator (trust), mediator (satisfaction), and outcome (return intention).

Respondents who completed one subsection of questions were required to take a break and perform several unrelated tasks before they could proceed to the next section. Last, confirmatory factor analysis (CFA) was conducted during the analysis phase to assess the bias.

RESULTS

Descriptive Analysis

Table 2 presents the profile of the 500 respondents and their trips. The respondents were young, with 50% between the ages of 21 and 30 years. This percentage is reasonable, given that most internet and P2P accommodation users are young people. Members of the younger generation in China are considered “digital natives,” who have spent most of their lives in an online environment, are more willing to accept new products via the internet, and are more proficient in this realm (Stanat, 2006). The majority (71.8%) of bookings were for leisure trips. Airbnb was the most frequently used P2P accommodation platform, which accounted for 40.2% of the trips. Most accommodation costs ranged from CNY100 to CNY500 (approximately US\$15 to US\$75). This range is reasonable because tourists who choose P2P accommodation are generally price sensitive.

Measurement Models

The reliability and validity of the measurement scales were first assessed (Table 3 in the online supplement material). The Cronbach’s α values for all the seven constructs surpassed the critical value of .70, thereby suggesting good internal consistency of the measurement scales (Bagozzi & Yi, 2012). Indicator reliability was assessed by examining each factor loading. The result demonstrated that factor loadings were higher than .70 for all the constructs, which implied good indicator reliability for all the measurement scales (Hair et al., 2011).

CFA was conducted to establish the convergent and discriminant validities of the seven scales. A full measurement model was constructed and tested, and all the factors were allowed to correlate. The seven-factor model achieved good overall fit, except for the significant χ^2 values, that is, $\chi^2 = 1044$, degrees of freedom [df] = 329, root mean square error of approximation (RMSEA) = 0.06, root mean square residual (RMR) = 0.06, normed fit index (NFI) = 0.908, and comparative fit index (CFI) = 0.935. However, considering the complexity of this model due to the number of indicators (Cortina et al., 2001) and given that χ^2 values are highly sensitive to large sample size (Bentler, 1990), this high value is within expectations and reflects the results of published studies (Nishii et al., 2008).

The average variance extracted (AVE) values were calculated using the equation proposed by Fornell and Larcker (1981) and used to establish convergent validity. All AVE values for the constructs were higher than 0.5, except that of trust (which was lower than but close to 0.5). This result implied that the

Table 2
Profile of Respondents and Their Most Recent Trips (*N* = 500)

	%		%
Age, years		Trip purpose	
<18	0.4	Leisure	71.8
18-20	6.6	Business	18.2
21-25	31.2	Other	10.0
26-30	37.8	Platform used	
31-35	12.2	Airbnb.com	40.2
36-40	8.2	Tujia.com	27.0
41-50	3.2	Xiaozhu.com	15.6
>50	0.4	Mayi.com	12.4
		Others	4.8
Gender			
Male	41.0	Expenses (CNY/capita*night)	
Female	59.0	1-100	2.8
Monthly income (CNY)		101-200	17.6
1-1,000	21.6	201-300	39.4
1,001-5,000	46.0	301-400	20.2
5,001-10,000	20.4	401-500	9.2
10,001-15,000	8.4	501-700	7.4
15,001-20,000	2.2	701-1000	2.4
>20,000	1.4	>1,000	1.0
Length of Stay (nights)		Destination	
1-2	39.2	Mainland China	37.2
3-5	45.8	Hong Kong, Macau, and Taiwan	10.0
6-7	11.8	Other Asian countries	1.6
>7	3.2	Europe	11.0
		North America	4.0
		South America	0.2
		Oceania	1.0
		Multiple destinations	35.0

Note: 1 CNY = 0.15 US\$.

measurement scales exhibited good convergent validity (Hair et al., 2011). Discriminant validity was established based on the rule of thumb proposed by Fornell and Larcker (1981), in which the AVE value of each latent construct and its squared correlations were compared with the remaining constructs. The AVE of each latent construct was higher than the highest squared correlation with any other latent variable, which implied good discriminant validity. The common method bias may not be a problem because each variable in this study is distinct.

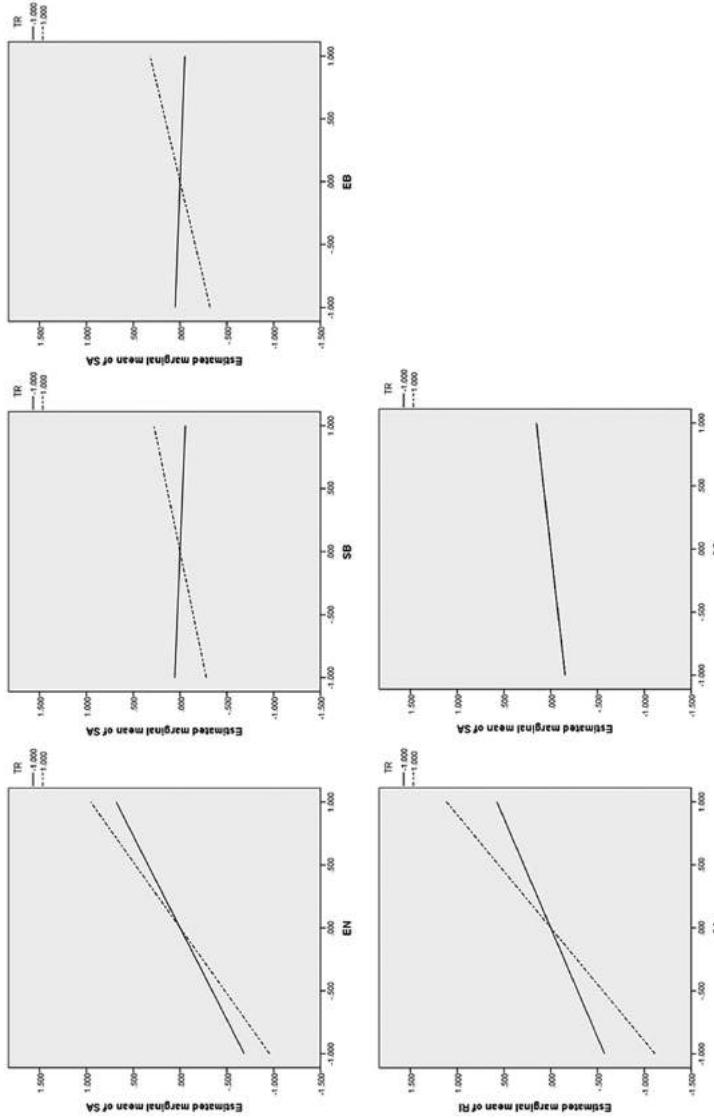
Structural Model and Moderating Effect

After conducting CFA, a full structural model was constructed and estimated based on the hypotheses. The moderating effects of trust between perceived value components and satisfaction and between satisfaction and return intention were represented by five single-indicant interaction factors, which were directly incorporated into the structural model. Error terms were not allowed to correlate and the parameters were estimated using the default maximum likelihood method. With the exception of the χ^2 statistic, the model achieved good overall fit, that is, $\chi^2 = 991$, $df = 390$, RMSEA = 0.056, standardized RMR (SRMR) = 0.046, NFI = 0.919, and CFI = 0.949. Figure 2 (available in the online supplement material) presents the results of the structural model.

The results of the SEM modeling generally supported the fitness of the *perceived value–satisfaction–return intention* framework in the context of P2P accommodation. This model consists of four alternative hypotheses that depict the indirect effects of four perceived values on return intention via satisfaction. As shown in Figure 2 (available in the online supplement material), all the alternative hypotheses were supported. Perceived enjoyment exerted a direct, positive, and significant effect on satisfaction ($0.820, p < .01$) and an indirect, positive, and significant effect on return intention ($0.820*0.845 = 0.693$, Sobel test statistic = $0.820, p < .01$). Thus, Hypothesis 1_a was supported. Perceived sustainability exerted a direct, positive, and significant effect on satisfaction ($0.111, p < .05$) and a significant indirect effect on return intention ($0.111*0.820 = 0.091$, Sobel test statistic = $2.039, p < .05$). Hence, Hypothesis 2_a was supported. Similarly, perceived economic benefit positively, directly, and significantly affected satisfaction ($0.134, p < .05$) and indirectly affected return intention ($0.134*0.845 = 0.113$, Sobel test statistic = $3.06, p < .01$), which supported Hypothesis 3_a. Perceived social connection exerted a positive, significant, and direct effect on satisfaction ($0.153, p < .01$) and a positive and indirect effect on return intention ($0.153*0.845 = 0.129$, Sobel test statistic = $2.696, p < .01$). Thus, Hypothesis 4_a was supported. Last, the direct effect of satisfaction on intention was significantly positive ($0.845, p < .01$). Therefore, Hypothesis 5_a was supported.

The hypotheses regarding the moderating effects of trust were represented by five interaction terms. The interactivity analysis is presented in Figure 3. The product term of trust and perceived enjoyment exerted a positive effect on satisfaction ($0.136, p < .01$), thereby implying that trust had a positive moderating effect on the relationship between perceived enjoyment and satisfaction. Thus, Hypothesis 6_a was supported. Similarly, the interaction terms of trust and sustainability ($0.168, p < .01$) and trust and economic benefit ($0.186, p < .01$) exerted positive effects on satisfaction, which implied that trust may positively moderate the effects of perceived sustainability and economic benefit on satisfaction. Therefore, Hypotheses 7_a and 8_a were supported. Notably, the interaction term of trust and social connection had no significant effect on satisfaction,

Figure 3
Interactivity Analysis



Note: SA = satisfaction; RI = return intention; TR = trust; EN = perceived enjoyment; SB = sustainability; EB = economic benefit; SA = satisfaction; SC = social connection.

thereby suggesting that trust exerted no moderating effect in this case, and thus, Hypothesis 9_a was not supported. Last, the interaction term of trust and satisfaction had a positive effect on return intention (0.270, $p < .05$), which provided support for Hypothesis 10_a.

Comparison Between Airbnb and Domestic Platforms

Airbnb customers ($N = 201$) and domestic platform users ($N = 299$) were compared to further investigate the hypothesized model. The MSEM model achieved good overall fit for the Chinese platform group ($\chi^2 = 557.276$, $df = 324$, SRMR = 0.056, CFI = 0.968, and RMSEA = 0.049). However, it demonstrated poor fit for the Airbnb group ($\chi^2 = 965.615$, $df = 336$, SRMR = 0.08, CFI = 0.881, RMSEA = 0.097). Therefore, a regular SEM model without moderation terms was implemented, which generated improved fit ($\chi^2 = 688.710$, $df = 235$, SRMR = 0.065, CFI = 0.900, and RMSEA = 0.058). Accordingly, the nonmoderation model was adopted for the Airbnb group. The result of the comparison is presented in Figure 4.

The MSEM model in the Chinese platform group demonstrates results similar to those in the aggregated group. Nearly all the alternative hypotheses were supported, except for Hypothesis 8_a. However, the SEM model in the Airbnb group only supported Hypotheses 1_a, 3_a, 4_a, and 5_a. The direct effect of sustainability on satisfaction and the moderating effect of trust were not confirmed for Airbnb customers. As such, Hypothesis 11 was supported.

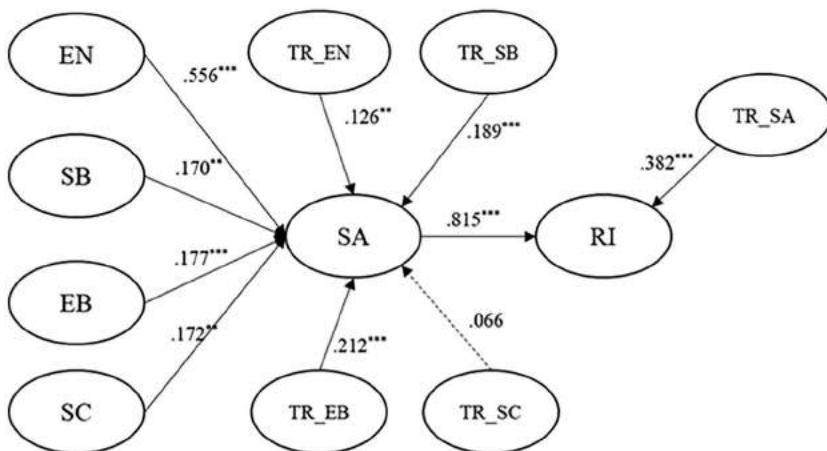
DISCUSSION

The four perceived values exert positive indirect effects on repurchasing intention via satisfaction. These findings are generally consistent with conceptual and empirical studies on the sharing economy. For example, studies with samples from the United States (Tussyadiah, 2016) and Finland (Hamari et al., 2016) demonstrated that perceived economic benefit is a good predictor of user satisfaction in the Western context. Chinese consumers are typically price conscious about hotel services (Guo et al., 2007); thus, the finding that good value for money strongly influences their satisfaction and repurchase intention is expected.

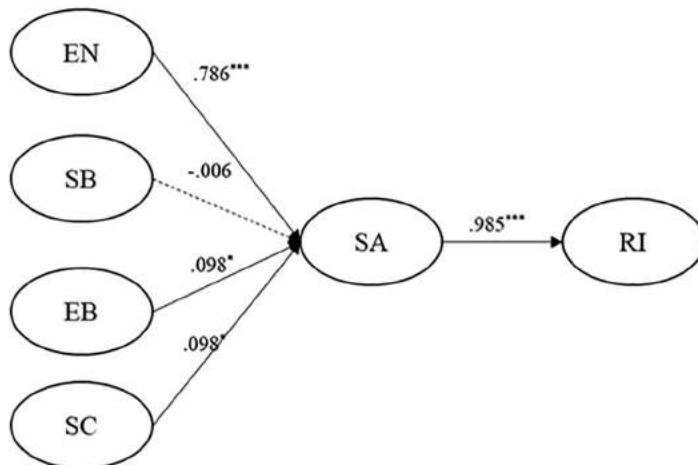
The positive effect of perceived social connection is also consistent with previous findings (Kim et al., 2015; Tussyadiah, 2016). Notably, the effect of perceived social connection can be strengthened by the collectivist orientation of the Chinese, which is characterized by a preference for close relationships (Hofstede, 1984). China scored 20 in the individualism dimension of its culture, which is considerably lower than those typical of Western countries, including the United States, which scored 91, and the United Kingdom, which scored 89 (Hofstede Insights, 2017). The strong desire of Chinese customers toward socialization and a sense of belonging is unsurprising. Enjoyment is associated with interest, curiosity, and novelty seeking. The identified positive effect is also

Figure 4
Comparison Between Airbnb and Chinese Domestic Platforms

MSEM model: Chinese platforms



SEM model: Airbnb



Note: EN = enjoyment; EB = economic benefit; SB = sustainability; SC = social connection; SA = satisfaction; TR = trust; RI = return intention.

*, **, and *** denote significance at the 5%, 1%, and 0.1% levels, respectively.

reasonable, given that P2P accommodation is emerging as an innovative form of hospitality in China. Consequently, customers are likely to expect that adventurous enjoyment and pleasure are associated with this new accommodation style.

The effect of sustainability is worth discussing. P2P accommodation users have been widely assumed to pursue sustainable experiences. However, research regarding the effect of perceived sustainability has generated conflicting results. Tussyadiah (2016) found that sustainability exerts negative effects on satisfaction and return intention and explained that customers may not value efforts toward environmental protection that will influence their P2P accommodation experiences. Palgan et al. (2017) determined that although customers are aware of the sustainability of P2P accommodations, they do not participate in such a service because of environmental reasons. By contrast, Hamari et al. (2016) reported that sustainability exerts a positive effect on user attitude. The conflicting effects of sustainability can probably be attributed to varying cultural backgrounds, ideologies, and social norms. Following the self-determination theory, sustainability can only influence attitude when this value is highly internalized (Hamari et al., 2016). For customers who are concerned about the environment, sustainability can be a benefit from their perspective, which will not be the case for customers who care less about the environment.

The moderating effect of trust is the core interest and the most significant finding of this study. The results support the notion that trust positively moderates the effects of nearly all the perceived values on satisfaction, except for social connection. Thus, if a consumer holds P2P accommodation in high trust, then positive perceptions of economic benefit, enjoyment, and sustainability may strongly influence satisfaction. Moreover, trust positively moderates the effect of satisfaction on intention, which indicates that satisfaction may exhibit a strong predictive power for return intention among consumers with high trust. These findings empirically reflect the results in organizations and social settings (e.g., Innocenti et al., 2011; Neeraj, 2009; Wang et al., 2013).

However, the moderating effect of trust on the relationship between social connection and satisfaction is insignificant. A possible explanation is that social benefit is related to interpersonal interaction and the relationship and sense of belonging developed during this process are generally manageable. This concept differs from enjoyment, economic benefit, or sustainability, in which consumers' judgment is mostly based on information related to the service provider. Therefore, the neutralizing effect of trust derogation may not be as significant for social connection as those for the other three perceived values.

The comparison between Airbnb and Chinese domestic platform customers generates contrasting findings that should be discussed. The sustainability value significantly affects Chinese platform customers but does not affect Airbnb customer satisfaction. Similarly, trust does not exert a moderating effect on Airbnb customers' perceived *value–satisfaction–return intention* framework. As a global platform, Airbnb features various accommodation products worldwide, and its users are mostly international travelers. Chinese tourists, therefore, can be less familiar with it (compared with other domestic platforms). Therefore, it can be perceived as fraught with uncertainties. In this sense, the use of Airbnb belongs to a "weak structure," in which customers have insufficient clues to completely evaluate its products/services, even after consumption. Therefore,

trust in this context does not shape the attribution process, which results in insignificant moderating effects.

IMPLICATIONS

This study contributes to customer behavior studies and sharing economy knowledge in several aspects. First, it identifies the determinants of both consumer satisfaction and return intention that are associated with P2P accommodation. These determinants represent the distinguishing features of internet-based accommodation, such as Airbnb, and are distinct from previous findings dominated by service or experience quality indices.

Second, this study considers the moderating role of trust, and thus, provides at least two major theoretical contributions to consumer knowledge beyond the sharing economy context: (1) It improves the extant knowledge regarding how trust can shape consumer behavior during the postconsumption stage, given that previous studies have rarely examined the moderating effect of trust in the sharing economy. Building on this study, future studies can further investigate how trust can moderate the effects of customer cognition, apart from the value (e.g., service quality and perceived experience), and whether various forms of trust (e.g., trusts on the vendor, platform, or product) can function differently; (2) It enhances the explanation of the *value–satisfaction–return intention* framework by simultaneously modeling the cognitive and attribution processes. As a pioneering study in this aspect, the current work paves the way for future studies to consider additional factors that can shape the attribution process, such as personality and expectation.

Based on the above findings, platforms should further enhance their image of being playful, interesting, and exciting to distinguish themselves from traditional accommodations. Creating an image of sustainability may also be helpful and can be achieved by providing recyclable products in accommodations and encouraging customers to sort garbage and save energy during their stay. To facilitate the social connection between hosts and guests (or between guests), the platform can significantly improve their website design. For example, a module that allows both hosts and guests to create and “follow” each other’s updates would be conducive to such connection. To build trust, the platform also has various options. The primary measures would be completing personal profiles (e.g., education, hobbies) for both hosts and guests, establishing a strict trust policy including background checks of hosts and ocular inspections of listed rooms, and guaranteeing a secure online transaction environment for customers. Technological measures are also suggested to improve the platform–customer interface to create a sense of trust during the human–computer interaction. In this regard, one effective method is to imbue the website with a high social presence (S. Ye et al., 2020) by integrating multimedia elements of the interface to facilitate actual or imaginary interactions. The website design should be polished so that users can change its characteristics (e.g., language, page arrangement) or interact with it through its given form; by contrast, these nonverbal

cues should be added into host–guest communications, such as gestures, humorous content and emoticons, and timely self-disclosure of messages including one's thoughts, feelings, and experiences. The development of augmented reality/virtual reality technology offers more opportunities to improve trust. The platform can reshape its interface with more augmented reality/virtual reality settings to create a sense of face-to-face interaction, which can be conducive to trust building.

LIMITATIONS

Despite its contributions, this study has several limitations. The online survey and convenience sampling resulted in the centralization of the respondents' ages (over 50% were between the ages of 21 and 30 years), with middle-aged and elderly P2P accommodation customers being less represented. A more diverse demographic profile should be adopted in future studies. Moreover, the determining mechanism of consumer behavior can assume different forms due to the unique attributes of platforms. Therefore, the model examined in this study can be moderated by brands and other factors, such as trip traits (e.g., single or group tours). Finally, the research findings of this study can only be generalized for Chinese consumers (and at its best, to some other Asian developing countries). Due to cultural differences and gaps in economic development level, consumers in developed countries such as the United States are very likely to display different behavior patterns. Therefore, future studies should be carried out in diverse research contexts to validate the moderating effects of trust.

The outbreak of the coronavirus disease of 2019 (COVID-19) has significantly affected the global tourism industry and tourist behavior patterns were expected to change afterwards. Tourists might pay more attention to the health risks during their stay in a P2P accommodation unit, and thus, functional values (safety, hygiene) may have much stronger effects on satisfaction and return intention. The pandemic can also add to the uncertainty of living in a P2P accommodation, and thus, the role of trust could be even more significant. Despite such limitations, the theoretical value of this study will be not undermined. It provides baseline findings for future comparison with postpandemic research, and thereby can reveal how the pandemic can reshape tourist behavior. Moreover, changes in behavior patterns brought by the pandemic are unlikely to last forever. The pandemic will end someday and the global tourism will go back to the normal track, and so will tourists' behavior modes. In this sense, findings by this study are still benefiting in the long-run.

CONCLUDING SUMMARY

In this study, we extended the classic *value–satisfaction–loyalty* framework by incorporating the moderating effect of trust and compared the users of Airbnb and Chinese domestic platforms. Four perceived values (social connection, enjoyment, economic benefit, and sustainability) were found to exert positive

indirect effects on repurchasing intention via satisfaction. Trust positively moderated the effects of nearly all the perceived values on satisfaction, except for that on social connection. Moreover, trust also positively moderated the effect of satisfaction on intention. However, the modeling effects differed significantly between Airbnb and Chinese domestic platforms. The sustainability value significantly affected Chinese platform customers but did not affect Airbnb customer satisfaction. Similarly, trust did not exert a moderating effect on Airbnb customers' perceived *value-satisfaction-return intention* framework.

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SUPPLEMENTAL MATERIAL

Supplemental material for this article is available online.

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Submitted March 2, 2020

Accepted February 17, 2021

Refereed Anonymously

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The contribution of emotional satisfaction to consumer loyalty

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Keywords Loyalty, Customer satisfaction, Customer loyalty, Higher education

Abstract Many customer satisfaction studies have concluded that there is a significant relationship between customer satisfaction and loyalty, but this finding has been questioned in that most of the studies focus on measuring the cognitive component of customer satisfaction. This study includes the cognitive component, but focuses on the affective component. It explores the role of emotions in satisfaction, and then compares the predictive ability of the cognitive and affective elements. Key findings are that both positive and negative emotions, and the cognitive component of satisfaction correlate with loyalty. Regression analysis indicates that the affective component serves as a better predictor of customer loyalty than the cognitive component. Further, the best predictor of both overall loyalty and the most reliable dimension of loyalty, positive word of mouth, is positive emotions. The theoretical and practical implications of these findings are discussed.

Introduction

It may appear unnecessary to study the relationship between customer satisfaction and customer loyalty as many studies have confirmed that there is a significant positive relationship between these two variables (see Colgate and Stewart, 1998; Hocutt, 1998; Patterson and Spreng, 1997). However, many of the satisfaction-loyalty relationship studies were done when the development of the satisfaction construct was at an early stage, and customer satisfaction was still seen as an "elusive construct" (Rosen and Surprenant, 1998). More recently, scholars comment that it is inappropriate to ignore the emotional component of satisfaction, and hence the reliability findings of the previous studies are questioned (Liljander and Strandvik, 1997; Peterson and Wilson, 1992; Stauss and Neuhaus, 1997; Wirtz and Bateson, 1999). Consequently, this paper reports on a study which aims to:

- explore the role of emotions in customer satisfaction; and
- re-test the satisfaction-loyalty relationship when the emotional component is included.

First, we review the recent literature on customer satisfaction and customer loyalty, and develop research propositions consistent with the research aims. The research design is then described, and the results discussed. The paper concludes with implications and recommendations for future research.

A brief review of customer satisfaction research

In the early stages of services research, researchers attempted to diminish the confusion between customer satisfaction and service quality by determining whether there is any distinction between them, and by exploring antecedents (Cronin and Taylor, 1992; Oliver, 1993a). Oliver (1993a, p. 76) distinguishes between the two constructs by suggesting that satisfaction is "potentially all salient dimensions", it requires experience-dependency and involves emotions. In his study, Oliver reverses the previous notion that satisfaction is the antecedent of quality and claims that quality is the antecedent of satisfaction. Spreng and Mackoy's (1996) study further tests and confirms Oliver's conceptual model. Lately, customer satisfaction has been commonly accepted as a different construct from service quality and the emphasis has been on studying the relationships between them (Shemwell *et al.*, 1998; Taylor and Baker, 1994).

With consistent findings that service quality and satisfaction are different constructs, and that service quality leads to customer satisfaction, the research interest moved to studying the linkages between customer satisfaction, service quality and customer loyalty/retention. While the direct relationship between customer satisfaction and loyalty has been shown to be complex and asymmetric (Bloemer and Kasper, 1995; Mittal and Lassar, 1998; Oliver, 1999), and some research has shown that switching behavior and repurchase intentions are not consistent with satisfaction levels (Stauss and Neuhaus, 1997), a number of studies suggest that there is a significant positive relationship between customer satisfaction and customer loyalty/retention (Anderson and Sullivan, 1993; Cronin, Brady and Hult, 2000; Shemwell *et al.*, 1998; Taylor and Baker, 1994). Hence an overall research proposition is suggested as follows.

Research proposition 1: There is a significant positive relationship between customer satisfaction and customer loyalty.

Before proceeding with further literature, we now briefly discuss the terms satisfaction and loyalty and define them for the context of our study. Drawing on the work of leading researchers in the services field for over 20 years, Roest and Pieters (1997) developed a nomological net to distinguish service quality and customer satisfaction. In doing so, they define satisfaction, as a relative concept that involves both cognitive and affective components, is consumer-related (rather than product-related), mainly transactional, and incorporating an appraisal of both benefits and sacrifices. However, Roest and Pieters also state that "... eventually, satisfaction may become or influence product attitude, which may be regarded as an aggregated but not relativistic construct involving a readiness to act" (1997, p. 345). In summary, we note the distinction between transaction-specific and overall satisfaction, and we adopt the broader definition of satisfaction whereby the overall measure is an aggregation of all previous transaction-specific satisfaction, and involves both cognitive and

affective components. Recently, the overall measure has been shown to be a better predictor of repurchase intentions (Jones and Suh, 2000).

Loyalty is interpreted as true loyalty rather than repeat purchasing behaviour, which is the actual rebuying of a brand, regardless of commitment (Bloemer and Kasper, 1995). True loyalty, in this context, encompasses a non-random, behavioural response which results from evaluation processes that result in commitment (Bloemer and Kasper, 1995). This is in contrast to spurious brand loyalty which is a function of inertia. However, loyalty is a multi-dimensional construct and includes both positive and negative responses (Zeithaml *et al.*, 1996). In this study, loyalty is to an educational provider and is therefore service loyalty, rather than brand loyalty as has been developed in relation to goods. In comparison to brand loyalty, service loyalty studies are under-represented in the literature (Bloemer *et al.*, 1999; Javalgi and Moberg, 1997).

Having established our overall research proposition as above, we acknowledge that it would be meaningless to re-test the same proposition without incorporating recent developments in the satisfaction literature. In particular, it is argued that satisfaction includes both cognitive and emotional components. The cognitive component refers to a customer's evaluation of the perceived performance in terms of its adequacy in comparison to some kind of expectation standards (Liljander and Strandvik, 1997; Oliver, 1980; Wirtz, 1993). The emotional component consists of various emotions, such as happiness, surprise and disappointment (Cronin *et al.*, 2000; Liljander and Strandvik, 1997; Oliver, 1993b; Stauss and Neuhaus, 1997).

It is important to note that the emotional component is a form of affect, and is a response to service delivery. In this study, "consumption emotions are the affective responses to one's perceptions of the series of attributes that compose a product or service performance" (Dubé and Menon, 2000, p. 288). Such emotions are usually intentional (that is, they have an object or referent) and are different to the concept of mood, which is a generalised state induced by a variety of factors, and is usually diffused and non-intentional (Bagozzi *et al.*, 1999). Emotions and mood (and attitudes) are all elements of a general category for mental feeling processes, referred to as "affect" (Bagozzi *et al.*, 1999). The emotional component in the satisfaction judgment is therefore independent from the overall affective sense present in the respondent at the time of the service (de Rutyer and Bloemer, 1998). The cognitive and emotional components of satisfaction are now considered separately.

Reflections on the cognitive component in customer satisfaction studies

As indicated above, expectancy disconfirmation theory is the dominating model for measuring customer satisfaction (Brookes, 1995). That is, satisfaction is determined by the confirmation or disconfirmation of expectations with perceptions of the perceived performance on various service items (Danaher and Haddrell, 1996). The multi-item disconfirmation model has been applied in

many customer satisfaction studies, and has been proven to be very useful (Danaher and Haddrell, 1996; Wirtz and Bateson, 1999). Further, when compared to other approaches, its benefits outweigh its main shortcoming, which is its conceptual overlap with service quality. Such benefits include higher reliability, convergent and discriminant validity, face validity, managerial value and a lower skewness problem (Danaher and Haddrell, 1996).

In relation to the overlap between service quality and satisfaction, the multi-item disconfirmation model is very similar to the most famous service quality measurement scale, SERVQUAL. As both scales use disconfirmation of expectations, it is doubtful whether the results of some previous satisfaction studies show satisfaction or service quality. However, the two constructs employ a different definition of expectations (Zeithaml *et al.*, 1993), and have a conceptual distinction in that satisfaction is an "experience-dependency" construct and service quality does not require experience (Danaher and Haddrell, 1996; Oliver, 1993a). If the scale seeks respondents' assessment of their "perceived service experience", it is alleged that it is essentially measuring satisfaction rather than service quality (Danaher and Haddrell, 1996). This study therefore employs the multi-item disconfirmation scale to measure the cognitive component of satisfaction.

Many previous satisfaction studies, which focus on the cognitive component, suggest that there is a positive relationship between satisfaction and loyalty (see Andreassen and Lindestad, 1998; Colgate and Stewart, 1998; Danaher and Haddrell, 1996; Mittal *et al.*, 1998; Taylor and Baker, 1994), and we therefore propose the following:

Research proposition 1a: There is a significant positive relationship between the cognitive component of customer satisfaction and customer loyalty.

However, focusing only on the cognitive component of satisfaction neglects an important element, namely emotions, and may be insufficient to obtain a comprehensive picture of consumer responses. The emotional element is now pursued.

Affective measures in customer satisfaction

Although there is still debate about whether satisfaction is itself an emotional construct or a cognitive construct which includes an emotional component (Babin and Griffin, 1998; Bagozzi *et al.*, 1999; Crooker and Near, 1998), it appears that emotions may be one of the core components of satisfaction (Dubé and Menon, 2000; Westbrook and Oliver, 1991). Further, it is suggested that emotions may distinguish customer satisfaction from service quality (Oliver, 1993a).

Recent studies recognize that emotion is a core attribute in satisfaction and suggest that customer satisfaction should include a separate emotional component (Cronin *et al.*, 2000). Stauss and Neuhaus (1997) argue that most satisfaction studies only focus on the cognitive component, and that the omission of the affective component is one of the main issues in satisfaction

research. Their proposition is supported by Liljander and Strandvik (1997), who argue that customer satisfaction includes both affective (or emotional) and cognitive components. Further, Stauss and Neuhaus (1997) suggest that it is inappropriate to assume that consumers experience the same emotions and cognition when they give the same score for their overall satisfaction level. We therefore propose to include a separate emotional component in satisfaction, as the major contributor to the affective element.

It is proposed that one's emotions have an influence on behavior. This is due to human nature, in that one responds to an event in certain ways to maintain a positive emotion, such as happiness, and to avoid a negative emotion, such as depression. Specifically, a person's positive emotions tend to link to his/her decisions to stay or continue with what he/she has been doing. Conversely, negative emotions tend to link to the opposite decisions, such as to leave and discontinue involvement (Bagozzi *et al.*, 1999). Positive emotions may also lead one to share the positive experience with others, while negative emotions may result in complaining behavior (Bagozzi *et al.*, 1999; Liljander and Strandvik, 1997). Supported by the previous findings that there is a connection between emotions and behavior (Bagozzi *et al.*, 1999), and Stauss and Neuhaus' (1997) study, which found that there is a significant relationship between emotions and loyalty, we propose the following:

Research proposition 1b: There is a significant positive relationship between the affective component of customer satisfaction and customer loyalty.

The better predictor of customer loyalty: cognitive or affective?

While general research conclusions suggest that there is a positive relationship between customer loyalty and both the cognitive and emotional components of satisfaction, there is a lack of empirical evidence to determine which of the components serves as a better predictor of satisfaction. This is particularly important, as the cognitive component of satisfaction alone has failed to serve as an effective predictor of customer loyalty (Stauss and Neuhaus, 1997).

To date there are very few affective/emotional scales specifically developed to measure customer satisfaction emotions. Stauss and Neuhaus (1997) developed a scale, originally with four dimensions, namely, optimism/confidence, steadiness/trust, disappointment/indecision, and protest/opposition. Stauss has now extended this to five with the addition of indifference/resignation (personal communication, 1999). In 1997, Liljander and Strandvik (1997), based on the previous literature, developed a more comprehensive emotional scale that includes seven emotional attributes: happy, hopeful, positively surprised, angry, depressed, guilty and humiliated. Liljander and Strandvik also suggest that customer satisfaction emotions can be divided into two groups: positive emotions and negative emotions. Positive emotions include happy, hopeful and positively surprised, while negative emotions include angry, depressed, guilty and humiliated. Although there is no apparent consensus about the best way to measure the emotional component,

in traditional literature, positive and negative emotions are often used to compare effects (Crooker and Near, 1998).

There is consensus among researchers that loyalty is a complex construct, evident in the variety of perspectives that have been used to study it (Javalgi and Moberg, 1997). These perspectives include behavioral, attitudinal and cognitive processes, however, the early customer loyalty studies focus mainly on the behavioral perspective and then later shift to an attitudinal approach (de Ruyter *et al.*, 1998). Based on the attitudinal approach, customer loyalty can be studied via its dimensions, such as word-of-mouth, complaining behavior and purchase intention. However, there are different findings in relation to loyalty dimensions, even when the same loyalty scales are employed. Parasuraman *et al.* (1994) developed a loyalty scale and found that loyalty consists of loyalty to company, propensity to switch, willingness to pay more, external response to problem and internal response to problem. De Ruyter *et al.* (1998) later adopted the same scale but found that loyalty consists of three dimensions: preference, price indifference and dissatisfaction response. However, the same authors suggest that the necessary elements to operationalise loyalty are captured in the "behavioral intentions battery", refined by Parasuraman and his co-workers. (Bloemer *et al.*, 1999; Zeithaml *et al.*, 1996). This study therefore adopts and customises this scale to explore the relationship between customer satisfaction, including both cognitive and emotional components, and loyalty.

Methodology

Sample

The subjects in this study were on-campus undergraduate students in business and economics at a large university in Australia. Convenience sampling was employed and self-administered surveys were used to collect the data. A total of 320 surveys were distributed and 122 valid returns were obtained, giving a response rate of 37.5 per cent. The average age of respondents was 24. The respondent profile was female (55.8 per cent), average age 24 years, and comprising 57.9 per cent Australian and 42.1 per cent international students. This cohort was considered representative by the head of the school.

Scales employed: customer satisfaction cognitive component

Seven-point Likert scales were employed to measure both customer satisfaction and loyalty. The scale employed to measure the cognitive component of customer satisfaction focused on educational service attributes, and was customised from the instrument developed by Dean (1999). It is based on the multi-item disconfirmation model, and uses a single column format. The scale includes six groups of service attributes: course structure, teaching, lecturer's interaction and support, administration support, feedback and assessment, and physical presentation. A typical item reads, "The written feedback on assignments . . . 1 (failed to meet my expectations) . . . to 7 (far exceeded my expectations)". At the end of each group, an overall value for satisfaction with the focus of the items was obtained.

Scales employed: customer satisfaction affective component

To gain insights into the affective component, we used the emotional scale developed and tested by Liljander and Strandvik (1997). The scale was adopted in its entirety. A typical item reads "So far, my overall studying experience at (the provider institution) makes me feel . . . happy". Responses are on a Likert scale from 1 (never) . . . to 7 (often). Liljander and Strandvik were unable to study the relationship between the customer satisfaction emotional component and customer loyalty because, in the industry that they used, customers do not have the choice to switch to another brand or another service provider. Our study therefore builds on their work in pursuing the relationship.

Scales employed: customer loyalty

In terms of customer loyalty, Parasuraman *et al.*'s (1994) "Reconfigured behavioral-intentions battery", subsequently refined by its authors (Zeithaml *et al.*, 1996) and also used by de Ruyter *et al.* (1998), and Bloemer *et al.* (1999) was adopted and customised for this study. The original scale had 13 items (discussed in relation to Table II), and five components: loyalty to company, external response to problem, propensity to switch, willingness to pay more, and internal response to problem. In their paper, Parasuraman *et al.* (1994) note that their scale requires refinement particularly for the latter three of these components, but that the "loyalty" component demonstrated excellent internal consistency while the "external response" was adequate according to the criteria of Nunnally (1978).

Results and discussion*The scales*

Prior to exploring the findings with respect to the research aims, we include some discussion about the scales that we used, their reliability and the factor patterns that they produce.

Normality

In all cases, negative questions were reverse coded for consistency. Normality tests, based on the different components in the survey, indicated adequate results. Of particular interest is the degree of skewness as customer satisfaction studies tend to be positively skewed (Coakes and Steed, 1999). The overall scales did indicate some positive skewing (0.22 and 0.23 for emotional and cognitive scales) but, given the nature of the study, these values were considered adequate to continue with the analysis.

Reliability

The reliability of the scales was established by utilising Cronbach's alpha. The cognitive component, emotional component and overall loyalty component had alpha scores of 0.94, 0.80 and 0.77 respectively, all indicating acceptable values (Nunnally, 1978).

Factor analysis: emotions scale

It was intuitively expected that the emotions scale would divide into two factors, representing positive and negative emotions. Principal components analysis with varimax rotation confirmed this expectation, with the two factors explaining 46.9 per cent and 19.1 per cent of the variance respectively (see Table I). However, feelings related to anger loaded more highly with positive emotions than with negative. This result is not easily explained but it is possible that, as anger is usually directed at someone, its interpretation is confused. Or anger might represent a third dimension of the emotional component and need to be further explored. This possibility is consistent with the model conceptualised by Dubé and Menon (2000) which suggests that negative emotions have three components, "other-attributed", "self-attributed" and "situation-attributed". In their model, the "other-attributed" component is related to anger. Another possibility is that both positive and negative emotions can exist at the same time at a high level, thus anger loads on both factors. It is suggested that customers may have a zone of tolerance for negative emotions and that, within this zone, their negative emotions do not affect their positive emotions, so that both positive and negative emotions can exist at the same time (Liljander and Strandvik, 1997). In this study, a possible interpretation is that the respondents have simultaneously experienced high levels of positive emotions and anger. When anger is dropped from our scale, the reliability only decreases by 0.1, so it is retained in our current analysis. However, its role in customer satisfaction provides an interesting focus for future work on the emotions scale.

Factor analysis: cognitive scale

The dimensions of the cognitive scale, the educational service attributes have been developed and tested previously (Dean, 1999). However, as a number of items were added to the original scale, to account for the different educational context (on-campus classes versus distance education), a factor analysis was performed. Principal components analysis with varimax rotation identified

Description	Factor loading	Reliability
	1	2
1. Positive emotions		0.77
Happy	0.794	
Hopeful	0.778	
Positively surprised	0.810	
2. Negative emotions		0.75
Angry ^a	0.852	0.546
Depressed ^a		0.657
Guilty ^a		0.829
Humiliated ^a		0.771

Note: Factor loadings less than 0.35 have been omitted; ^a reverse coded

Table I.
Emotions scale: factor loadings and reliability values

seven factors with eigenvalues greater than one, accounting for 69.1 per cent of the variance. The results are shown in Table II.

The factors shown in Table II have loaded essentially as expected, except for the factor that we had labelled "teaching" which split across the factors we had labelled "teaching" and "course structure". On reflection, this result is readily

Description	Factor loading						
	1	2	3	4	5	6	7
<i>1. Feedback and assessment</i>							
Clearness of criteria	0.821						
Written feedback	0.763						
Assignment return time	0.641						
Questions and subject aims	0.608						
Fairness	0.594						
					0.362	0.372	
<i>2. Physical environment</i>							
Tables	0.879						
Heating	0.817						
Chairs	0.811						
Lighting	0.594						
<i>3. Interaction and support</i>							
Feedback in class	0.803						
Interaction with lecturers	0.792						
Consultation times	0.720						
<i>4. Administration</i>							
Effectiveness	0.847						
Efficiency	0.772						
Time student advisor spent	0.698						
Friendliness of staff	0.567						
Visual presentation of lectures	0.464						0.356
<i>5. Learning materials</i>							
Ease of reading	0.815						
Learning materials	0.675	0.382					
Clarity of objectives	0.390	0.630					
Arrival in timely manner	0.439	0.597					
<i>6. Course structure and content</i>							
Variety	0.662						
Flexibility	0.628						
Ease of understanding	0.623						
Knowledge or skills taught	0.423						0.602
Teaching techniques used	0.415					0.463	0.464
<i>7. Technology</i>							
Technology in the classroom	0.422						0.755

Table II.
Cognitive scale: factor loadings

Note: Factor loadings less than 0.35 have been omitted.

explained as the items left in “teaching” are all related to “learning materials”, and “course structure” is really “course structure and content”. Finally, the single item relating to technology split out and formed a factor on its own. In summary, the seven factors that contribute to the cognitive scale, and the percentage of variance that they explain, are feedback and assessment (11.2), physical environment (11.1), interaction and support (10.8), administration (10.6), learning materials (10.1), course structure and content (9.7), and technology (5.5). As the overall cognitive scale demonstrated good reliability (0.94) and was used in its entirety for our analysis, we did not pursue further implications of the factor structure. However, the results provide a useful starting point for further scale development.

Factor analysis: loyalty scale

When the items in the loyalty scale were analysed, four factors emerged, as shown in Table III. These factors (positive word of mouth, complaining behavior, switching behavior, and willingness to pay more) accounted for 28.9 per cent, 19.2 per cent, 10.7 per cent and 9.3 per cent of the variance respectively. The first of our four factors contains four of the five items in Parasuraman *et al.*'s (1994) “loyalty to company” factor. The fifth item, “Do

Description	Factor loading				Alpha
	1	2	3	4	
<i>1. Positive word-of-mouth</i>					0.94
Say positive things about the course	0.887				
Recommend the course to someone else	0.954				
Encourage friends to apply for the same course	0.933				
Consider the same uni. as the first choice if pursue further study	0.544		0.479		
<i>2. Complaining behavior</i>					0.67
Complain to other students if experience problems	0.671				
Complain to external agencies if experience problems	0.782				
Complain to school staff if experience problems	0.777				
<i>3. Switching behavior</i>					0.72
Try to switch to another campus of the same university if experience problems	0.597	0.611			
Try to switch to another university if experience problems	0.563	0.646			
Study in another uni. If it offers a better price		0.748			
Try to study fewer subjects at this university		0.622			
<i>4. Willingness to pay more</i>					0.45
Continue the same course if the price increases			0.635		
Pay a higher price for the benefits currently received			0.780		
Note: Factor loadings less than 0.35 have been omitted					

Table III.
Loyalty scale: factor loadings and reliability values

more business with XYZ in the next few years" was not included in our study as we felt it would be confusing to respondents in the second or third year of their degree programs. We refer to the first factor as "positive word of mouth" to indicate its primary focus. Consistent with Parasuraman *et al.*'s (1994) study, the best reliability was demonstrated by this factor.

In relation to the other factors, "willingness to pay more" has the same two items as Parasuraman *et al.* (1994) but is not internally consistent, while the items in "external response to problem" and "propensity to switch" have been customised and are shown in the manner in which they loaded in our study. We have changed the names to facilitate clarity.

To conclude the discussion of the scales, we found that they have proven sufficiently reliable to work with, and the items have generally loaded as expected on the various dimensions. Having established that the instrument was adequate to pursue the aims of the study, we now report and discuss the findings with respect to the specific aims.

The role of emotions

To commence our investigation of the first aim, the role of emotions in the measurement of customer satisfaction, we first consider the correlation between the dimensions of loyalty and the cognitive and emotional components of satisfaction (see Table IV). Consistent with research propositions 1a and 1b, Table IV confirms that there is a significant correlation between the two major components of customer satisfaction (emotional and cognitive) and loyalty. However, there is a higher correlation between overall customer loyalty and the emotional component than the cognitive component, at the 0.01 significance level. Further, the emotional component has slightly higher correlation coefficients for positive word of mouth, switching behavior and willingness to pay more when compared to the cognitive component.

The correlation coefficients for the positive and negative emotions suggest that positive emotions are associated with all dimensions of loyalty except "complaining behavior". This finding may be due to the emotions scale not covering all the emotions that significantly correlate with the various loyalty dimensions. Intuitively, we expect that positive and negative emotions would link to complaining behavior (Liljander and Strandvik, 1997) but, as well as the three positive emotions included, there are other positive emotions, such as

	Emotional component	Cognitive component	Positive emotions	Negative emotions ^a
<i>Overall loyalty</i>	0.534**	0.424**	0.516**	0.404**
Positive word of mouth	0.590**	0.517**	0.582**	0.435**
Complaining behavior ^a	0.088	0.153	0.007	0.133
Switching behavior ^a	0.262**	0.145	0.246**	0.206*
Willingness to pay more	0.350**	0.313**	0.375**	0.235*

Notes: * $p < 0.05$; ** $p < 0.01$; ^a items reverse coded

Table IV.
Correlation analysis
results

relief, elation and joy (Bagozzi *et al.*, 1999), which were not included in the scale. There is no evidence to show that each emotion has the same influence on different responses, such as complaining behavior, but rather that different emotions may trigger different behavioral intentions (see Stauss and Neuhaus, 1997).

Bagozzi *et al.* (1999) suggest that emotions influence decision making, and that positive emotions particularly link to one's intention to maintain an ongoing plan and share the outcome of a certain activity/event. This conclusion is consistent with our research findings that positive emotions significantly correlate with positive word of mouth (to share the positive experience), switching behavior (negatively correlated) and willingness to pay more (in order to stay where he/she is).

The association between loyalty and negative emotions (which have been reverse coded) suggests that they have a significant impact on loyalty as well. Of particular interest is the lack of association between negative emotions and complaining behavior. Again, this may be due to the absence of specific negative emotions from the scale, such as regret and disappointment, which are more likely to cause complaining behavior (Zeelenberg and Pieters, 1999). The seven emotions in our emotions scale do not correlate with the respondents' complaining behavior in this study, and it is noteworthy that the findings about the relationship between regret and disappointment with complaining behavior are inconsistent in Zeelenberg and Pieters' (1999) studies. These results emphasise the need to further explore the possible negative emotions that may influence complaining behavior. They also indicate that education providers need to seek out negative responses as these are unlikely to be voluntarily provided by students.

The satisfaction-loyalty relationship revisited

The second major aim of our study was to re-test the satisfaction-loyalty relationship when the emotional component of satisfaction is included. In particular, we were keen to establish the best predictors of loyalty and so we used regression analyses to explore the possible relationships.

Best predictors of overall loyalty

To gain a feel for the relative importance of the cognitive and emotional components in predicting customer loyalty, in the first regression we used overall loyalty as the dependent variable, with the cognitive and emotional components as independent variables. The adjusted $R^2 = 0.336$, and $F(2, 98) = 26.325$, $\text{sig} = 0.000$. The standardized beta coefficients are shown in Table V

	Beta	t	sig.
Cognitive component	0.179	1.917	0.058
Emotional component	0.482	5.149	0.000

Table V.
Standardized beta coefficients (dependent variable: overall loyalty)

and, while only 33.6 per cent of the variance in loyalty is explained, the findings indicate that the emotional component is an important factor in explaining loyalty, apparently more important than the cognitive component.

To substantiate the finding that inclusion of the emotional component leads to better results in explaining loyalty when compared to using the cognitive component alone, we performed another regression with overall loyalty as the dependent variable and only the cognitive component as the independent variable. In this case, the adjusted $R^2 = 0.172$, and $F(1, 101) = 22.151$, $\text{sig} = 0.000$. The beta value for the cognitive component equalled 0.424, $t = 4.706$, $\text{sig} = 0.000$. This result suggests that the emotional component is an important predictor of loyalty, and is consistent with the suggestions of Liljander and Strandvik (1997) that customer satisfaction is better explained when emotions are included.

The next question of interest is the relative effect of positive and negative emotions. To explore this, another regression analysis was performed, again using overall loyalty as the dependent variable, but including the factor scores for the two types of emotions. While the same variance is explained, positive emotions emerge as the best predictor of overall loyalty ($\text{beta} = 0.336$, $t = 3.153$, $\text{sig} = 0.002$) with negative emotions also significant ($\text{beta} = 0.232$, $t = 2.488$, $\text{sig} = 0.015$) and the overall cognitive assessment no longer significant. One would expect that having positive emotions towards "my overall studying experience at service provider", would result in more loyalty to that service provider. Our finding supports this assumption and also indicates that there is a negative association for negative feelings (as responses were reverse coded). How students *feel* about their studying experience is therefore highly relevant to the messages they are likely to give to others, and the personal responses they are likely to make.

Best predictors of word of mouth behavior

As indicated in Table IV, positive word of mouth has the highest correlation with the components of customer satisfaction and the highest reliability of the four loyalty dimensions. Further, switching costs are high and price regimes are generally inflexible in education, so we decided to conduct a further regression analysis using the components of satisfaction with positive word of mouth as the dependent variable. As there was no correlation between complaining behaviour and the components of satisfaction, we did not pursue its analysis.

The results in Table VI indicate that positive emotions are an important predictor of "positive word of mouth", but that the students' cognitive

Table VI.
Standardized beta
coefficients (dependent
variable: word of
mouth)

	Beta	<i>t</i>	sig.
Positive emotions	0.369	3.720	0.000
Negative emotions	0.152	1.735	0.086
Cognitive component	0.263	2.882	0.005

assessment of satisfaction with educational attributes is also a significant predictor. The adjusted $R^2 = 0.395$ and $F(3, 100) = 23.402$, sig = 0.000. Further, while the t value for negative emotions is not significant at the 95 per cent confidence level, the result suggests that this is worthy of further investigation. When a further regression was run, using positive word of mouth as the dependent variable against the cognitive component only, the result confirmed that, in this study, positive emotions are a better predictor of positive word of mouth than the cognitive element. In particular, for the latter regression, the adjusted $R^2 = 0.260$ and $F(1, 104) = 37.855$, sig = 0.000.

In general then, if emotions were not included in the scale, and only the cognitive component used to measure satisfaction, a comprehensive illustration of satisfaction is not gained. Consequently, it is suggested that an emotional scale needs to be included as part of customer satisfaction measurement.

Implications of the study

The main theoretical implication of this study is that the emotional component of satisfaction, which has not been considered in some of the recent customer satisfaction studies, serves as a better predictor of loyalty than the cognitive component. In particular, positive emotions are positively associated with positive word of mouth and willingness to pay more, and negatively associated with switching behaviour. Similarly, negative emotions are negatively related to positive word of mouth and willingness to pay more, and positively associated with switching behaviour. However, as this study represents a relatively small sample in one industry, these results require further investigation and verification.

As there is a significant relationship between customer satisfaction (especially the emotional component) and customer loyalty, and based on the assumption that it is cheaper to retain existing customers than attract new customers (see Alford and Sherell, 1996), it appears that managers need to re-emphasise how customers "feel" about their experiences of service delivery. In particular, they should try to achieve some balance in their pursuit of satisfaction information. It seems feasible that, in endeavouring to adopt measurement practices that are scientific and rigorous, managers may not provide sufficient opportunity for comments with an affective base and, consequently, fail to recognise the power and importance of emotions. An obvious extension of this is that, in retaining or enhancing customer loyalty, organizations need to explore and, as far as possible, manage the emotional components.

Future research

It is suggested that expectations, perceived performance and/or satisfaction level shift over time (Patterson *et al.*, 1998; Peterson and Wilson, 1992). In this study, emotions in customer satisfaction were measured at one specific point in time and, hence, the result is only true for the time of completion of the questionnaire. As the delivery of higher education is an extended service

encounter, the endurance of loyalty resulting from satisfaction may be challenged (Oliver, 1999). Future longitudinal studies could explore this issue.

Demographic backgrounds also need to be considered. In particular, it is suggested that different cultural backgrounds may affect one's beliefs and behaviors (Hofstede, 1994; Winsted, 1997). That is, future research could compare the sample being studied based on their demographic backgrounds to see if the affective component still serves as a better predictor for customer loyalty.

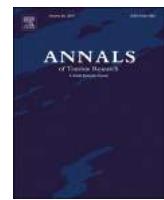
As in other satisfaction studies, there are still some methodological issues that need to be addressed. These include the use of bipolar construct questions, and positively skewed responses (Peterson and Wilson, 1992). Finally, there is a need to develop and refine the emotion scales. This provides scope for much interesting work.

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Disruptive innovation, innovation adoption and incumbent market value: The case of Airbnb



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ARTICLE INFO

Associate editor: Sara Dolnicar

Keywords:

Disruptive innovation
Innovation adoption
Market value
Incumbent response
Peer-to-peer lodging
Event study

ABSTRACT

The purpose of this article is to analyze the market value impact of actions taken in response to disruptive innovation; specifically, actions that incumbent lodging firms implement to adopt the innovation of peer-to-peer trading-based accommodation rental. As incumbent firms need to devise strategies to accommodate the disruption stemming from a new entrant with a disruptive business model, we analyze the differentiated efforts of four incumbent lodging firms to compete with the peer-to-peer lodging firm Airbnb. This study is the first to quantify the effects of innovation on incumbent tourism firms challenged by a disruptive entrant. It finds that adoption speeds, that is first vs. late adoption, make a difference as the former are awarded a significant increase in market value.

Introduction

While it is generally understood that disruptive innovation creates new offerings and at times new actors in the marketplace, research in tourism, hospitality and beyond often focuses on the disruptor and pays little attention to already existing firms in the marketplace. These existing firms, generally referred to as incumbents or incumbent firms, often survived in the market place by adopting or developing their own innovations to accommodate disruptions stemming from new market entrants, new technologies or changes in consumer behavior. For disruption triggered by information technology and resulting digital innovation, it was found that incumbent firms are best served by redefining their identity to incorporate changing beliefs in the market place and among stakeholders (Tripsas, 2009). Specifically, when faced with a disruptive business model based on a technology innovation, incumbent firms are left with two strategies to ward off the new entrant: strengthening the existing business model or adopting the new business model either exclusively, simultaneously with the existing business model or not at all (Osievskyy & Dewald, 2015). The choice among these strategies as a potential response is influenced by organizational and environmental settings and decisions prior to the experienced market disruption. Ultimately incumbent firms adopt these strategies with varying degrees of success: from decline to failure by succumbing to the new technology or business model to survival and even dominance following the disruption (Ahuja & Lampert, 2001; Hill & Rothaermel, 2003).

To measure the success of incumbents' elected strategy past studies assess performance in terms of sales revenue (Kim & Min, 2015) or productivity growth and patent counts (Aghion, Blundell, Griffith, Howitt, & Prantl, 2009). More generally innovation performance can also be measured by a firm's market value (e.g. Blundell, Griffith, & van Reenen, 1999; Sood & Tellis, 2009). For tourism, the measurement of innovation adoption has been challenging at the destination level as performance data is distributed across many destination stakeholders. At the firm level, however, Nicolau and Santa-María (2013) used firm market value to assess

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the impact of hotel innovation announcements. Assessing market value has the advantage of allowing for daily observations compared to annual or quarterly internal performance data such as sales revenue or productivity growth. The second advantage is that market value analysis forward looking whereas internal accounting measures look backward. In this study we use timestamped event data of incumbent firms to measure changes to their market value. Specifically, we are analyzing announcements of four incumbent lodging firms in their efforts to adopt peer-to-peer lodging introduced by Airbnb. Each of the four firms (Accor, Hyatt, Marriott and Wyndham) chose a different strategy at a different point in time. In fact, this study is, to the authors' best knowledge, not only the first study to assess the impact of Airbnb on incumbents' market value, but also the first to quantify the effects of incumbents' responses to disruptive innovation.

The purpose of this study is to learn if the stock market rewards incumbent firms in their efforts to adjust their business to "deal with" the increasing popularity of peer-to-peer trading (Volgger, Taplin, & Pforr, 2019). In tourism peer-to-peer trading started as the rental of individual rooms in private residences and is referred to as peer-to-peer lodging. Specifically, the aim of this study is to contribute to innovation and tourism literature by identifying differences among first and late moving incumbents and the effect of these various adoption speeds on firm market value.

Literature review

Innovation

Broadly defined, innovation is the creation or adoption of marketable new ideas (Daft, 1978; Damanpour & Schneider, 2006; Zaltman, Duncan, & Holbeck, 1973). On a more granular level, Schumpeter (1947) argues that an innovation consists of making use of an invention that is new to the market, while the adoption of something already existing, but new to an organization is an imitation (Rogers, 2003). Hence, an innovation can be new to the market or new to the adopting entity (Johannessen, Olsen, & Lumpkin, 2001; Mansfield, 1963). This property of innovation "newness", however, depends on the level of analysis: economists consider the industry level, while management scholars are concerned with the organizational level (Gopalakrishnan & Damanpour, 1997). For tourism research Peters and Pikkemaat (2005) argue that complex and networked characteristics of tourism require a clear focus both on the unit of interest and the innovation measurement (for example innovation intensity or success vs. failure). This study adopts the organizational level as it investigates how incumbent firms adopt an idea that is new to them and assesses the introduction or withdrawal of service offers to fend off peer-to-peer lodging competition on incumbent market value.

Newness can also be viewed as a dimension from incremental to radical (Nord & Tucker, 1986). Incremental innovation is a stepwise improvement of products, services and process and can result in efficiency improvements and error reductions (Clark & Fujimoto, 1991). Creating new knowledge, novel ideas and products, often through technological advancements, and commercializing them is referred to as radical innovation (Tushman & Anderson, 1986). Radical innovations, thus can result in starkly different new ways to produce or deliver products and services and alter the relationship between a firm and its customers. Christensen (1997) argues that while radical innovations can disrupt the market place, incremental innovations have the capacity for massive disruptions. This is attributed to incumbents overlooking small changes, especially when they appeal to a market segment currently not served while radical changes and their impact on current market segments are easier spotted. Disruptive innovations, thus, create new markets and challenge incumbents and disrupt the status quo of existing markets (Nagy, Schuessler, & Dubinsky, 2016).

A radical technology policy, as pursued by technology startups or startups relying heavily on technology, has a direct impact on the development of radical innovation (Ettlie, Bridges, & O'Keefe, 1984). Indeed, strategic orientation of the organization and fit with existing strategies, markets and resources are predictors of innovation output and success (de Brentani, 2001; Hitt, Hoskisson, & Hicheon, 1997). Organizations seeking diversification often end up with incremental innovations to expand their current markets while not alienating existing customers (Ettlie et al., 1984). Hence, in the case of peer-to-peer lodging it is thus not surprising that a technology-driven startup like Airbnb developed a disruptive innovation to provide lodging services not only differently than incumbent firms, but also catered to a market overlooked by existing lodging firms.

The disruptive force of peer-to-peer lodging is also reflected in Hjalager's (2002) tourism interpretation of the creative destruction of innovation model developed by Abernathy and Clark (1985). Peer-to-peer lodging in the United States is an architectural innovation as it, by definition disrupts existing production competences and creates new linkages in the market place: first, it produces overnight stays in private rooms or homes rather than in properties originally intended for lodging, and second, Tussyadiah (2016) found that it attracted individuals to the travel market that did not travel previously. Incumbent firms were innovators before the emergence of peer-to-peer accommodation. They developed niche and regular innovations; for example, new brands that combine or split existing services to cater to new customer segments (niche) or development of properties in geographic regions previously untapped. In either case, incumbents did not deviate from the traditional lodging model of allocating many guest rooms within branded properties, whereas peer-to-peer lodging is the opposite: one to few rooms in many residential properties.

Hence, while there is an important argument to understand peer-to-peer lodging through an innovation lens, tourism and hospitality research on peer-to-peer lodging and innovation to date is siloed. Studies on peer-to-peer lodging thus far mostly focus on understanding consumer choice or peer-to-peer properties (e.g. Prayag & Ozanne, 2018; Tussyadiah, 2016; Tussyadiah & Zach, 2017) or host decisions to accept guests (Karlsson, Kemperman, & Dolnicar, 2017). On the other hand, innovation studies help us understand three aspects of innovation: first, drivers of innovation such as human capital (Nieves, Quintana, & Osorio, 2014), and customer orientation and collaborative competence in hospitality (Ordanini & Parasuraman, 2011) and at destination marketing organizations (Zach, 2016). Second, the management of innovation processes at hospitality firms (Jones, 1996; Ottenbacher, 2007), the incorporation of partners (Cabiddu, Lui, & Piccoli, 2013; Zach & Hill, 2017), the use of policies to spur innovation (Rodríguez, Williams,

& Hall, 2014) and the successful innovation development at hotels (Ordanini & Maglio, 2009) and at destination marketing organizations (Zach, 2012). Third, the effects of innovation and innovation behavior on hotel performance (Mattsson & Orfila-Sintes, 2014; Ordanini & Maglio, 2009) and on small and medium sized tourism businesses in general (Martínez-Román, Tamayo, Gamero, & Romero, 2015). For publicly traded hospitality firms several studies measured the impact of innovation behavior on market value of select firms; for example, the effect of innovation announcements (Zach, Krizaj, & McTier, 2018) and innovation awards (Nicolau & Santa-María, 2013) for hospitality firms and the effect of localized innovations on tourism firms in general (Napierała & Szutowski, 2018).

Innovation adoption

Innovation adoption literature typically focuses on either the full adoption or the rejection of an innovation (Frambach & Schillewaert, 2002), as in the case of information technology adoption (Carlo, Lytinen, & Rose, 2012), and assumes that the adopters make full use of the innovation (Rogers, 2003) and commit to using it in perpetuity (Bhattacherjee, 1998). However, this dichotomous point of view ignores that firms might adopt an innovation with less intensity, for example that not all practices of total quality management are adopted (Ravichandran, 2000) or that a disruptive business model by a new entrant cannot be easily and fully replicated by the incumbent (Chesbrough, 2010). However, firm adoption of innovation, which is the decision to implement an innovation, is a process with sequential stages starting with the identification of an innovation. In its entirety it is “the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision” (Rogers, 2003, p. 20). Frambach and Schillewaert (2002) argue that the decision to adopt happens between becoming aware and forming an understanding of the innovation and the decision to purchase and make use of the innovation. The three main steps of pre-adoption, adoption decision and post-adoption (Damanpour & Schneider, 2006) are commonly known as initiation, adoption decision and implementation (Frambach & Schillewaert, 2002; Pierce & Delbecq, 1977; Rogers, 2003).

Innovation and business models

The adoption of new technologies goes beyond a simple purchasing and staff training process. The new technology itself has no value until it is realized in a commercial setting (Chesbrough, 2010) whereby each approach returns different results. In other words, the value of technology depends up on the business model employed by an incumbent firm to market it. Zott and Amit (2010) and Amit and Zott (2012) define a business model as interdependent system of activities that explains how to create and capture value from technology and other key resources. Business models are often defined for a specific entity, but can also extend to individuals and collective actors (Reinhold, Zach, & Krizaj, 2017), enabling service firms incorporate consumers and other stakeholders relevant to co-create their offerings (Beritelli, Reinhold, Laesser, & Bieger, 2015). As incumbent firms already employ a business model the injection of a new technology or equipment requires them to reassess their current business model to generate a new value proposition for their customers and stakeholders (Souto, 2015). To do so incumbent firms require both knowledge and capabilities to seize opportunities from an innovation (Teece, 2007).

Incumbent lodging firms employ a variety of business models, from operating hotels in leased or owned properties to franchising their brand names to third party operators. Individuals renting their properties as part of peer-to-peer trading can be the property owners or a professional management firm that leases such properties (Reinhold & Dolnicar, 2017a). A firm such as Airbnb, on the other hand, operates a multi-sided platform business model requiring multiple actors on either side (consumer or provider) and connects them (Reinhold & Dolnicar, 2017b); this is similar to hotel booking platforms such as Expedia. Hence, entering the peer-to-peer lodging market is a challenging proposition for incumbent lodging firms, as it is capitalizing on different value propositions and capabilities.

Innovation diffusion: first and second mover advantages

Innovation adoption does not take place at once, but is diffused over time (Reinganum, 1989; Rogers, 2003). Peer-to-peer lodging at individual rooms in private residences has been available in Europe for a long time; for example, “Private Zimmervermietung” (rental of private rooms) in Austria and Germany lacks a separation of private household and rental unit and were mostly rented based on word of mouth and often to repeat guests. Airbnb combined this type of rental of individual rooms and even pull-out sofas in living rooms with a large-scale internet-based distribution system. Although offline channels such as classifieds in print and unpaid channel such as Couchsurfing might also appear to be relevant, they have not had the same disruptive effect, and in addition, comprise platforms that are distinct from the paid and online Airbnb model (Dolnicar, 2019). This makes Airbnb the inventor of a distribution system for private rooms, which was its first type of offering at its conception in 2008. Incumbent lodging firms, thus, are potential adopters of this innovation.

The internet platforms required to enable peer-to-peer lodging at large scale require substantial resource investments and have uncertain benefits. As for many uncertain investments first movers bear these investment costs and risk to develop a sustained leadership in technology as costs fall with cumulative output (Lieberman & Montgomery, 1988). However, until the entrance of a second mover the first mover has a monopoly and an uncluttered marketspace (Kerin, Varadarajan, & Peterson, 1992). Business models that, such as peer-to-peer lodging, are built on network effects thus have an opportunity to develop a winner-takes-all situation to dominate the marketplace as each additional user makes the network more valuable and useful to all. While first movers

might have high rewards, second movers and late adopters can reduce risk by assessing first mover's innovation adoption in the marketplace. Second movers can benefit from several advantages: first, innovations lacking protection in the form of patents and copyright regulation can be freely copied (Dos Santos & Peffers, 1995). This applies to service innovations, especially in tourism where competitors often replicate market leaders. Second, through adoption the first mover reveals the value of the innovation due to the irreversibility of investment and thus informs competitors' adoption decision (Hoppe, 2000). In other words, competitors can choose to adopt after the first movers educated potential customers of the service need, delivered a proof of concept of the innovation or, in the best case, demonstrated the viability of the innovation in the marketplace. This creates a free-rider problem where competitors, even those that did not adopt, can wait to observe market demand after the first mover adopted (Jensen, 2003). Third, by catching up in big steps second movers can leapfrog the first mover without related sunk costs and risks (Fudenberg, Gilbert, Stiglitz, & Tirole, 1983). This suggests that incumbent lodging firms adopting the peer-to-peer lodging innovation early can reap benefits in the market place whereby those that adopt later can learn not only from innovator Airbnb, but also from the early adopting incumbents.

Incumbent firms respond to disruptive innovations that threaten the firms' existence in three different ways: carry on as usual, adopt the innovation quickly or adopt it later. Regardless of the decision, incumbents will either suffer from the disruption of the status quo of their market, in the worst case to the point that they falter, or they survive with or without adjustments and remain in the market (Ansari & Krop, 2012). Among incumbents the speed of adoption varies; however, so does research on the benefits of fast or slow adoption. In response to a technological innovation second movers can often develop from niche to mass market while the first mover is still occupied with learning both the technology and the field (Markides & Geroski, 2005). On the other hand, and more generally as a response to radical innovation, Hopkins (2003) found that incumbents with a slow aggressive response were better off than those that responded quickly. Hence, both speed and type of adoption response matter.

Methodology

We are employing an event study to measure the effect of relevant news items on the market value (defined as number of shares times the share price) of incumbent lodging firms. By relying on market value this methodology is a forward-looking performance metric that avoids the disadvantages of backward-looking accounting firm measures. Under the efficient hypothesis assumption, share prices show the actual value of future cash flows, which represents a good metric to gage the effect of innovation adoption actions on firm performance. Assuming this hypothesis, the portfolio theory postulates, for the case of this empirical application, that the impact of incumbent response on performance is estimated in an unbiased way. The impact is assessed on three different window lengths: one, two and three contiguous days before and after the event. Each window assesses all included days as an aggregate. We refrain from using longer windows as they may introduce the possibility of contamination. The relatively short windows we use for the present study allow us to be more confident that any effects we detect result from events of interest, and not from other, non-innovation related developments that affect firm performance over longer time horizons.

Accordingly, we start with the market model

$$R_{it} = \alpha_i + \beta_{1i}R_{mt} + \beta_{2i}R_{ht} + \varepsilon_{it} \quad (1)$$

where R_{it} is the return to shareholders from changes in market value for each firm i on day t , R_{mt} is the return for the market portfolio on day t , and R_{ht} is the return for the hotel industrial index on day t . The market portfolio used is the Standard & Poor's index of the 500 largest companies in the US (SP500). As for the industrial index, we use the Dow Jones Hotel and Lodging REITs Index for the US market (Hyatt, Marriott and Wyndham) and, because we are not aware of any similar hotel index specific to France (Accor), we create an index for the French market by factoring in the returns of all the hotels trading on Euronext Paris.

Note that in the literature of event studies, no control groups are used; rather, the general news items that occur in the market are controlled through the market portfolio. Controlling for events that happen to the industry the firm belongs to will certainly refine the analysis. Therefore, we are controlling for general factors and industry-specific factors. The fact that we find some significant and positive parameters related to the innovation news examined in the manuscript means that those firms beat both the market and the industry; in other words, no matter what types of news announcements are made on specific days (market-wise or industry-wise), those firms react more positively to innovation-related announcements than to other general and industry-specific announcements. Obviously, the reverse applies when the parameters are significant and negative.

We estimate a market model for each firm and apply Karafiath's (1988) methodology, so that a dummy variable x_t is introduced that takes value 1 on the day t the news item is released for the news type j : Note that Karafiath's (1988) method captures the excess returns (abnormal returns) by adding dummy variables to the right-hand side of the market model. The resulting parameter estimate capture those excess returns derived from shock that happen on the day the announcement is made. To be more specific, this author literally defines the parameter that accompanies the dummy variable as the "estimated coefficient on the dummy variable, or excess return to security j on observation t " (page 352).

$$R_{it} = \alpha_i + \beta_i R_{mt} + \beta_{2i} R_{ht} + \sum_{j=1}^J \gamma_j x_{jt} + \varepsilon_{it} \quad (2)$$

where γ_j reflects the effect of the news item j on the returns; accordingly, any potential abnormal returns will be captured by this coefficient. As the error term might be affected by kurtosis and heteroskedasticity, GARCH-family models are estimated. In particular, we use the symmetric models ARCH (Engle, 1982) and GARCH (Bollerslev, 1986), and the asymmetric models EGARCH (Nelson, 1991) and TGARCH (Glosten, Jagannathan, & Runkle, 1993; Zakoian, 1994). For the symmetric models, the impact of new

information on the variance does not depend on its sign. Thus, the ARCH(p) model brings about the following returns:

$$\varepsilon_{it} = h_{it}^{1/2} \eta_{it} \text{ and } \varepsilon_{it}/\varepsilon_{it-1}, \varepsilon_{it-2}, \dots \sim N(0, h_{it}) \text{ being}$$

$$\eta_{it} \text{ i. i. d. with } E(\eta_{it}) = 0 \text{ and } E(\eta_{it}^2) = 1$$

The conditional variance h_{it} is as follows:

$$h_{it} = c_i + \sum_{j=1}^p \lambda_{ij} \varepsilon_{it-j}^2 \quad (3)$$

where c_i and λ_{ij} are parameters to be estimated and p are the number of lags. A generalization of this model is obtained by the GARCH (p,q) models, where q is the number of lags of the autoregressive part, and the conditional variance is

$$h_{it} = c_i + \sum_{j=1}^p \lambda_{ij} \varepsilon_{it-j}^2 + \sum_{k=1}^q \gamma_{ik} h_{it-k} \quad (4)$$

Given that positive and negative news might affect differently the returns, other models exist to consider this potential asymmetry: the EGARCH (p,q) model. In this model, the conditional variance is defined as

$$h_{it} = \exp \left\{ c_i + \sum_{j=1}^p \left(\lambda_{ij} \left| \frac{\varepsilon_{it-j}}{h_{it-j}^{1/2}} \right| + \delta_{ij} \frac{\varepsilon_{it-j}}{h_{it-j}^{1/2}} \right) + \sum_{k=1}^q \gamma_{ik} \ln(h_{it-k}) \right\} \quad (5)$$

and the TGARCH (p,q) model, whose conditional variance is defined as follows:

$$h_{it} = c_i + \sum_{j=1}^p \lambda_{ij} \varepsilon_{it-j}^2 + \phi_i \varepsilon_{it-1}^2 D_{it-1} + \sum_{k=1}^q \gamma_{ik} h_{it-k} \quad (6)$$

where $D_{it-1} = 1$ if $\varepsilon_{it-1} < 0$ and $D_{it-1} = 0$ otherwise. Akaike's and Schwarz's Information Criteria are used to find the best model, which are defined as $AIC = -2\log(L_{ML})/M + 2k/M$ and $SIC = -2\log(L_{ML})/M + k\log(M)/M$, respectively, in which L_{ML} is the likelihood function, M is the sample size and k the number of coefficients estimated in the model. An Ordinary Least Squares model serves as the base line model to with the ARCH class models are compared to. These measures are based on the likelihood functions and use the number of parameters as a penalty, so that the best parsimonious model can be detected. The best goodness of fit is indicated by the lowest value.

Data

To observe the effects of incumbents' response to disruptive innovation on their market value we seized on the opportunity presented by the market entrance of Airbnb as a leading peer-to-peer lodging firm. Hence, Airbnb's approach to delivering lodging experiences is an external impetus for change. Specifically, we treat Airbnb's entrance into the lodging market as a disruptive innovation that forces existing firms to adapt not only to Airbnb and similar competitors, but also to consumer demands for personalized experiences (Tussyadiah, 2016), hybrid experiences that combine a home feeling with expectations of professional hospitality (Zhu, Cheng, Wang, Ma, & Jiang, 2019), and staying in a local home rather than a hotel (Karlsson et al., 2017).

The incumbent firms we analyzed were four lodging firms that since the entrance of Airbnb adopted the peer-to-peer lodging innovation by developing their own response to Airbnb or by partially or fully acquiring a peer-to-peer lodging startup: Accor, Hyatt, Marriott and Wyndham. For each firm we searched press releases and public disclosure forms for planned or implemented innovation adoptions of peer-to-peer lodging solutions from 2008 until including December 31st, 2018 (specifically, the common time frame of identified items for the sampled firms is January 1st, 2013 to December 31st, 2018). As incumbent firms pursue different announcement strategies it was not possible to exclusively use announcements of either planned or implemented innovations. The effect of each innovation adoption on return was measured with the first announcement towards the innovation and follow-up announcements towards the performance of that response. Table 1 shows the responses put in place by these four firms and the types of news these responses have been classified into. Most interestingly Accor and Hyatt initially invested into the same two startups Oasis and OneFineStay, but later on sold shared in one to settled on just one. Below is a brief description of events in alphabetical order of incumbent firms.

In 2016 **Accor** invested heavily in peer-to-peer lodging startups. First, it purchased 30% and 49% stakes in the Oasis and Squarebreak, respectively, fully acquired OneFineStay. Still in 2016 Accor launched the Jo & Joe hotel brand that promised to deliver an experience similar to Airbnb. With the acquisition of Travel Keys in 2017 Accor expanded its peer-to-peer lodging offers. All four external investments and acquisitions were in the upper class and luxury segment. Still in 2017 Accor first sold its stake in Oasis after it received a strategic investment from Hyatt, expanded OneFineStay across the US and Europe and consolidated its three remaining peer-to-peer investments under OneFineStay. In 2018 Accor announced major additions to OneFineStay, but also a write-off of US \$228 million.

Hyatt, in 2015, publicized an initial investment into OneFineStay dating back to 2014. When OneFineStay was fully purchased by Accor in 2016 Hyatt sold its shares and a year later made a strategic investment in Oasis, resulting in the divestment of Accor as mentioned above. In 2018 Hyatt added Oasis to its loyalty program, but was sold the same year to home rental firm Vacasa after

Table 1
Description of the news items.

Incumbent	Type of news	News item
ACCOR		
2/18/2016	TN _{ACCOR1}	30% stake in Oasis
2/18/2016	TN _{ACCOR1}	49% stake in Squarebreak
4/5/2016	TN _{ACCOR1}	OneFineStay acquisition
9/27/2016	TN _{ACCOR1}	Jo & Joe brand launch - similar to Airbnb
2/5/2017	TN _{ACCOR1}	Negotiations start to acquire Travel Keys
2/9/2017	TN _{ACCOR1}	Travel Keys acquisition announced
9/5/2018	TN _{ACCOR1}	OneFineStay major additions
9/12/2016	TN _{ACCOR2}	OneFineStay new CEO
2/15/2017	TN _{ACCOR3}	OneFineStay expanding to US and across Europe
7/26/2017	TN _{ACCOR4}	Announcement to finish consolidating Travel Keys, Squarebreak and OneFineStay under OneFineStay by end of year
7/26/2018	TN _{ACCOR5}	OneFineStay write-off \$228 million
HYATT		
5/21/2015	TN _{HYATT1}	Publicized investment into OneFineStay
11/3/2015	TN _{HYATT1}	OneFineStay is investment to learn
4/5/2016	TN _{HYATT1}	OneFineStay acquisition by Accor - Hyatt sells its shares
8/3/2017	TN _{HYATT1}	Oasis strategic minority investment
11/2/2017	TN _{HYATT1}	Oasis - only brief mentioning
2/15/2018	TN _{HYATT1}	Oasis - small investment to explore match with Hyatt portfolio
3/1/2018	TN _{HYATT2}	Add Oasis to Hyatt loyalty program
8/1/2018	TN _{HYATT3}	Oasis underperforming and 22 m write-off
10/2/2018	TN _{HYATT4}	Sale of Oasis to Vacasa
MARRIOTT		
4/23/2018	TN _{MARRIOTT1}	London pilot launch
5/9/2018	TN _{MARRIOTT1}	London pilot positive CEO comments
8/7/2018	TN _{MARRIOTT1}	London pilot positive CEO comments
11/6/2018	TN _{MARRIOTT1}	London pilot positive CEO comments
10/2/2018	TN _{MARRIOTT2}	London pilot expansion to Paris, Lisbon and Rome
WYNDHAM		
2/7/2014	TN _{WYNDHAM1}	HomeAway - used as a distribution channel
4/28/2015	TN _{WYNDHAM1}	HomeAway - global agreement and talks with others
7/31/2017	TN _{WYNDHAM1}	Love Home Swap acquisition

announcing Oasis underperformance and a US\$ 22 million write-off.

Among the studied firms **Marriott** was the last one to go head-to-head with peer-to-peer lodging services. As Airbnb evolved over time from the rental of individual rooms to full homes Marriott launched its own full home offerings as a pilot in London, United Kingdom in 2018. Later that same year Marriott announced an expansion of the pilot to Paris, France, Rome, Italy and Lisbon, Portugal.

Finally, **Wyndham** first used the home rental platform HomeAway for bookings from 2014 to 2015 and tested Airbnb in 2016 with little success. In 2017 it acquired peer-to-peer startup LoveHomeSwap.

Results

Table 2 shows the optimum model, that is the most parsimonious model, for each incumbent firm, where the numbers in bold represent the best fitting model. Accordingly, for Accor the TGARCH(1,1) is best, for Hyatt and Marriott EGARCH(1,1) and for Wyndham the ARCH(1) is optimum.

Table 3 presents the results derived from the effect of investing in peer-to-peer lodging-related responses on the market value of each of the incumbent firms analyzed. All six models show acceptable R-squared and adjusted R-squared measures, between 0.43 and 0.51.

For Accor only news related to the announcement to finish consolidating Travel Keys, Squarebreak and OneFineStay under OneFineStay by end of the year has significant results (TN_{ACCOR4}). However, the parameter is negative which means that shareholders perceived this news as not beneficial to the firm. All three different window lengths present robust results. For the type of news TN_{ACCOR1} we analyze the type itself (one parameter for all seven announcements) and each announcement (one parameter for each announcement), and find no significant reaction in any case.

The results for Hyatt show that positive and significant parameters for news related to the investing in peer-to-lodging (TN_{HYATT1}). All three different window lengths present robust results. As before, we analyze the individual effect of each announcement contained in the type TN_{HYATT1}, and obtain that the particular announcements bring out positive returns are “Oasis strategic minority investment” and “Oasis – only brief mentioning”.

For Marriott both types of news (TN_{MARRIOTT1} and TN_{MARRIOTT2}) related to the launch and expansion of its own version of peer-to-peer lodging, respectively, have negative and significant parameters. As before seen with Accor, this innovation is not perceived as

Table 2

Selection of the model specification.

ACCOR		HYATT	
AIC	SIC	AIC	SIC
OLS	-6.0167	-6.0097	-6.0952
ARCH(1)	-6.0214	-6.0075	-6.1541
ARCH(1,1)	-6.0555	-6.0381	-6.1722
TGARCH(1,1)	-6.0642	-6.0433	-6.1752
EGARCH(1,1)	-6.0583	-6.0409	-6.1799

MARRIOTT		WYNDHAM	
AIC	SIC	AIC	SIC
OLS	-6.2791	-6.2722	-6.1784
ARCH(1)	-6.2963	-6.2824	-6.1961
ARCH(1,1)	-6.3227	-6.3053	-6.1952
TGARCH(1,1)	-6.3214	-6.3006	-6.1945
EGARCH(1,1)	-6.3320	-6.3146	-6.1798

adequate by the firm's shareholders. All three different window lengths present robust results. Regarding the individual effects of the announcement type $TN_{MARRIOTT1}$, we find that the last two "London pilot positive CEO comments" cause the impact.

Wyndham, as in the previous case, has a negative and significant parameter for the announcement of its innovation adoption ($TN_{WYNDHAM1}$). All three different window lengths present robust results. Concerning the individual impacts, we see that the reaction is derived from the announcements "HomeAway - used as a distribution channel" and "HomeAway - global agreement and talks with others".

Among the incumbent lodging firms responding to industry disruption led by Airbnb, the analysis suggests that the strongest rewards are available to Hyatt, the earliest of adopters among incumbents. Hyatt's foray into the domain of peer-to-peer lodging, marked by its investment into luxury home rental enterprise OneFineStay in May 2015, followed by its continued peer-to-peer lodging related announcements, resulted in a significant increase in market value of Hyatt.

Discussion

Our analysis shows that incumbent firms, despite their familiarity with online booking platforms and rental of dedicated units, did not seize quickly on the peer-to-peer lodging market segment. Airbnb introduced the rental of full homes, an activity like vacation rentals, in 2009 when Hilton, Marriott and others managed or had investments in vacation rental businesses. However, the peer-to-peer approach of full rental units distributed across many properties rather than in purpose-built properties might have been a major hurdle for adoption. Nevertheless, the asset-light strategies pursued by incumbent lodging firms that are the separation of property management and property ownership to forgo investment into real estate. This would have suggested that a peer-to-peer lodging approach with no ownership beyond an online booking platform would have been desirable by incumbent lodging firms. Indeed, Marriott and Wyndham split of their timeshare vacation business into publicly traded companies in 2011 and 2017, respectively. Hilton pursued the asset-light strategy even more aggressively with its 2017 split into three separate publicly traded companies: property management Hilton Worldwide, asset ownership Park Hotels & Resorts and timeshare business Hilton Grand Vacations. Nevertheless, Hilton today is the only large US lodging firm that has not entered the peer-to-peer-like lodging market. It did, however, create TrueHotel as a new hotel brand to capture travelers attracted to peer-to-peer experiences. The divestment from vacation rentals can also explain why incumbent lodging firms did not engage the peer-to-peer lodging market from its 2008 start to 2014. In line with Christensen (1997) it appears the initial low-cost single room or pull-out sofa rental offerings catered to a market segment not appealing to incumbent lodging firms. However, from our data we cannot discern if the lack of appeal stems from timeshare divestment or the initial low-price market segment. Nevertheless, the product evolution and the increased appeal of peer-to-peer lodging eventually did catch the attention of incumbent firms.

Our results show that innovation adoption responses by incumbent lodging firms, except for Hyatt, were not rewarded by shareholders. While Wyndham was the first incumbent to jump on the peer-to-peer bandwagon by utilizing the Home Away platform to sell its inventory, Hyatt was the first to invest into peer-to-peer lodging. Hence, Wyndham's first move was to adding Home Away as another distribution channel and is thus not an innovation adoption. Hyatt, on the other hand, can be seen as the first second mover among incumbent lodging firm following the inventor and first mover Airbnb. Hyatt's investments into OneFineStay and Oasis were exposed to greater risk than later movers, but the positive effect on market value can be explained as a reward by shareholders for the anticipated return stemming from this investment as suggested by Hoppe (2000). On the other hand, Hyatt's integration of Oasis into its loyalty program was neither rewarded nor punished by the market. A possible explanation would be that this move was an effort to save the Oasis investment as it took place with a two year delay after the acquisition, but just months before devaluation and sale.

Table 3

Effect of sharing economy-related news on the hotel market value.

	Model 1A Window (-1,+1)		Model 1B Window (-1,+1)		Model 2A Window (-2,+2)		Model 2B Window (-2,+2)		Model 3A Window (-3,+3)		Model 3B Window (-3,+3)	
	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD
ACCOR												
Constant	-2E-05	2E-04	-2E-05	2E-04	-4E-05	2E-04	-4E-05	2E-04	-1E-05	3E-04	-4E-05	2E-04
CAC40 Index	0.723 ^a	0.027	0.724 ^a	0.027	0.723 ^a	0.027	0.724 ^a	0.027	0.719 ^b	0.027	0.719 ^a	0.027
Hotel industrial index	0.377 ^a	0.021	0.377 ^a	0.021	0.378 ^a	0.021	0.376 ^a	0.021	0.379 ^a	0.021	0.377 ^a	0.021
TN _{ACCOR1}	0.002	0.002			0.003	0.002			0.001	0.002		
TN _{ACCOR1.1}			0.018	0.016			0.016	0.011			0.012	0.006
TN _{ACCOR1.2}			-0.0002	0.004			0.001	0.004			0.003	0.004
TN _{ACCOR1.3}			-0.003	0.008			0.001	0.004			-0.0001	0.004
TN _{ACCOR1.4}			0.004	0.005			0.003	0.004			0.005	0.005
TN _{ACCOR1.5}			-0.003	0.008			-0.004	0.008			-0.009	0.010
TN _{ACCOR1.6}			0.004	0.003			0.003	0.003			-0.002	0.003
TN _{ACCOR1.7}			-0.001	0.006			0.001	0.005			0.002	0.005
TN _{ACCOR2}	-0.001	0.006	-0.005	0.015	0.001	0.005	-0.003	0.009	0.002	0.005	0.003	0.009
TN _{ACCOR3}	-0.005	0.015	-0.009	0.003	-0.004	0.009	-0.007	0.003	-0.001	0.006	-0.006	0.003
TN _{ACCOR4}	-0.009 ^b	0.003	-0.008 ^b	0.005	-0.007 ^c	0.003	-0.005 ^c	0.004	-0.006 ^d	0.003	-0.004	0.003
TN _{ACCOR5}	-0.008	0.005	0.018	0.016	-0.005	0.004	0.016	0.011	-0.004	0.003	0.012	0.006
R-squared	0.476		0.478		0.476		0.478		0.475		0.477	
Adjusted R-squared	0.473		0.474		0.473		0.474		0.472		0.473	
HYATT												
Constant	7E-07	2E-04	-4E-06	2E-04	5E-01	2E-04	-1E-05	2E-04	6E-07	2E-04	-8E-6	2E-04
SP500 Index	0.649 ^a	0.035	0.645 ^a	0.034	0.643 ^a	0.034	0.650 ^a	0.034	0.6393 ^a	0.035	0.651 ^a	0.034
Hotel industrial index	0.405 ^a	0.020	0.407 ^a	0.020	0.406 ^a	0.020	0.400 ^a	0.020	0.4076 ^a	0.020	0.401 ^a	0.020
TN _{HYatt1}	0.016 ^a	0.0009			0.012 ^a	0.0006			0.0124 ^a	0.0006		
TN _{HYatt1.1}			-0.002	0.009			-0.002	0.006			-0.002	0.006
TN _{HYatt1.2}			-0.004	0.004			0.004	0.004			0.003	0.004
TN _{HYatt1.3}			-0.005	0.011			-0.006	0.008			-0.002	0.005
TN _{HYatt1.4}			0.027 ^a	0.001			0.025 ^a	0.001			0.019 ^a	0.001
TN _{HYatt1.5}			0.023 ^a	0.002			0.018 ^a	0.002			0.018 ^a	0.002
TN _{HYatt1.6}			0.0004	0.005			0.002	0.003			0.003	0.003
TN _{Hyatt2}	0.005	0.013	0.005	0.013	-0.0008	0.006	0.005	0.013	-0.002	0.005	0.005	0.013
TN _{Hyatt3}	0.002	0.008	0.002	0.008	-0.003	0.006	0.002	0.008	-0.004	0.004	0.002	0.008
TN _{Hyatt4}	-0.010	0.022	-0.010	0.021	-0.007	0.006	-0.010	0.022	0.002	0.003	-0.010	0.022
R-squared	0.432		0.449		0.435		0.446		0.432		0.443	
Adjusted R-squared	0.430		0.445		0.433		0.442		0.430		0.439	
MARRIOTT												
Constant	5E-04 ^c	2E-04	6E-04 ^c	2E-04	5E-04 ^c	2E-04	5E-04 ^c	2E-04	5E-04 ^c	2E-04	6E-04 ^c	2E-04
SP500 Index	0.754 ^a	0.034	0.767 ^a	0.030	0.754 ^a	0.034	0.766 ^a	0.034	0.749 ^a	0.035	0.756 ^a	0.030
Hotel industrial index	0.368 ^a	0.020	0.354 ^a	0.017	0.367 ^a	0.020	0.359 ^a	0.021	0.371 ^a	0.020	0.354 ^a	0.017
TN _{MARRIOTT1}	-0.009 ^a	0.001			-0.006 ^a	0.001			-0.003 ^c	0.001		
TN _{MARRIOTT1.1}			0.004	0.019			0.002	0.017			0.002	0.008
TN _{MARRIOTT1.2}			-0.006	0.020			-0.001	0.003			-0.001	0.002
TN _{MARRIOTT1.3}			-0.015 ^a	0.003			-0.012 ^a	0.002			-0.008 ^a	0.002
TN _{MARRIOTT1.4}			-0.027 ^a	0.003			-0.011 ^a	0.003			0.005 ^c	0.002
TN _{MARRIOTT2}	-0.020 ^c	0.008	-0.018 ^c	0.008	-0.017	0.004	-0.020 ^c	0.008	-0.007 ^c	0.003	-0.018 ^c	0.008
R-squared	0.509		0.514		0.507		0.509		0.503		0.504	
Adjusted R-squared	0.508		0.512		0.505		0.507		0.502		0.502	
WYNDHAM												
Constant	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04
SP500 Index	0.767 ^a	0.047	0.768 ^a	0.047	0.765 ^a	0.047	0.768 ^a	0.047	0.766 ^a	0.047	0.766 ^a	0.047
Hotel industrial index	0.337 ^a	0.026	0.337 ^a	0.026	0.338 ^a	0.026	0.337 ^a	0.026	0.338 ^a	0.026	0.337 ^a	0.026
TN _{WYNDHAM1}	-0.007 ^a	0.001			-0.006 ^a	0.001			-0.0039 ^c	0.0018		
TN _{WYNDHAM1.1}			-0.006 ^c	0.002			-0.009 ^b	0.003			-0.003 ^d	0.002
TN _{WYNDHAM1.2}			-0.018 ^a	0.003			-0.009 ^a	0.002			-0.006 ^c	0.002
TN _{WYNDHAM1.3}			0.001	0.010			-0.002	0.005			-0.0025	0.0052
R-squared	0.4364		0.4383		0.4366		0.4368		0.4358		0.4360	
Adjusted R-squared	0.4352		0.4362		0.4353		0.4347		0.4345		0.4338	

^a $p < 0.001$.^b $p < 0.01$.^c $p < 0.05$.

^d $p < 0.10$.

Theory suggests that later adopters such as Accor, Marriott and Wyndham would be rewarded for their investments (Fudenberg et al., 1983; Jensen, 2003) as they had the opportunity to observe and learn from Hyatt's integration of a peer-to-peer-like lodging producing into a traditional lodging firm. Our results, however, found the opposite. That is, all incumbents that invested into peer-to-peer lodging offerings after Hyatt were punished by the stock market for these investments. As market value is nothing else than the value an investor puts on all future cash flows it appears that investors in all studied firms except Hyatt did not believe that these investments aid in the future success of the firm. Indeed, despite investments similar to Hyatt both Accor and Wyndham saw negative returns. It is even more striking that their investments were not rewarded even before Hyatt reported a poor performance on its investments. Since we analyzed market portfolios, we have to assume that the Hyatt firm structure and strategies were more appealing to investors. It is also possible that investors believed that due network effects only one incumbent firm can successfully compete with dominant Airbnb. Unfortunately, our data does not reveal these details. Similarly, this lack of reward was found for Marriott's approach to partnership versus acquisition, thus reducing its investment and pursuing an asset-light approach before write-offs and underperformance were reported by Accor and Hyatt. However, timing might be an issue as although the stock market reflects investor assessment of future cash flows, investors may adopt a wait and see approach in which abnormal returns may not be generated in the investigated window. These results are intriguing as past research suggests rewards for these later adopters given that first movers and other early adopters took the risk and investment to test for market viability (Hoppe, 2000; Lieberman & Montgomery, 1988).

There are several potential explanations for this lack of reward. New technologies challenge existing processes, resources and assets and can make them obsolete. Hobijn and Jovanovic (2001) argue that capital disappears from the stock market and incumbent firms to be reallocated to new, private firms until they enter the stock market at a later point. Second, contextual explanations are that Accor's investments in and acquisitions of multiple startups while simultaneously launching a new hotel brand aimed at peer-to-peer customers might have raised concerns of a lack of focus to respond to the peer-to-peer market. Indeed, even the consolidation of acquired startups yielded a statistically significant negative effect on market value. As hotel firms engage in many avenues to secure future success there might be an overlap of firm actions beyond innovation adoption that affect market value. Marriott, on the other hand, might have been punished for being the first client of its partner firm Hostmaker and for locating its investment into the European markets where peer-to-peer products at the time of the Marriott launch already faced stronger legislative and political opposition compared to the United States. It is important to note, that the controversy created by peer-to-peer trading has been responded differently through distinct regulations across countries (Grimmer, Vorobjovas-Pinta, & Massey, 2019).

Innovation announcements or the announcement of innovation adoption are connected with portraying a firm as a pioneer in the field while simultaneously positioning the new product for the most profitable clientele (Urban, Carter, Gaskin, & Mucha, 1986). Hence, such announcements are a positive message for investors (Chaney, Devinney, & Winer, 1991). For our data this holds only for Hyatt as the first adopter among incumbents in 2015 while similar investments by Accor in 2016, Marriott in 2018 and Wyndham in 2017 were too late with their investments potentially being seen as "me too" innovation adoptions. Indeed, a negative effect of innovation announcements on market value, especially for announcements related to marketing innovations as well as opening of new properties and entering new geographic markets has been found by Zach et al. (2018). While our study differs from Zach et al. (2018) it provides further evidence of a lack of appreciation of innovation adoptions in tourism and hospitality. Furthermore, Subramani and Walden (2001) found that announcements of introducing e-commerce solutions benefitted providers of tangible goods more than providers of digital goods whereby the latter had mostly positive effects. The mostly negative effects of intangible goods, such as lodging services, thus are a category. Finally, the stock market respond promptly to innovation announcements as for all statistically significant types of announcements the ± 1 day window lengths was always significant, thus supporting prior findings on the effect of innovations on market value (Sood & Tellis, 2009).

Conclusion

The goal of our study was to extend research on the effects of incumbent firms' innovation adoption actions in response to disruptive innovation to tourism research. The market entrance of Airbnb and the subsequent responses by incumbent lodging firms provided a unique opportunity to better understand disruption in the tourism marketplace. The findings of our research confirm expectations only for the first incumbent entering the newly created market, whereas later adopters saw negative effects of their responses on market value. All responses by incumbents after the first one resulted in negative impacts on market value. Investors and other shareholders, thus, do not reward efforts by these later adopting incumbent lodging providers. This contradiction to findings from studies on other industries and the confirmation of similar findings from other tourism and hospitality studies suggests that lodging providers are treated differently. Our study adds to a better understanding of market value effects of different categories of businesses, that is tangible, intangible and digital goods. As such, our study contributes to innovation and tourism literature, specifically on the issue of speed of second movers to reap a positive impact on market value.

Implications

Our findings provide strong evidence that lodging firms need to act fast in their efforts to adopt disruptive tourism innovations. The lack of reward for later movers suggests that the stock market did not value incumbents' investments at the time of investment, possibly due to concerns about returns on that investment or regulatory issues, while Airbnb as a startup funded with venture capital

has the benefit to try and test its products despite headwinds from local governments and citizens. Incumbent actions avoided breaking or disregarding rules and regulations, which suggests that their diligence added to their response time. This again suggests that incumbent lodging firms need to allocate more resources to act faster.

Limitations and future research

The dataset of publicly traded lodging firms engaging in the peer-to-peer market is very limited. Future studies should investigate other innovations and triggered innovation adoption decisions that apply to many, if not all, publicly traded tourism and hospitality firms. Next, incumbent investments are at the longest 4 years old, which at this point do not warrant a long-term analysis of their innovation adoption decision. Indeed, innovative late adopters can outperform pioneers and non-innovative late adopters (Shankar, Carpenter, & Krishnamurthi, 1998). Thus, of particular interest is Marriott actions to develop its own peer-to-peer solution with a partner compared to the acquisition of existing startups. Also, in this study we have drawn conclusions at the parent-company level. A parent company like Hyatt or Marriott consists of several diversified brands of hotels. Hajibaba and Dolnicar (2017) suggest that specific characteristics, such as whether the hotel is high-end or not influences the extent to which a hotel is affected by the growth of peer-to-peer accommodation networks, and therefore determines the hotel's response. Additional research using alternative methodologies that can detect property or brand level impacts of peer-to-peer trading-related innovation is therefore needed. Also, our analysis of incumbent market value does not provide insights into how into the internal processes of incumbents to develop their responses. Additional research on firm and specifically leadership rationale of the adoption of disruptive innovation is needed to understand firm motives related to adoption and adoption speed.

Finally, it is important to note that the news items about peer-to-peer innovation adoption mostly depict business expansions which very often lead to positive momentum in market value. Deriving the innovation adoption component in those announcements is not always feasible. To ascertain whether "innovation adoption" or "expansion" is the cause of the reactions found would imply using a sample of "pure" innovation adoption-related news and a sample of "pure" expansion non-innovation adoption-related news. The literature has proven that both types of announcements have an effect on the market value (for the former see Nicolau and Santa-Maria (2013) who find positive effects, and for the former see Nicolau (2002) who also finds positive impacts). What we can say is that, regardless of whether the peer-to-peer announcements are innovation adoption- or expansion-related news, the methodology seems to capture potential reactions. What is more, the fact that some announcements do not bring about any reaction and some even cause negative reactions, means that innovation adoption (or expansion) in the context of peer-to-peer economy do not necessarily follow the patterns of the positive impacts found in the literature.

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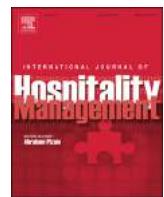
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Exploring Airbnb service quality attributes and their asymmetric effects on customer satisfaction

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ARTICLE INFO

Keywords:

Airbnb
Service quality
Customer satisfaction
Mixed method
Impact range performance analysis
Impact asymmetry analysis

ABSTRACT

With the rise of the sharing economy, Airbnb has become the predominant example of the online peer-to-peer accommodation market in the hospitality industry. This study adopts a mixed method approach to systematically and comprehensively capture various service aspects of Airbnb. Two main studies are conducted to identify key service quality (SQ) attributes of Airbnb, verify the dimensionality of the SQ attributes, and examine the effects of these attributes on customer satisfaction (CS). The first qualitative study generated a list of SQ attributes by collecting and analyzing 16,430 online reviews. In the second study, online survey ($N = 322$) is conducted to identify multiple dimensions of SQ attributes and examine their asymmetric effects on CS using impact-range performance analysis and impact asymmetry analysis. Findings suggest that Airbnb has multiple SQ attributes associated with website, host, and facility that produce distinctive effects on CS.

1. Introduction

The development of media technology has led to the flourishing of the sharing economy (Belk, 2014; Botsman and Rogers, 2010; Zervas et al., 2017). Through collaborative renting, borrowing, or sharing ownership, the sharing economy refers to peer-to-peer platforms of using underutilized or surplus personal assets to achieve monetary gains (Zervas et al., 2017). As the Internet and Web 2.0 technologies have expedited and accelerated peer-to-peer transactions online (Ert et al., 2016), more than 2.7 million people in the United States seek business opportunities by sharing goods and services (Roberts, 2016).

The sharing economy has been rapidly growing in the lodging industry by providing low-cost accommodations and a home-like environment, and direct interactions with the local community (Guttentag, 2016). Although Airbnb is the predominant example of peer-to-peer accommodation market, other Airbnb competitors, including HomeAway, HouseTrip, and FlipKey, share the peer-to-peer accommodation market by focusing on vacation rental customers (Guttentag, 2015; Guttentag and Smith, 2017). Founded in 2008, Airbnb is an online intermediary platform that connects hosts and guests by sharing part or all of homes as rental properties for short stays. According to Quinby (2016), with gross bookings of approximately \$7.5 billion in 2015, Airbnb has become the third largest online accommodation seller, whereas Expedia and Priceline rank first and

second, respectively. Gallagher (2017) states that Airbnb is expected to make a profit of \$3.5 billion (versus \$100 million in 2016) per year on \$8.5 billion (versus \$1.7 billion in 2016) in revenues by 2020, projecting 3400% profit growth. The market valuation of \$30 billion ranks Airbnb as the second most valuable online travel agency behind Priceline and ahead of Expedia, TripAdvisor, and Ctrip (Quinby, 2016). Airbnb aims to be the first online travel agency to reach a market valuation of \$100 billion. This aim is noteworthy given that the Marriott and Hilton groups have a combined market capitalization of \$53 billion (Gallagher, 2017).

Recent studies have investigated this online mechanism of sharing accommodation in terms of the effect of Airbnb businesses on hotels targeting the same geographical market segment (Zervas et al., 2017); issues of legislation, regulation, and taxation (Allen and Berg, 2014; Cohen and Sundararajan, 2015; Guttentag, 2015; Koopman et al., 2015); and decision making of consumers (Ert et al., 2016; Guttentag, 2016; Yang and Ahn, 2016). As the role of Airbnb is increasingly important in the hospitality industry, the company's service quality (SQ) attributes are reflected in the hospitality and tourism literature. For example, Airbnb manages a website and a mobile application where hosts can introduce their homes (part or whole) as rental properties, and guests can post reviews to share their stay experiences (Guttentag, 2015). An online review of guest experience is critical to the Airbnb business together with price, amenities, and authenticity because SQ

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Table 1
Overview of service quality models.

Offline Service quality model	SERVQUAL (Parasuraman et al., 1988)	SERPERF (Cronin and Taylor, 1992)	SERVQUAL in hospitality industry (Saleh and Ryan, 1991)	LQI (Getty and Getty, 2003)
Dimensions	<ul style="list-style-type: none"> ● Tangibles ● Responsiveness ● Reliability ● Assurance ● Empathy 	<ul style="list-style-type: none"> ● Physical service environment quality ● Interaction quality ● Outcome quality 	<ul style="list-style-type: none"> ● Tangibles ● Reassurance ● Avoiding sarcasm ● Empathy ● Conviviality 	<ul style="list-style-type: none"> ● Tangibility ● Responsiveness ● Confidence ● Communication ● Reliability
Online Service quality model	<p>SITEQUAL (Yoo and Donthu, 2001)</p> <ul style="list-style-type: none"> ● Competitive value ● Product quality assurance ● Clarity of ordering ● Ease of use ● Aesthetic design ● Processing speed ● Security ● Corporate and brand equity ● Product uniqueness 	<p>WebQual (Loiacono et al., 2002)</p> <ul style="list-style-type: none"> ● Online completeness ● Response time ● Trust ● Tailored communications ● Ease of understanding ● Intuitive operations ● Visual appeal ● Innovativeness ● Emotional appeal ● Consistent image ● Information fit-to-task ● Relative advantage 	<p>E-S-QUAL (Parasuraman et al., 2005)</p> <ul style="list-style-type: none"> ● Efficiency ● Fulfillment ● System availability ● Privacy 	<p>E-RecS-QUAL (Parasuraman et al., 2005)</p> <ul style="list-style-type: none"> ● Responsiveness ● Compensation ● Contact
Dimensions				

attributes are associated with the online platform (e.g., website design and usability) (Guttentag, 2015). Guttentag and Smith (2017) also assess Airbnb performance expectations relative to hotels using SQ attributes, such as cleanliness, security, authenticity, uniqueness, and price. In addition, Wang and Nicolau (2017) adopt SQ attributes in five domains (host, site and property, facility and service, rental rules, and online review score) to examine Airbnb price determinants.

The aforementioned papers serve as useful references to understand Airbnb SQ attributes. However, SQ attributes of Airbnb vary with the extant studies and are not rigorously developed and validated in the extant literature. Limited research has been conducted to examine the asymmetric effect of SQ attributes on customer satisfaction. An understanding of the asymmetric effect provides researchers with insights into the dynamic nature of attributes that symmetric linear effect cannot identify (Anderson et al., 2004; Kano, 1984; Mikulic and Prebezac, 2008; Oliver, 1997). Understanding of the asymmetrical and nonlinear relationship between attribute–performance and overall satisfaction is lacking, thereby inhibiting Airbnb operators from identifying SQ attributes that affect CS or customer dissatisfaction based on Kano's three-factor theory (Cadotte and Turgeon, 1988; Kano, 1984; Oliver, 1997).

Therefore, the main purpose of this study is threefold: 1) to identify and validate key SQ attributes of Airbnb, 2) to verify the dimensionality of SQ attributes, and 3) to examine the asymmetric effects of SQ attributes on satisfaction. This study adopted a mixed method with two main studies to systematically and comprehensively capture various service aspects of Airbnb. The first study conducted content analysis and generated a list of SQ attributes by collecting and analyzing qualitative data (online reviews). In the second study, an online survey was conducted to identify and validate SQ attributes and multiple dimensions and examine their asymmetric effects on satisfaction using impact–range performance analysis (IRPA) and impact asymmetry analysis (IAA).

2. Literature review

2.1. Key service quality attributes in Airbnb

Many researchers have attempted to conceptualize SQ as customers' subjective perception and identify key factors that determine what is considered good service. Identifying key SQ attributes is important because customers have certain standards regarding SQ attributes, and

their absence negatively influences customers' perceived SQ (Mersha and Adlakha, 1992). Correctly identifying key SQ attributes that customers value the most is also crucial to increasing CS. In their seminal work on SQ, Parasuraman et al. (1985) articulated five dimensions of SQ (tangibles, reliability, responsiveness, assurance, and empathy) in the SERVQUAL model. Cronin and Taylor (1992) claimed that performance is an important factor when measuring SQ and argued that their performance-based model (SERPERF) is more reliable in measuring SQ than SERVQUAL. Three dimensions of SERPERF were further developed later by Brady and Cronin (2001) as interaction quality, physical service environment, and outcome quality.

SQ models have been empirically tested and mortified in many hospitality settings. For example, Saleh and Ryan (1991) implemented SERVQUAL in the hospitality context and identified various dimensions to the original model, which are conviviality, tangibles, reassurance, avoidance of sarcasm, and empathy. Considering the five dimensions of SERVQUAL, Getty and Getty (2003) developed the lodging quality index (LQI) to measure five SQ dimensions in the lodging industry: tangibility, reliability, responsiveness, confidence, and communication.

In the context of e-commerce and online platform, the dimensionality of SQ is fundamentally different from that in offline settings. Several researchers have developed SQ models in the context of online service platforms or web interfaces (e.g., Yoo and Donthu, 2001; Loiacono et al., 2002; Parasuraman et al., 2005). Yoo and Donthu (2001) developed SITEQUAL to measure customers' perception of multiple online SQ attributes: competitive value, clarity of ordering, corporate and brand equity, product uniqueness, product quality assurance, ease of use, aesthetic design, processing speed, and security. Similarly, Loiacono et al. (2002) developed WebQual to measure the following website SQ attributes: information fit-to-task, tailored communications, trust, response time, ease of understanding, intuitive operations, visual appeal, innovativeness, emotional appeal, consistent image, online completeness, and relative advantage. In their study on e-commerce SQ, Parasuraman et al. (2005) developed E-S-SUQL to measure electronic SQ with four dimensions (efficiency, fulfillment, system availability, and privacy) and E-RecS-QUAL to measure three dimensions (responsiveness, compensation, and contact) of electronic SQ recovery. E-S-QUAL and E-RecS-QUAL are used in this study to measure website responsiveness and efficiency. Table 1 summarizes SQ models applied in online and offline settings.

To articulate the SQ attributes of Airbnb, reflecting on its unique service environments of the sharing economy and peer-to-peer

Table 2
Overview of service attributes that appeared in previous studies on sharing economy and peer-to-peer (P2P) marketplace.

Author(s)	Year Published	Research Setting	Potential Service-related Attributes	Implications
Yannopoulou, Moutahim, & Bian	2013	Couchsurfing and Airbnb	Diversity, meaningful interpersonal exchange, friendship, access to private space, and authenticity	Identifying identity construction and visual representation of user-generated brands
Jia, Cegleski, & Zhang	2014	Taobao (P2P e-commerce)	Trust in intermediary and online sellers, seller performance, information quality, and service quality	Information quality, service quality → trust and CS
Guttentag	2015	Airbnb	Disruptive innovation theory (more people trying because it is new)	Now has some impact on an existing market, but will not displace the market
Ert, Fleischer, & Magen	2016	Airbnb	Visual-based trust (photo of hosts), facility condition (accommodation size, type, and location)	Visual-based trust → purchase decision
Yang & Alm	2016	Airbnb	Economic benefit, enjoyment, reputation, sustainability, regulation policy, and security	Enjoyment and reputation → significant antecedents of attitudes toward Airbnb
Guttentag & Smith	2017	Airbnb	Cleanliness, security, authenticity, uniqueness, and price Assurance, tangibles, convenience, understanding, and caring	SQ → performance expectations
Priporas, Stylos, Vedanthachari, & Santivivatana	2017	Airbnb	Host, site, property, facility and service, rental rules, and online review score	SQ → CS and loyalty
Wang & Nicolau	2017	Airbnb	Trust, platform (system), benefit, and cost (price)	SQ as rental price determinants
Zervas, Proserpio, & Byers	2017	Airbnb	Hedonic value, utilitarian value	P2P market → long-term effect on diversity of goods offered and consumed
Lee & Kim	2018	Airbnb	Transaction experience, accommodation experience	Hedonic value and utilitarian value → CS and loyalty
Liang, Choi, & Joppe	2018	Airbnb	Hospitality hosting behavior, service quality, perceived risk reduction, social authentic appeal, and economic appeal	Transaction and accommodation experiences construct satisfaction, which lead to trust in Airbnb and host. SQ, social, and authentic experiences → loyalty
Lalicic & Weismayer	2018	Airbnb		

marketplace is important. Airbnb's business model is based on utilizing online platform to connect hosts and guests and generating profit by receiving guest service fees. Thus, the Airbnb website acts as a key service platform on which key SQ attributes are simultaneously consumed and assessed by guests. In the process of Airbnb stay, guests would be involved in at least three experiential components: the Airbnb website (or mobile application), host, and accommodation facility. For instance, guests must visit and browse the Airbnb website to determine accommodation alternatives and pay for accommodations. Many services associated with the website, such as interface design, security, ease of use, and responsiveness, would constitute the website SQ of Airbnb. The host plays an important role of interacting with guests during their Airbnb stay (e.g., check-in-and-out process and problem solving). The accommodation facility provided by the host is considered a key service quality dimension in Airbnb as a main product for an overnight stay.

A systematic literature review was conducted to identify potential SQ attributes in the context of the sharing economy and peer-to-peer online market (see Table 2). Several service-related attributes, such as friendship (Yannopoulou et al., 2013), photo of hosts (Ert et al., 2016; Wang and Nicolau, 2017), understanding and caring (Priporas et al., 2017), and hospitality hosting behavior (Lalicic and Weismayer, 2018), are associated with the host. A set of SQ attributes, including facility condition (Ert et al., 2016; Guttentag and Smith, 2017), accommodation experience (Liang et al., 2018), and tangibles (Priporas et al., 2017) are associated with accommodation facility. Several SQ attributes such as information quality/trust in intermediary (Jia et al., 2014), platform (Zervas et al., 2017), and transaction experience (Liang et al., 2018) are associated with the website or platform.

Airbnb SQ has not been studied to capture both online and offline experiences and may possibly have multiple dimensions. However, qualitative investigations are required to understand its uniqueness and apply pre-established SQ models. Empirically testing the dimensions of SQ attributes is critical as well.

2.2. Asymmetric effects of SQ attributes on customer satisfaction

Researchers have conceptualized that CS is a feeling of pleasure or disappointment as an outcome of consumers' perceived performance compared with expectation (Kotler et al., 2015; Oliver, 1980). According to the expectation-disconfirmation theory of CS by Oliver (1980), when performance is perceived higher than expectation, a positive disconfirmation occurs; otherwise, the condition results in a negative disconfirmation. Although many studies have investigated key attributes influencing CS in e-commerce (e.g., Gefen, 2000; Jia et al., 2014; Tan and Sutherland, 2004), limited studies have been conducted in the context of the online peer-to-peer accommodation market. Airbnb features similarities with other e-commerce entities but also contains distinctive characteristics, which produce possible non-traditional SQ attributes. Recent studies have supported the effects of overall SQ (Lalicic and Weismayer, 2018; Priporas et al., 2017) and perceived hedonic and utilitarian values (Lee and Kim, 2018) on CS. However, no study has integrated both online and offline experiences into the Airbnb SQ model and examined the effects of multiple SQ attributes on CS.

The Airbnb literature tends to overlook the asymmetric effects of SQ attributes on satisfaction although the asymmetric effect of these attributes on satisfaction are empirically reported in the business literature (Anderson and Mittal, 2000; Mittal et al., 1998; Oliver, 1997; Streukens and Ruyter, 2004). Streukens and Ruyter (2004) advocate that ignoring the asymmetric relationships between attributes and satisfaction may cause model misspecification and poor predictive power.

The asymmetric effects of SQ attributes on satisfaction are evidenced by three-factor theory by which attributes are classified into dissatisfiers, satisfiers, and hybrids (Anderson et al., 2004; Back, 2012; Deng, 2007; Kano, 1984; Mikulic and Prebezac, 2008; Oliver, 1997). To reflect the nature of asymmetric effect, for example, Oliver (1997)

Table 3
Statistics of collected Airbnb reviews.

	# of Listings	%	# of Reviews	%	Property Type	
San Francisco	34	33%	5974	36%	Private Room	
New York	26	25%	4009	24%	Entire Home/APT	
Chicago	23	22%	3358	20%	Shared Room	
Miami	20	19%	3088	19%		4
Total	103	100%	16,430	100%		2
						0
						2
						8

Price	Overall Rating	Detailed Rating				Value
		Accuracy	Communication	Cleanliness	Location	
Minimum	\$24	4.0	4.5	3.5	3.5	4.5
Maximum	\$133	5.0	5.0	5.0	5.0	5.0
Mean	\$66	4.7	4.8	4.7	4.6	4.7
Median	\$59	4.5	5.0	5.0	4.5	4.5
Mode	\$55	5.0	5.0	5.0	4.5	4.5

conceptualizes attributes as three categories: bivalent satisfiers, monovalent dissatisfiers, and monovalent satisfiers. Bivalent satisfiers (hybrid attributes) trigger satisfaction or dissatisfaction depending on a level of attribute performance. Monovalent dissatisfiers (must-be attributes) cause dissatisfaction when the attributes are not available. However, although the attributes are supplied, satisfaction does not necessarily occur because individuals take the attributes for granted. Monovalent satisfiers (value-added and delighted attributes) induce a high level of satisfaction when provided and do not cause dissatisfaction even when not available because people do not usually expect the attributes. In line with the abovementioned categories, this study adopts the following asymmetric domains using IRPA and IAA:

- Dissatisfiers and frustrators (must-be attributes) exhibit negative asymmetric effect. Dissatisfiers give rise to dissatisfaction when not provided. Frustrators are considered as severe dissatisfiers that induce a feeling of frustration (an extreme dissatisfaction) if not available. Given that individuals take must-be attributes for granted, the dissatisfiers and frustrators do not cause satisfaction even when the attributes are present.
- Hybrids that display symmetric effect trigger satisfaction when the attributes are supplied but evoke dissatisfaction when not present.
- Satisfiers and delighters (value-added attributes) generate a positive asymmetric effect. Satisfiers lead to satisfaction when the attributes are given. Delighters are deemed as a high level of satisfiers; thus, individuals are delighted when the attributes are available. As satisfiers and delighters are not generally expected, the attributes do not induce dissatisfaction even when not available.

Furthermore, as Back (2012) stressed the importance of assessment of the relationship between the attribute–performance scores and three categories for developing CS (i.e., dissatisfier, satisfier, and hybrids), investigating the role of each category of SQ attributes is critical. For example, an attribute categorized as a frustrator (e.g., ease of navigation) would have a greater influence on customer dissatisfaction in low-level rather than high-level performance issues.

3. Study 1

To articulate SQ attributes of Airbnb and examine its asymmetric effect on CS, this study adopted a mixed method using both qualitative and quantitative approaches. In Study 1, qualitative data (online reviews) were collected and analyzed to identify key SQ attributes and customers' emotional responses to them.

3.1. Methodology of study 1

3.1.1. Review data collection

Four major US cities with the most Airbnb property rental listings were selected as follows: Miami, New York, San Francisco, and Chicago (Airbnb.com, 2017). ParseHub was used to scrap data from the Airbnb webpages of the four cities from January 10 to 13, 2017. This study included Airbnb listings with price range between \$20 and \$150 (based on the rate on February 1, 2017) and with 100 and more reviews. The set of listings that appeared first when selecting one of four cities was collected because the Airbnb website automatically updates as users change geographic location displayed on the map. A total of 16,430 online reviews containing more than 800,000 words were collected and stored in TXT format.

3.1.2. Content analysis of online reviews

Consumer feedback, including online reviews, have been utilized as a source for measuring company performance and understanding customer needs and wants (Yang and Fang, 2004). Xiang et al. (2015) also suggested that utilizing big data and text analysis provides an improved understanding of guest experience and CS in hospitality. The collected

raw text data were examined, and the frequency and co-occurrence of words were analyzed using QDA Miner 5.

3.1.3. Sentiment analysis

Negative, neutral, and positive guest emotions associated with SQ attributes were examined using SentiStrength (see Appendix A). SentiStrength is a dual sentiment (positive and negative) strength scoring system that produces an optimal level of near-human accuracy when analyzing general short social web texts (Thelwall, 2013). Nielsen (2011) found that SentiStrength has the overall best performance over other software programs in terms of the correlation between the results of sentiment analysis conducted by computerized programs and humans hired through Amazon Mechanical Turk (MTurk).

3.2. Findings of study 1

A total of 16,430 reviews from 103 Airbnb listings in four major cities were collected. The average number of reviews per listing was 160, and the average number of words per review was 53. As shown in Table 3, San Francisco had the largest number of listings, whereas Miami had the smallest. Private room was the most common property type, followed by entire home/house. The overall ratings in Airbnb reviews had a mean score of 4.7 out of 5.0, which is highly positive.

3.2.1. Content analysis

To conduct content analysis, the collected review data were refined first. For example, hosts' names were frequently mentioned in reviews, and actual names were replaced with "host" (single name) or "hosts" (two or more names). Approximately 1300 reviews with only one word or written in a non-English language were removed during analysis.

Table 4 displays the top 30 most frequently appearing words in Airbnb reviews. The most frequently appearing word was "host" (17,856; 16.54%). Its plural form, "hosts" (2520; 2.33%), also appeared frequently. The next set of most frequently appearing words was associated with accommodation facility: "place" (7616; 7.05%), "room"

Table 4
Top 30 most frequently appearing words.

Word	Frequency	% Shown
Host	17,856	16.54%
Great	8642	8.00%
Stay	7624	7.06%
Place	7616	7.05%
Room	5842	5.41%
Clean	5230	4.84%
Nice	4987	4.62%
Location	3797	3.52%
Comfortable	3302	3.06%
Apartment	3266	3.02%
Time	2861	2.65%
Good	2704	2.50%
House	2701	2.50%
Recommend	2600	2.41%
Hosts	2520	2.33%
Easy	2337	2.16%
Home	2280	2.11%
Friendly	2144	1.99%
Perfect	2079	1.93%
Close	2056	1.90%
Helpful	2053	1.90%
Neighborhood	1954	1.81%
Experience	1919	1.78%
Night	1849	1.71%
Bed	1756	1.63%
Staying	1665	1.54%
City	1536	1.42%
Area	1415	1.31%
Welcoming	1398	1.29%
Total		100.00%

(5842; 5.41%), "clean" (5230; 4.84%), "location" (3797; 3.52%), "comfortable" (3302; 3.06%), and "apartment" (3266; 3.02%). However, no word was associated with website SQ.

As shown in Fig. 1, "host" had a relatively high co-occurrence with almost every word that appeared in the frequency analysis, implying that "host" is at the center of many other important SQ attributes. Not only tangible SQ attributes but also interpersonal experiences with "host" is important in the context of peer-to-peer accommodation. Some guest reviews also served as a thank you letter, as shown in the following example:

Hi [host], Thank you for your caring and sharing during my stay with you. I arrived tired and jetlagged, not really in the mood for exploring San Francisco. Instead we talked a lot and I got to know the neighborhood [...] For me, traveling is more about meeting people than seeing the sights. I'm happy I met you.

Co-occurrence analysis results show that "host" often appeared with adjectives describing the host's personality and attitude: friendly, helpful, welcoming, and accommodating. A group of words was also associated with accommodation experience, and these words included "room," "clean," "comfortable," and "location." Frequently used in the form of a comfortable bed, a clean room and bathroom, walking distance to restaurants and airport, and beautiful house, facility SQ attributes were also considered important for Airbnb guests. "Neighborhood," "quiet," and "safe" had high frequency and high co-occurrence among these words. Perceptions of quietness and safety of neighborhood (or community) were considered important SQ attributes for Airbnb guests.

As a result of topic analysis using WordStat 7, this study found four overarching topics (each has two sub-topics) that encompass keywords identified in frequency and co-occurrence analysis: "host" (personality and attitude), "room/house" (clean bathroom and comfortable bed), "location" (accessibility to public transportation and the property), and "neighborhood" (quiet and safe neighborhood) (see Table 4).

3.2.2. Sentiment analysis

To analyze Airbnb guests' emotions expressed in their reviews, this study conducted sentiment analysis. The strength of positive (scale of 1–5) and negative (scale of -1 to -5) sentiment was estimated. Positive (or negative) content with the highest sentiment score was retained as the main sentiment of the sentence. The overall sentiment of review was determined by adding both positive and negative sentiment scores (Thelwall, 2013). The majority of reviews (13,802, 91.3%) had a positive overall sentiment score. Only 927 (6.1%) and 380 reviews (2.5%) had neutral and negative overall sentiment scores, respectively.

To identify important SQ attributes, critical incident analysis, an effective investigation tool for examining customer's perception of SQ (Yang et al., 2004), was performed. This study investigated two extreme reviews: a review with the highest positive sentiment score (215) and a review with the lowest negative sentiment score (-202) (Table 5). Although these two reviews are not representative of all review data, their contents could provide an insight to identify SQ attributes in satisfying or dissatisfying situations.

Important SQ attributes were identified in the positive review. For example, "host" (e.g., host name, they, and she) was mentioned 10 times, complementing the host(s) for being kind, responsive, and helpful. Attributes related to room (e.g., clean bathroom, comfortable beds, and physical appearance of the house) were mentioned positively. Accessibility to public transportation (location) and nice neighborhood also contributed to positive sentiment. However, in the positive critical incident review, accessibility to the property and quiet neighborhood were not mentioned.

Similar to most negative reviews, host-related words (host, hosts, or name of host) were not mentioned once. The guest complained about the absence of personal interaction with the host(s). Many SQ attributes appeared in a negative manner. For example, the guest mentioned the

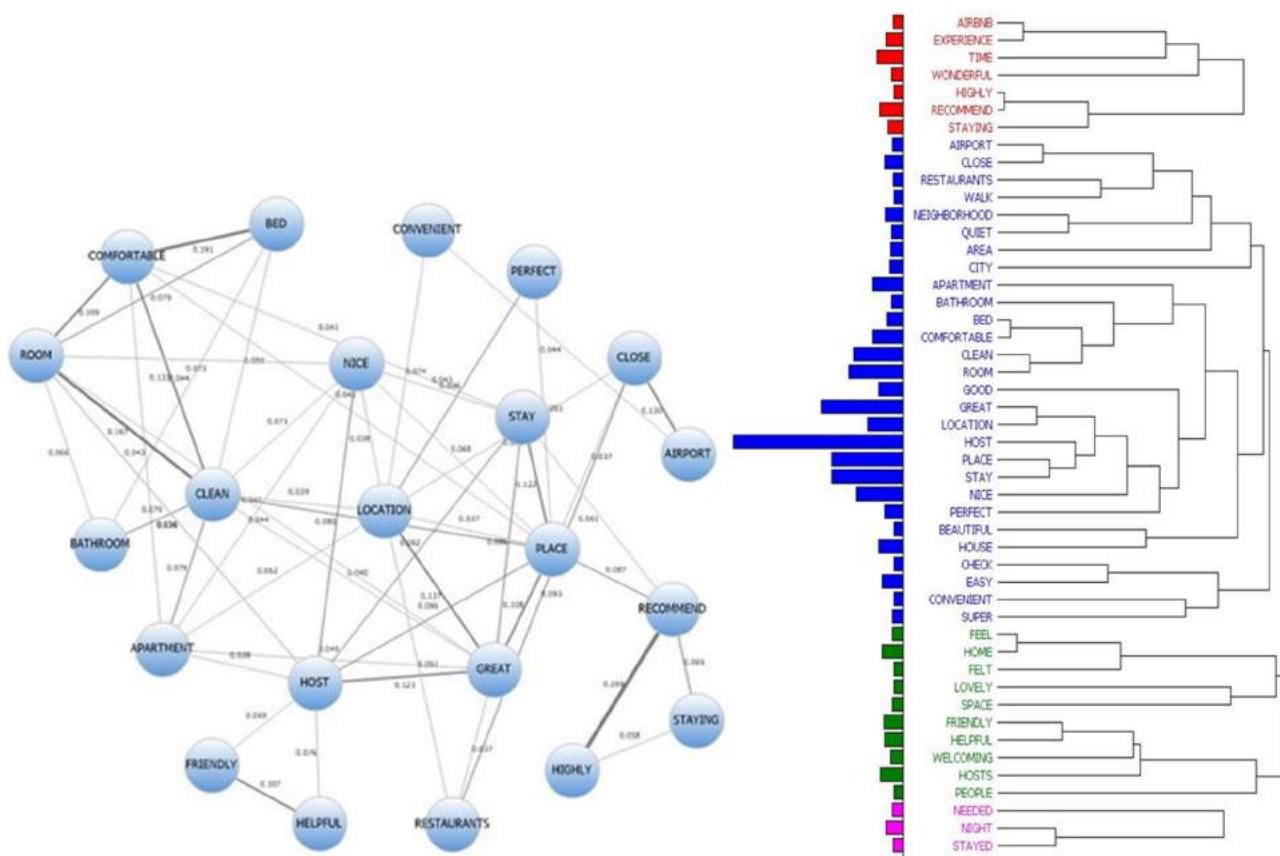


Fig. 1. Visual Representations of Co-occurrence Analysis Results: Link Analysis (Left) and Dendrogram (Right).

Table 5
Results of critical incident analysis.

Review with the Highest Positive Sentiment Score		
Topic	Identified Attributes	Contents
Host	Personality of host(s)	[Host] was great They were kind Easy to communicate with Helped accommodate
	Attitude of host(s)	Available to help with anything Bathroom is super clean and nice Beds were very comfortable Transit is nearby
Room/House	Clean bathroom Comfortable bed	Not far from the airport
Location	Accessibility to public transportation	None
Neighborhood	Accessibility to the property Quiet neighborhood Safe neighborhood	None Neighborhood is nice
Review with the Lowest Negative Sentiment Score		
Topic	Identified Attributes	Contents
Host	Personality of host(s)	None
	Attitude of host(s)	Dislike the 100% anonymous stay This place is only for making money
Room/House	Clean room	Room was dirty Bed smelling carpets Chair with [...] stains
	Clean bathroom	Bathroom disgusting [...], smells terrible
Location	Accessibility to public transportation	None
Neighborhood	Accessibility to the property Quiet neighborhood Safe neighborhood	None Neighborhood made a very bad impression

uncomfortable feeling of having an unlocked door. The guest criticized the level of cleanliness of the room/bathroom and expressed an unfavorable impression of the neighborhood. In the negative critical incident review, location and quiet neighborhood were not mentioned.

4. Study 2

Building upon the findings of Study 1, Study 2 used a quantitative approach (online survey) to evaluate and compare customers' expectation and actual performance of Airbnb and its operators. The main purpose of the quantitative study is to verify the dimensionality of SQ attributes and examine the asymmetric effects of SQ attributes on satisfaction.

4.1. Methodology of study 2

4.1.1. Questionnaire development

To conduct the online survey, measurement items of SQ and CS of Airbnb were developed. The initial set of Airbnb SQ attributes were generated from Study 1 based on results of content analysis of online reviews. Based on the results of qualitative study (Tables 4 and 5), several items were derived by focusing on host, room/house, location, and neighborhood. In addition, web quality attributes were added to assess the customers' perception about efficiency, system availability, and other electronic service-related quality attributes from the analysis of online reviews. Then, those attributes were compared with the current measurements of SQ studies in various scales including SERVQUAL (Parasuraman et al., 1985), SITEQUAL (Yoo and Donthu, 2001), WebQual (Loiacono et al., 2002), and E-S-QUAL (Parasuraman et al., 2005). As a result of comparison between qualitative results (Study 1) and critical reviews of current SQ measurements, 35 items were generated to fully understand the underlying structure of Airbnb SQ. In

addition, CS was measured with three items (i.e., overall SQ perception, guests' feelings toward provided service, and intention to use the service in the future) derived from [Oliver \(1980\)](#). A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to measure both SQ and CS.

4.1.2. Pilot test

An online survey was constructed using Qualtrics. To verify the comprehensibility of instruction, survey flow, and validity of measurement items, a pilot test was conducted with 43 respondents who stayed at one of the Airbnb property rentals. Based on the pilot test findings, the survey instruction was clarified, and the wording of ambiguous items was refined. Eight items were removed owing to overlapped meanings, thereby leaving 27 Airbnb SQ items.

4.1.3. Data collection

The survey was distributed using an online crowdsourcing platform, MTurk, in March 2017. Despite the possible limitations of using MTurk as a data collection method, recent studies have supported that data obtained from MTurk are no better or worse than other online survey platforms using convenient sampling methods and can be superior to the data collected from single convenient organization ([Landers and Behrend, 2015](#)). The online survey link was posted on MTurk and each participant was paid US\$0.75 upon the completion of survey. A total of 322 responses were collected from those 1) who reside in the US and Canada, 2) who meet the qualification requirement of human intelligence task approval rate greater than 95%, and 3) who stayed in Airbnb property rentals within the last three-month period. The survey data were screened for missing values and normal distribution. An exploratory factor analysis (EFA) was conducted to examine the dimensionality of SQ. This study then used IRPA and IAA to investigate the asymmetric effects of SQ attributes on satisfaction.

4.2. Findings of study 2

4.2.1. Survey participants

A similar proportion of male (49.4%) and female (48.8%) respondents participated in the survey ([Table 6](#)). Half of the respondents belonged to the 18–29 age group, followed by 30–49 (43.8%), and 50–64 (5.9%). The majority of the respondents were identified as having white ethnicity (72.7%) and college (28.3%) or university education (45.7%). Income level was diversely distributed. Similar to the findings of Study 1, the most common room type of Airbnb stay was private room (48.1%). The median rate for Airbnb stay was \$61–\$80, which was also similar to the mean of Airbnb listings (\$66) found in Study 1. Forty-nine percent of the respondents stayed in an Airbnb property two to four times. Thirty-five percent used Airbnb once a quarter, whereas thirty-two percent used Airbnb only when needed. Most respondents used Airbnb for leisure travel purposes (81.7%).

4.2.2. Exploratory factor analysis

An EFA using principle axis factoring with Promax rotation was conducted to examine the dimensionality of SQ attributes of Airbnb (see [Table 7](#)). When conducting IRPA and IAA, the number of independent variables must be reduced to avoid multicollinearity issue and complexity of correlations between variables ([Back, 2012](#)). After deleting seven items owing to low factor-loading (< 0.40) and cross-loading issues, EFA results suggest 20 SQ items with four dimensions: host service quality, web responsiveness quality, web efficiency quality, and facility service quality (FSQ). All four factors showed good reliability (Cronbach's alpha = 0.814–0.899).

4.2.3. Result of asymmetric effects of SQ attributes on CS

IRPA and IAA were conducted to investigate the asymmetric effects of SQ attributes on satisfaction. The first step of IRPA is penalty–reward contrast analysis, which identifies penalty indices (PI) and reward

Table 6
Profile of respondents (N = 322).

	Frequency	Percentage
Gender		
Male	159	49.4
Female	157	48.8
Missing	6	1.9
Age		
18–29	161	50.0
30–49	141	43.8
50–64	19	5.9
65 <	1	0.3
Education		
Some high school	1	0.3
High school	17	5.3
2-year college	91	28.3
4-year university	147	45.7
Postgraduate degree	66	20.5
Ethnicity		
African American	29	9.0
Asian	34	10.6
Hispanic	20	6.2
White	234	72.7
Other	4	1.2
Missing	1	0.3
Income		
Under \$25,000	72	22.4
\$25,000–\$34,999	47	14.6
\$35,000–\$49,999	65	20.2
\$50,000–\$74,999	71	22.0
\$75,000–\$99,999	40	12.4
More than \$100,000	27	8.4
Number of previous Airbnb stays		
1	68	21.1
2–4	159	49.4
5–7	61	18.9
8–10	15	4.7
10 <	19	5.9
Frequency of Airbnb stays		
Every week	2	0.6
Every other week	12	3.7
Once a month	35	10.9
Once a quarter	113	35.1
Once a year	57	17.7
Only when I need it	103	32.0
Room Type		
Shared room	18	5.6
Private room	155	48.1
Entire house	149	46.3
Rate		
Less than \$20	8	2.5
\$21–\$40	34	10.6
\$41–\$60	67	20.8
\$61–\$80	59	18.3
\$81–\$100	70	21.7
More than \$100	84	26.1
Purpose of stay		
Business	52	16.1
Leisure	263	81.7
Other	7	2.2

indices (RI) with a multiple regression analysis using two dummy variables ([Brandt, 1987](#)). The first dummy variable was created by coding the lowest attributes performance score (APS) as 1 and the other ratings as 0. The second dummy variable was generated by coding the highest APS as 1 and the other ratings as 0. Two dummy variables were then regressed on CS to generate PI and RI. PI refers to the incremental decrease in CS when the APS is low, and RI indicates incremental increase in CS when APS is high ([Back, 2012](#)).

The second step of IRPA is calculating impact asymmetry (IA) using the absolute value of PI and RI as well as the sum of two or attribute's range of effect on CS (RICS) for each attribute. IA index was then calculated to compare an attribute's satisfaction-generating potential (SGP) to its dissatisfaction-generating potential (DGP) ([Back, 2012](#)).

Table 7
Results of exploratory factor analysis.

	Factor loading	Eigen value	% Variance explained	Cronbach's alpha	Factor mean
Factor 1: Host service quality		8.353	39.732	0.899	4.040
Host is helpful	0.919				
Host is welcoming	0.910				
Host is friendly	0.892				
Host has your best interests at heart	0.625				
Host makes me feel like I am home	0.567				
Factor 2: Web responsiveness quality		1.983	7.934	0.867	3.865
It offers the ability to speak to a live person if there is a problem	0.907				
This site has a customer service representative available online	0.781				
This site provides a telephone number to reach the company	0.725				
This site compensates me for problems it creates	0.705				
It processes refunds as promised	0.553				
Factor 3: Web efficiency quality		1.516	5.356	0.853	4.188
This site is simple to use	0.848				
It loads its pages fast	0.761				
Information at this site is well organized	0.697				
This site makes it easy to find what I need	0.691				
Listings provided by this site are actually available	0.625				
Factor 4: Facility service quality		1.364	4.819	0.814	4.196
Room/house is located in a quiet neighborhood	0.807				
Bed is comfortable	0.733				
Room/house is located in a safe neighborhood	0.635				
Room/house provided by host is visually appealing	0.617				
Host provides a clean bathroom	0.418				
Total variance explained			57.841		

Note: KMO measure of sampling adequacy = 0.915; Bartlett's test of sphericity = 0.000.

The equations for calculating SGP, DGP, and IA index for SQ attribute i are as follows (Mikulic and Prebezac, 2008, p. 566):

$$SGP_i = \frac{RI}{RICS_i}$$

$$DGP_i = \frac{|RI|}{RICS_i}$$

$$IA_i \text{ index} = SGP_i - DGP_i$$

IA was then used as a criterion to categorize SQ attributes into five different asymmetric zones based on the cut-off point suggested by Mikulic and Prebezac (2008): frustrators ($IA \leq -0.7$), dissatisfiers ($-0.7 < IA \leq -0.4$), hybrids ($-0.4 < IA < 0.4$), satisfiers ($0.4 \leq IA < 0.7$), and delighters ($IA \geq 0.7$).

Findings in Table 8 show different attribute categories in each factor. In facility service quality, safe neighborhood (0.63), clean bathroom (0.62), and quiet neighborhood (0.33) were identified as satisfiers. Comfortable bed (-0.67) and visual appeal (-0.60) were categorized as dissatisfiers. In host service quality, welcoming (0.37) and best interests at heart (0.29) were considered as satisfiers. Helpful host (-0.68) and home-feeling (-0.39) were identified as dissatisfiers. Friendliness (-0.83) was categorized as a frustrator. Dissatisfiers and frustrators were dominant in web efficiency quality. Fast page loading (-0.83) and being easy to find (-0.75) were identified as frustrators. Available listings (-0.65), being simple to use (-0.47), and having well-organized information (-0.43) were categorized as dissatisfiers. Web responsiveness quality was also strongly characterized as a dissatisfier and frustrator. Available live person (-0.82) was a frustrator, whereas promised refund process (-0.57), compensation (-0.38), telephone number (-0.34), and online representative (-0.27) were identified as dissatisfiers.

4.2.4. Result of IRPA

An SQ attribute with higher RICS and lower APS suggests that improvement priority should be given to the attribute (Mikulic and Prebezac, 2008). Table 8 presents the results of IRPA.

For facility service quality, visually appealing room/house had the

most significant effect on CS (RICS = 1.32), followed by comfortable bed (RICS = 1.00). For host service quality, helpful host (RICS = 1.43) and friendly host (RICS = 1.15) were most powerful. In terms of web efficiency quality, being easy to find (RICS = 1.89) and available listings (RICS = 1.85) were strong. For web responsiveness quality, refund process was most significant (RICS = 1.89).

5. Discussion

5.1. Theoretical implications

The rapid growth of Airbnb represents the increasing popularity of the sharing economy in hospitality businesses. To articulate the key SQ attributes of Airbnb and examine its asymmetric effect on CS, this research conducted two main studies using a mixed method approach. The findings provide meaningful theoretical contributions to the Airbnb literature. For example, to identify and validate Airbnb SQ attributes, this study conducted thorough reviews of literature and content analysis with 16,430 online reviews, followed by online survey. Consequently, this study articulated Airbnb SQ attributes in the dimensions of facility service quality, host service quality, web efficiency quality, and web responsiveness quality. Although the prior Airbnb literature used quality attributes to examine Airbnb-related phenomena, previous studies (e.g., Ert et al., 2016; Guttentag, 2015; Guttentag and Smith, 2017; Wang and Nicolau, 2017) adopted the attributes from the literature and used them in varying degrees of numbers and dimensions of quality attributes because no previous research had developed and validated the attribute scale.

Following the comprehensive procedures of identifying Airbnb SQ attributes, this study presents the detailed list of SQ attributes and validates them in the domains of facility, host, web efficiency, and web responsiveness. This study identified the SQ attributes of web efficiency and responsiveness that were not explored in the prior literature. The findings provide empirical evidence supporting that website functions, design, usability, and responsiveness are important SQ attributes for Airbnb guests (Jia et al., 2014; Liang et al., 2018; Zervas et al., 2017). In accordance with previous studies on the sharing economy and peer-to-

Table 8

Results of IRPA and IAA.

	RI	PI	RICS	SGP	DGP	IA	Factor	APS
Facility Service Quality ($R^2 = 0.35$)								
Host provides a clean bathroom	0.51	0.12	0.63	0.81	0.19	0.62	Satisfier	4.30
Bed is comfortable	0.17	-0.84	1.00	0.17	0.83	-0.67	Dissatisfier	3.93
Room/house provided by host are visually appealing	0.26	-1.06	1.32	0.20	0.80	-0.60	Dissatisfier	3.98
Room/house is located in a quiet neighborhood	0.24	-0.12	0.36	0.67	0.33	0.33	Satisfier	3.83
Room/house is located in a safe neighborhood	0.24	0.05	0.29	0.81	0.19	0.63	Satisfier	4.17
Host Service Quality ($R^2 = 0.42$)								
Host has your best interests at heart	0.20	0.11	0.31	0.65	0.35	0.29	Satisfier	4.05
Host makes me feel like I am home	0.10	0.23	0.33	0.31	0.69	-0.39	Dissatisfier	4.04
Host is friendly	0.10	-1.05	1.15	0.09	0.91	-0.83	Frustrator	4.32
Host is welcoming	0.54	-0.25	0.79	0.68	0.32	0.37	Satisfier	4.26
Host is helpful	0.23	-1.20	1.43	0.16	0.84	-0.68	Dissatisfier	4.30
Web Efficiency Quality ($R^2 = 0.33$)								
This site makes it easy to find what I need	0.24	-1.65	1.89	0.13	0.87	-0.75	Frustrator	4.29
Information at this site is well organized	0.25	-0.62	0.87	0.29	0.71	-0.43	Dissatisfier	4.17
It loads its pages fast	0.13	-1.42	1.55	0.09	0.91	-0.83	Frustrator	4.13
This site is simple to use	0.18	-0.49	0.66	0.27	0.73	-0.47	Dissatisfier	4.18
Listings provided by this site are actually available	0.32	-1.53	1.85	0.17	0.83	-0.65	Dissatisfier	4.17
Web Responsiveness Quality ($R^2 = 0.16$)								
This site compensates me for problems it creates	0.10	-0.23	0.33	0.31	0.69	-0.38	Dissatisfier	3.65
It processes refunds as promised	0.41	-1.48	1.89	0.22	0.78	-0.57	Dissatisfier	3.91
This site provides a telephone number to reach the company	0.18	-0.36	0.53	0.33	0.67	-0.34	Dissatisfier	3.95
This site has a customer service representative available online	0.16	-0.28	0.44	0.36	0.64	-0.27	Dissatisfier	3.89
It offers the ability to speak to a live person if there is a problem	0.05	0.54	0.59	0.09	0.91	-0.83	Frustrator	3.92

Bold values: Unstandardized coefficients were significant at $p < 0.05$; RI: reward index; PI: penalty index; RICS: range of impact on customer satisfaction; SGP: satisfaction-generating potential; DGP: dissatisfaction-generating potential; IA: impact-asymmetry; APS: attribute-performance score.

peer market, this study found that Airbnb guests also look for traditional SQ attributes associated with tangibles (Priporas et al., 2017; Wang and Nicolau, 2017) and hosts (Ert et al., 2016; Yannopoulou et al., 2013). By capturing both online and offline service environments, the identified SQ attributes reflect pre-trip and on-site experiences. As the validated measures of SQ attributes are fundamental to Airbnb empirical research, the current findings would be instrumental in facilitating future Airbnb quantitative research, thereby contributing to the quantity and quality of Airbnb literature.

In addition, this study examined the asymmetric effects of SQ attributes on CS using IRPA and IAA. A popular way of assessing the effects of SQ attributes on CS is a symmetric linear relationship in empirical research. The symmetric linear relationships allow scholars to verify if the relationships show statistical significance in either a positive or negative direction. If the relationships are found to be statistically non-significant, attributes are interpreted as not affecting satisfaction without considering asymmetrical relationships. An understanding of the asymmetric relationships enables researchers to comprehend the dynamic effect of attributes on satisfaction which the symmetrical linear relationships cannot recognize. An assessment of the asymmetric effect in this study enables researchers to identify negative asymmetric (frustrators, dissatisfiers), positive asymmetric (satisfiers, delighters), or symmetric (hybrids) effects of SQ attributes on CS. For example, 10 attributes in the dimensions of web efficiency and web responsiveness quality were all found to be either dissatisfiers or frustrators, exhibiting a negative asymmetric effect. As dissatisfiers and frustrators are considered as must-have attributes, the attributes cause dissatisfaction when not properly managed. However, even when the attributes are available, customers are not satisfied because people take them for granted. Such a dynamic nature of SQ attributes on CS would not be detected when a symmetrical linear effect is considered. The asymmetric effect of attributes on CS provides an expanded insight into the dynamic nature of attributes. With a method of IRPA and IAA, the current study offers unique findings not discussed and explored in the extant Airbnb literature and contributes to the literature by recognizing the dynamic effect of attributes on CS.

5.2. Practical implications

An identification of the dynamic effect of SQ attributes on CS assists industry practitioners concerned in prioritizing attributes for Airbnb strategic management. The results of Study 1 were further elaborated by the results of Study 2. For example, “host” was the most frequently used word based on the text analysis and co-occurrence study, and host’s friendliness was regarded as a frustrator which had the highest effect in terms of determining customer dissatisfaction when it was absent. The result of sentiment analysis was further supported by the result of IRPA that a safe and quiet neighborhood had both highest and negative sentiment review scores, whereas those items were clearly categorized in satisfiers. Thus, IRPA and IPA results provide a more meaningful guideline for practitioners in prioritizing management strategies.

Findings in Table 8 indicate that SQ attributes in the Airbnb industry exhibit either negative asymmetric (dissatisfiers and frustrators) or positive asymmetric effect (satisfiers) on CS. For instance, Table 8 shows that the respondents perceived “comfortable bed” and “visually appealing room/house” as dissatisfiers with high RICS score. The host should carefully monitor those attributes with relatively high RICS and low APS scores. Being a dissatisfier, it could be destructive for the host’s reputation depending on their perceived performance score. Moreover, Airbnb hosts should not neglect the importance of “easy web navigation” and “fast loading,” which were categorized as frustrators. Their RICS scores were relatively higher than those for other attributes, so Airbnb hosts should carefully monitor the performance ratings for these items.

This study also found that most SQ attributes associated with the website were categorized as either dissatisfier or frustrator. Airbnb guests would be easily dissatisfied when confronted with technical website issues. Thus, Airbnb should carefully monitor that all must-have attributes of website meet their users’ expectations. In the process of service recovery, providing Airbnb users with easy access to the information on how to handle booking errors or resolve technical problems is also important. Although Airbnb currently operates its Help Center on the website, multiple clicks and search processes are

necessary to determine relevant information. As a strategy of the instant feedback system, the employment of live chat functions on the website would increase guests' convenience and a sense of social presence when exploring the website. To facilitate users' immediate communication with customer service representatives, providing diverse contact methods (through phone, email, and website) is also necessary.

This study found that one of the must-have attributes is related to refunds, but the refund process on the Airbnb website is sometimes not performed as promised (Elliott, 2017). As individual hosts' refund and cancellation policies may vary, Airbnb should set a bottom line (e.g., minimum refund amount and cancellation conditions) to prevent possible conflicts between guest and host.

Furthermore, the result of this study provides insightful information for the Airbnb management team. Although standardizing the conditions of the entire Airbnb properties (e.g., room type, size, location, and neighborhood) would be difficult, controlling the must-have attributes of facility, which are bed conditions and visual appearance of accommodation, is important. Given that SQ attributes are determined by individuals' subjective expectations (Parasuraman et al., 1985), the availability of information is important to set expectations. Airbnb should help their guests determine sufficient information on bed condition and visual appeal in the user rating system. Airbnb should also develop a system to carefully monitor property listings and online reviews to filter fake information on facility and host (e.g., different room photo and extra cost not mentioned).

Given the importance of personal transactions between hosts and guests, Airbnb should inform hosts that their attitude (e.g., being friendly and helpful) and home-like atmosphere are must-have SQ attributes for Airbnb guests. The important role of the host should be emphasized by providing an orientation handbook for host registration or sending out reminder messages when posting a property list.

5.3. Limitations and suggestions for future research

Although this study provides meaningful information to broaden the understanding of Airbnb SQ attributes, the findings are mainly based on the Airbnb market in North America (US and Canada). The qualitative data were driven from four destinations with the most number of Airbnb listings, namely, Miami, New York, San Francisco, and Chicago as convenience sampling (Airbnb.com, 2017). Given that Airbnb has been successful in the global market, future research should investigate how local culture and community influence host–guest relationships and guests' evaluation of SQ attributes. Online reviews collected in this study were biased toward positive evaluation. As some guests consider writing a review as an act of personal interaction (e.g., sending a thank you letter or message to friends), the close relationship between host and guest can be one possible reason behind overly positive Airbnb review scores. Others may point out the issue of fake reviews written or supported by hosts (Christie, 2017). However, this study cannot determine the authenticity of reviews. Identifying the mechanism to detect fake reviews or postings would be an interesting future research topic. A short data collection period of the online survey is a limitation of this study. Future study should collect data throughout the year to offset potential seasonality effects and examine seasonal differences regarding guests' perception of SQ attributes. Given that Airbnb attempts to penetrate a business travel market (Vidalon and Denis, 2017), comparing Airbnb SQ attributes between leisure and business travelers would be interesting.

Appendix A

Review with highest positive sentiment score (215):

[The host] was great. The place is beautiful. Pictures are totally great. So sweet they provide a nice small welcome snack basket and drinks, very kind! Coffee as well! The bathroom is super clean and nice. They were kind enough to have shampoo products and plenty of towels. Both of the beds were very

comfortable. The living space with the TV was great and they have a great collection of books. Neighborhood is nice, definitely do not need a car, the transit is nearby. And they are not far from the airport. My friend and I really enjoyed our stay at [host's]. Super easy to communicate with, everything was on point and they even helped accommodate us for our early flight in (they were quick to turn over the unit). It has beautiful lighting. Hardwood floors and just overall a really nice space. We sadly didn't get to meet the host but she was available to help with anything. I love this listing, a great place to stay (I stay in Airbnbs frequently and this one is great)!

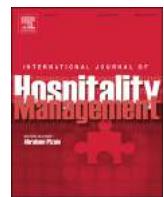
Review with lowest negative sentiment score (-202):

We booked one night and didn't sleep there in the end. The room was dirty, the bathroom disgusting (piss and hairs in toilet, sink full of hair), the smell [was] terrible. In the room there were several bad-smelling carpets, a chair with something that looked like blood stains. Also, the neighborhood made a very bad impression on us and the fact that the door downstairs was unlocked all the time made us feel uncomfortable. The garden was full of junk and litter. Also, we really disliked the 100% anonymous stay - this place is only for making money out of tourists and travelers and not at all what Airbnb is supposed to be about (meeting people at least for a second, feeling at home). Although I absolutely know that the price is relatively affordable for San Francisco and I didn't expect any sort of luxury [,] this place was not acceptable. After checking out the room and the bathroom we left, very disappointed, and booked a new place to spend the night. I would NOT recommend this place to anyone.

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Exploring Airbnb service quality attributes and their asymmetric effects on customer satisfaction

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ARTICLE INFO

Keywords:

Airbnb
Service quality
Customer satisfaction
Mixed method
Impact range performance analysis
Impact asymmetry analysis

ABSTRACT

With the rise of the sharing economy, Airbnb has become the predominant example of the online peer-to-peer accommodation market in the hospitality industry. This study adopts a mixed method approach to systematically and comprehensively capture various service aspects of Airbnb. Two main studies are conducted to identify key service quality (SQ) attributes of Airbnb, verify the dimensionality of the SQ attributes, and examine the effects of these attributes on customer satisfaction (CS). The first qualitative study generated a list of SQ attributes by collecting and analyzing 16,430 online reviews. In the second study, online survey ($N = 322$) is conducted to identify multiple dimensions of SQ attributes and examine their asymmetric effects on CS using impact-range performance analysis and impact asymmetry analysis. Findings suggest that Airbnb has multiple SQ attributes associated with website, host, and facility that produce distinctive effects on CS.

1. Introduction

The development of media technology has led to the flourishing of the sharing economy (Belk, 2014; Botsman and Rogers, 2010; Zervas et al., 2017). Through collaborative renting, borrowing, or sharing ownership, the sharing economy refers to peer-to-peer platforms of using underutilized or surplus personal assets to achieve monetary gains (Zervas et al., 2017). As the Internet and Web 2.0 technologies have expedited and accelerated peer-to-peer transactions online (Ert et al., 2016), more than 2.7 million people in the United States seek business opportunities by sharing goods and services (Roberts, 2016).

The sharing economy has been rapidly growing in the lodging industry by providing low-cost accommodations and a home-like environment, and direct interactions with the local community (Guttentag, 2016). Although Airbnb is the predominant example of peer-to-peer accommodation market, other Airbnb competitors, including HomeAway, HouseTrip, and FlipKey, share the peer-to-peer accommodation market by focusing on vacation rental customers (Guttentag, 2015; Guttentag and Smith, 2017). Founded in 2008, Airbnb is an online intermediary platform that connects hosts and guests by sharing part or all of homes as rental properties for short stays. According to Quinby (2016), with gross bookings of approximately \$7.5 billion in 2015, Airbnb has become the third largest online accommodation seller, whereas Expedia and Priceline rank first and

second, respectively. Gallagher (2017) states that Airbnb is expected to make a profit of \$3.5 billion (versus \$100 million in 2016) per year on \$8.5 billion (versus \$1.7 billion in 2016) in revenues by 2020, projecting 3400% profit growth. The market valuation of \$30 billion ranks Airbnb as the second most valuable online travel agency behind Priceline and ahead of Expedia, TripAdvisor, and Ctrip (Quinby, 2016). Airbnb aims to be the first online travel agency to reach a market valuation of \$100 billion. This aim is noteworthy given that the Marriott and Hilton groups have a combined market capitalization of \$53 billion (Gallagher, 2017).

Recent studies have investigated this online mechanism of sharing accommodation in terms of the effect of Airbnb businesses on hotels targeting the same geographical market segment (Zervas et al., 2017); issues of legislation, regulation, and taxation (Allen and Berg, 2014; Cohen and Sundararajan, 2015; Guttentag, 2015; Koopman et al., 2015); and decision making of consumers (Ert et al., 2016; Guttentag, 2016; Yang and Ahn, 2016). As the role of Airbnb is increasingly important in the hospitality industry, the company's service quality (SQ) attributes are reflected in the hospitality and tourism literature. For example, Airbnb manages a website and a mobile application where hosts can introduce their homes (part or whole) as rental properties, and guests can post reviews to share their stay experiences (Guttentag, 2015). An online review of guest experience is critical to the Airbnb business together with price, amenities, and authenticity because SQ

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Table 1
Overview of service quality models.

Offline Service quality model	SERVQUAL (Parasuraman et al., 1988)	SERPERF (Cronin and Taylor, 1992)	SERVQUAL in hospitality industry (Saleh and Ryan, 1991)	LQI (Getty and Getty, 2003)
Dimensions	<ul style="list-style-type: none"> ● Tangibles ● Responsiveness ● Reliability ● Assurance ● Empathy 	<ul style="list-style-type: none"> ● Physical service environment quality ● Interaction quality ● Outcome quality 	<ul style="list-style-type: none"> ● Tangibles ● Reassurance ● Avoiding sarcasm ● Empathy ● Conviviality 	<ul style="list-style-type: none"> ● Tangibility ● Responsiveness ● Confidence ● Communication ● Reliability
Online Service quality model	<p>SITEQUAL (Yoo and Donthu, 2001)</p> <ul style="list-style-type: none"> ● Competitive value ● Product quality assurance ● Clarity of ordering ● Ease of use ● Aesthetic design ● Processing speed ● Security ● Corporate and brand equity ● Product uniqueness 	<p>WebQual (Loiacono et al., 2002)</p> <ul style="list-style-type: none"> ● Online completeness ● Response time ● Trust ● Tailored communications ● Ease of understanding ● Intuitive operations ● Visual appeal ● Innovativeness ● Emotional appeal ● Consistent image ● Information fit-to-task ● Relative advantage 	<p>E-S-QUAL (Parasuraman et al., 2005)</p> <ul style="list-style-type: none"> ● Efficiency ● Fulfillment ● System availability ● Privacy 	<p>E-RecS-QUAL (Parasuraman et al., 2005)</p> <ul style="list-style-type: none"> ● Responsiveness ● Compensation ● Contact
Dimensions				

attributes are associated with the online platform (e.g., website design and usability) (Guttentag, 2015). Guttentag and Smith (2017) also assess Airbnb performance expectations relative to hotels using SQ attributes, such as cleanliness, security, authenticity, uniqueness, and price. In addition, Wang and Nicolau (2017) adopt SQ attributes in five domains (host, site and property, facility and service, rental rules, and online review score) to examine Airbnb price determinants.

The aforementioned papers serve as useful references to understand Airbnb SQ attributes. However, SQ attributes of Airbnb vary with the extant studies and are not rigorously developed and validated in the extant literature. Limited research has been conducted to examine the asymmetric effect of SQ attributes on customer satisfaction. An understanding of the asymmetric effect provides researchers with insights into the dynamic nature of attributes that symmetric linear effect cannot identify (Anderson et al., 2004; Kano, 1984; Mikulic and Prebezac, 2008; Oliver, 1997). Understanding of the asymmetrical and nonlinear relationship between attribute–performance and overall satisfaction is lacking, thereby inhibiting Airbnb operators from identifying SQ attributes that affect CS or customer dissatisfaction based on Kano's three-factor theory (Cadotte and Turgeon, 1988; Kano, 1984; Oliver, 1997).

Therefore, the main purpose of this study is threefold: 1) to identify and validate key SQ attributes of Airbnb, 2) to verify the dimensionality of SQ attributes, and 3) to examine the asymmetric effects of SQ attributes on satisfaction. This study adopted a mixed method with two main studies to systematically and comprehensively capture various service aspects of Airbnb. The first study conducted content analysis and generated a list of SQ attributes by collecting and analyzing qualitative data (online reviews). In the second study, an online survey was conducted to identify and validate SQ attributes and multiple dimensions and examine their asymmetric effects on satisfaction using impact–range performance analysis (IRPA) and impact asymmetry analysis (IAA).

2. Literature review

2.1. Key service quality attributes in Airbnb

Many researchers have attempted to conceptualize SQ as customers' subjective perception and identify key factors that determine what is considered good service. Identifying key SQ attributes is important because customers have certain standards regarding SQ attributes, and

their absence negatively influences customers' perceived SQ (Mersha and Adlakha, 1992). Correctly identifying key SQ attributes that customers value the most is also crucial to increasing CS. In their seminal work on SQ, Parasuraman et al. (1985) articulated five dimensions of SQ (tangibles, reliability, responsiveness, assurance, and empathy) in the SERVQUAL model. Cronin and Taylor (1992) claimed that performance is an important factor when measuring SQ and argued that their performance-based model (SERPERF) is more reliable in measuring SQ than SERVQUAL. Three dimensions of SERPERF were further developed later by Brady and Cronin (2001) as interaction quality, physical service environment, and outcome quality.

SQ models have been empirically tested and mortified in many hospitality settings. For example, Saleh and Ryan (1991) implemented SERVQUAL in the hospitality context and identified various dimensions to the original model, which are conviviality, tangibles, reassurance, avoidance of sarcasm, and empathy. Considering the five dimensions of SERVQUAL, Getty and Getty (2003) developed the lodging quality index (LQI) to measure five SQ dimensions in the lodging industry: tangibility, reliability, responsiveness, confidence, and communication.

In the context of e-commerce and online platform, the dimensionality of SQ is fundamentally different from that in offline settings. Several researchers have developed SQ models in the context of online service platforms or web interfaces (e.g., Yoo and Donthu, 2001; Loiacono et al., 2002; Parasuraman et al., 2005). Yoo and Donthu (2001) developed SITEQUAL to measure customers' perception of multiple online SQ attributes: competitive value, clarity of ordering, corporate and brand equity, product uniqueness, product quality assurance, ease of use, aesthetic design, processing speed, and security. Similarly, Loiacono et al. (2002) developed WebQual to measure the following website SQ attributes: information fit-to-task, tailored communications, trust, response time, ease of understanding, intuitive operations, visual appeal, innovativeness, emotional appeal, consistent image, online completeness, and relative advantage. In their study on e-commerce SQ, Parasuraman et al. (2005) developed E-S-SUQL to measure electronic SQ with four dimensions (efficiency, fulfillment, system availability, and privacy) and E-RecS-QUAL to measure three dimensions (responsiveness, compensation, and contact) of electronic SQ recovery. E-S-QUAL and E-RecS-QUAL are used in this study to measure website responsiveness and efficiency. Table 1 summarizes SQ models applied in online and offline settings.

To articulate the SQ attributes of Airbnb, reflecting on its unique service environments of the sharing economy and peer-to-peer

Table 2
Overview of service attributes that appeared in previous studies on sharing economy and peer-to-peer (P2P) marketplace.

Author(s)	Year Published	Research Setting	Potential Service-related Attributes	Implications
Yannopoulou, Moutahim, & Bian	2013	Couchsurfing and Airbnb	Diversity, meaningful interpersonal exchange, friendship, access to private space, and authenticity	Identifying identity construction and visual representation of user-generated brands
Jia, Cegleski, & Zhang	2014	Taobao (P2P e-commerce)	Trust in intermediary and online sellers, seller performance, information quality, and service quality	Information quality, service quality → trust and CS
Guttentag	2015	Airbnb	Disruptive innovation theory (more people trying because it is new)	Now has some impact on an existing market, but will not displace the market
Ert, Fleischer, & Magen	2016	Airbnb	Visual-based trust (photo of hosts), facility condition (accommodation size, type, and location)	Visual-based trust → purchase decision
Yang & Alm	2016	Airbnb	Economic benefit, enjoyment, reputation, sustainability, regulation policy, and security	Enjoyment and reputation → significant antecedents of attitudes toward Airbnb
Guttentag & Smith	2017	Airbnb	Cleanliness, security, authenticity, uniqueness, and price Assurance, tangibles, convenience, understanding, and caring	SQ → performance expectations
Priporas, Stylos, Vedanthachari, & Santivivatana	2017	Airbnb	Host, site, property, facility and service, rental rules, and online review score	SQ → CS and loyalty
Wang & Nicolau	2017	Airbnb	Trust, platform (system), benefit, and cost (price)	SQ as rental price determinants
Zervas, Proserpio, & Byers	2017	Airbnb	Hedonic value, utilitarian value	P2P market → long-term effect on diversity of goods offered and consumed
Lee & Kim	2018	Airbnb	Transaction experience, accommodation experience	Hedonic value and utilitarian value → CS and loyalty
Liang, Choi, & Joppe	2018	Airbnb	Hospitality hosting behavior, service quality, perceived risk reduction, social authentic appeal, and economic appeal	Transaction and accommodation experiences construct satisfaction, which lead to trust in Airbnb and host. SQ, social, and authentic experiences → loyalty
Lalicic & Weismayer	2018	Airbnb		

marketplace is important. Airbnb's business model is based on utilizing online platform to connect hosts and guests and generating profit by receiving guest service fees. Thus, the Airbnb website acts as a key service platform on which key SQ attributes are simultaneously consumed and assessed by guests. In the process of Airbnb stay, guests would be involved in at least three experiential components: the Airbnb website (or mobile application), host, and accommodation facility. For instance, guests must visit and browse the Airbnb website to determine accommodation alternatives and pay for accommodations. Many services associated with the website, such as interface design, security, ease of use, and responsiveness, would constitute the website SQ of Airbnb. The host plays an important role of interacting with guests during their Airbnb stay (e.g., check-in-and-out process and problem solving). The accommodation facility provided by the host is considered a key service quality dimension in Airbnb as a main product for an overnight stay.

A systematic literature review was conducted to identify potential SQ attributes in the context of the sharing economy and peer-to-peer online market (see Table 2). Several service-related attributes, such as friendship (Yannopoulou et al., 2013), photo of hosts (Ert et al., 2016; Wang and Nicolau, 2017), understanding and caring (Priporas et al., 2017), and hospitality hosting behavior (Lalicic and Weismayer, 2018), are associated with the host. A set of SQ attributes, including facility condition (Ert et al., 2016; Guttentag and Smith, 2017), accommodation experience (Liang et al., 2018), and tangibles (Priporas et al., 2017) are associated with accommodation facility. Several SQ attributes such as information quality/trust in intermediary (Jia et al., 2014), platform (Zervas et al., 2017), and transaction experience (Liang et al., 2018) are associated with the website or platform.

Airbnb SQ has not been studied to capture both online and offline experiences and may possibly have multiple dimensions. However, qualitative investigations are required to understand its uniqueness and apply pre-established SQ models. Empirically testing the dimensions of SQ attributes is critical as well.

2.2. Asymmetric effects of SQ attributes on customer satisfaction

Researchers have conceptualized that CS is a feeling of pleasure or disappointment as an outcome of consumers' perceived performance compared with expectation (Kotler et al., 2015; Oliver, 1980). According to the expectation-disconfirmation theory of CS by Oliver (1980), when performance is perceived higher than expectation, a positive disconfirmation occurs; otherwise, the condition results in a negative disconfirmation. Although many studies have investigated key attributes influencing CS in e-commerce (e.g., Gefen, 2000; Jia et al., 2014; Tan and Sutherland, 2004), limited studies have been conducted in the context of the online peer-to-peer accommodation market. Airbnb features similarities with other e-commerce entities but also contains distinctive characteristics, which produce possible non-traditional SQ attributes. Recent studies have supported the effects of overall SQ (Lalicic and Weismayer, 2018; Priporas et al., 2017) and perceived hedonic and utilitarian values (Lee and Kim, 2018) on CS. However, no study has integrated both online and offline experiences into the Airbnb SQ model and examined the effects of multiple SQ attributes on CS.

The Airbnb literature tends to overlook the asymmetric effects of SQ attributes on satisfaction although the asymmetric effect of these attributes on satisfaction are empirically reported in the business literature (Anderson and Mittal, 2000; Mittal et al., 1998; Oliver, 1997; Streukens and Ruyter, 2004). Streukens and Ruyter (2004) advocate that ignoring the asymmetric relationships between attributes and satisfaction may cause model misspecification and poor predictive power.

The asymmetric effects of SQ attributes on satisfaction are evidenced by three-factor theory by which attributes are classified into dissatisfiers, satisfiers, and hybrids (Anderson et al., 2004; Back, 2012; Deng, 2007; Kano, 1984; Mikulic and Prebezac, 2008; Oliver, 1997). To reflect the nature of asymmetric effect, for example, Oliver (1997)

Table 3
Statistics of collected Airbnb reviews.

	# of Listings	%	# of Reviews	%	Property Type	
San Francisco	34	33%	5974	36%	Private Room	
New York	26	25%	4009	24%	Entire Home/APT	
Chicago	23	22%	3358	20%	Shared Room	
Miami	20	19%	3088	19%		4
Total	103	100%	16,430	100%		2
						0
						2
						8

Price	Overall Rating	Detailed Rating				Value
		Accuracy	Communication	Cleanliness	Location	
Minimum	\$24	4.0	4.5	3.5	3.5	4.5
Maximum	\$133	5.0	5.0	5.0	5.0	5.0
Mean	\$66	4.7	4.8	4.7	4.6	4.7
Median	\$59	4.5	5.0	5.0	4.5	4.5
Mode	\$55	5.0	5.0	5.0	4.5	4.5

conceptualizes attributes as three categories: bivalent satisfiers, monovalent dissatisfiers, and monovalent satisfiers. Bivalent satisfiers (hybrid attributes) trigger satisfaction or dissatisfaction depending on a level of attribute performance. Monovalent dissatisfiers (must-be attributes) cause dissatisfaction when the attributes are not available. However, although the attributes are supplied, satisfaction does not necessarily occur because individuals take the attributes for granted. Monovalent satisfiers (value-added and delighted attributes) induce a high level of satisfaction when provided and do not cause dissatisfaction even when not available because people do not usually expect the attributes. In line with the abovementioned categories, this study adopts the following asymmetric domains using IRPA and IAA:

- Dissatisfiers and frustrators (must-be attributes) exhibit negative asymmetric effect. Dissatisfiers give rise to dissatisfaction when not provided. Frustrators are considered as severe dissatisfiers that induce a feeling of frustration (an extreme dissatisfaction) if not available. Given that individuals take must-be attributes for granted, the dissatisfiers and frustrators do not cause satisfaction even when the attributes are present.
- Hybrids that display symmetric effect trigger satisfaction when the attributes are supplied but evoke dissatisfaction when not present.
- Satisfiers and delighters (value-added attributes) generate a positive asymmetric effect. Satisfiers lead to satisfaction when the attributes are given. Delighters are deemed as a high level of satisfiers; thus, individuals are delighted when the attributes are available. As satisfiers and delighters are not generally expected, the attributes do not induce dissatisfaction even when not available.

Furthermore, as Back (2012) stressed the importance of assessment of the relationship between the attribute–performance scores and three categories for developing CS (i.e., dissatisfier, satisfier, and hybrids), investigating the role of each category of SQ attributes is critical. For example, an attribute categorized as a frustrator (e.g., ease of navigation) would have a greater influence on customer dissatisfaction in low-level rather than high-level performance issues.

3. Study 1

To articulate SQ attributes of Airbnb and examine its asymmetric effect on CS, this study adopted a mixed method using both qualitative and quantitative approaches. In Study 1, qualitative data (online reviews) were collected and analyzed to identify key SQ attributes and customers' emotional responses to them.

3.1. Methodology of study 1

3.1.1. Review data collection

Four major US cities with the most Airbnb property rental listings were selected as follows: Miami, New York, San Francisco, and Chicago (Airbnb.com, 2017). ParseHub was used to scrap data from the Airbnb webpages of the four cities from January 10 to 13, 2017. This study included Airbnb listings with price range between \$20 and \$150 (based on the rate on February 1, 2017) and with 100 and more reviews. The set of listings that appeared first when selecting one of four cities was collected because the Airbnb website automatically updates as users change geographic location displayed on the map. A total of 16,430 online reviews containing more than 800,000 words were collected and stored in TXT format.

3.1.2. Content analysis of online reviews

Consumer feedback, including online reviews, have been utilized as a source for measuring company performance and understanding customer needs and wants (Yang and Fang, 2004). Xiang et al. (2015) also suggested that utilizing big data and text analysis provides an improved understanding of guest experience and CS in hospitality. The collected

raw text data were examined, and the frequency and co-occurrence of words were analyzed using QDA Miner 5.

3.1.3. Sentiment analysis

Negative, neutral, and positive guest emotions associated with SQ attributes were examined using SentiStrength (see Appendix A). SentiStrength is a dual sentiment (positive and negative) strength scoring system that produces an optimal level of near-human accuracy when analyzing general short social web texts (Thelwall, 2013). Nielsen (2011) found that SentiStrength has the overall best performance over other software programs in terms of the correlation between the results of sentiment analysis conducted by computerized programs and humans hired through Amazon Mechanical Turk (MTurk).

3.2. Findings of study 1

A total of 16,430 reviews from 103 Airbnb listings in four major cities were collected. The average number of reviews per listing was 160, and the average number of words per review was 53. As shown in Table 3, San Francisco had the largest number of listings, whereas Miami had the smallest. Private room was the most common property type, followed by entire home/house. The overall ratings in Airbnb reviews had a mean score of 4.7 out of 5.0, which is highly positive.

3.2.1. Content analysis

To conduct content analysis, the collected review data were refined first. For example, hosts' names were frequently mentioned in reviews, and actual names were replaced with "host" (single name) or "hosts" (two or more names). Approximately 1300 reviews with only one word or written in a non-English language were removed during analysis.

Table 4 displays the top 30 most frequently appearing words in Airbnb reviews. The most frequently appearing word was "host" (17,856; 16.54%). Its plural form, "hosts" (2520; 2.33%), also appeared frequently. The next set of most frequently appearing words was associated with accommodation facility: "place" (7616; 7.05%), "room"

Table 4
Top 30 most frequently appearing words.

Word	Frequency	% Shown
Host	17,856	16.54%
Great	8642	8.00%
Stay	7624	7.06%
Place	7616	7.05%
Room	5842	5.41%
Clean	5230	4.84%
Nice	4987	4.62%
Location	3797	3.52%
Comfortable	3302	3.06%
Apartment	3266	3.02%
Time	2861	2.65%
Good	2704	2.50%
House	2701	2.50%
Recommend	2600	2.41%
Hosts	2520	2.33%
Easy	2337	2.16%
Home	2280	2.11%
Friendly	2144	1.99%
Perfect	2079	1.93%
Close	2056	1.90%
Helpful	2053	1.90%
Neighborhood	1954	1.81%
Experience	1919	1.78%
Night	1849	1.71%
Bed	1756	1.63%
Staying	1665	1.54%
City	1536	1.42%
Area	1415	1.31%
Welcoming	1398	1.29%
Total		100.00%

(5842; 5.41%), "clean" (5230; 4.84%), "location" (3797; 3.52%), "comfortable" (3302; 3.06%), and "apartment" (3266; 3.02%). However, no word was associated with website SQ.

As shown in Fig. 1, "host" had a relatively high co-occurrence with almost every word that appeared in the frequency analysis, implying that "host" is at the center of many other important SQ attributes. Not only tangible SQ attributes but also interpersonal experiences with "host" is important in the context of peer-to-peer accommodation. Some guest reviews also served as a thank you letter, as shown in the following example:

Hi [host], Thank you for your caring and sharing during my stay with you. I arrived tired and jetlagged, not really in the mood for exploring San Francisco. Instead we talked a lot and I got to know the neighborhood [...] For me, traveling is more about meeting people than seeing the sights. I'm happy I met you.

Co-occurrence analysis results show that "host" often appeared with adjectives describing the host's personality and attitude: friendly, helpful, welcoming, and accommodating. A group of words was also associated with accommodation experience, and these words included "room," "clean," "comfortable," and "location." Frequently used in the form of a comfortable bed, a clean room and bathroom, walking distance to restaurants and airport, and beautiful house, facility SQ attributes were also considered important for Airbnb guests. "Neighborhood," "quiet," and "safe" had high frequency and high co-occurrence among these words. Perceptions of quietness and safety of neighborhood (or community) were considered important SQ attributes for Airbnb guests.

As a result of topic analysis using WordStat 7, this study found four overarching topics (each has two sub-topics) that encompass keywords identified in frequency and co-occurrence analysis: "host" (personality and attitude), "room/house" (clean bathroom and comfortable bed), "location" (accessibility to public transportation and the property), and "neighborhood" (quiet and safe neighborhood) (see Table 4).

3.2.2. Sentiment analysis

To analyze Airbnb guests' emotions expressed in their reviews, this study conducted sentiment analysis. The strength of positive (scale of 1–5) and negative (scale of -1 to -5) sentiment was estimated. Positive (or negative) content with the highest sentiment score was retained as the main sentiment of the sentence. The overall sentiment of review was determined by adding both positive and negative sentiment scores (Thelwall, 2013). The majority of reviews (13,802, 91.3%) had a positive overall sentiment score. Only 927 (6.1%) and 380 reviews (2.5%) had neutral and negative overall sentiment scores, respectively.

To identify important SQ attributes, critical incident analysis, an effective investigation tool for examining customer's perception of SQ (Yang et al., 2004), was performed. This study investigated two extreme reviews: a review with the highest positive sentiment score (215) and a review with the lowest negative sentiment score (-202) (Table 5). Although these two reviews are not representative of all review data, their contents could provide an insight to identify SQ attributes in satisfying or dissatisfying situations.

Important SQ attributes were identified in the positive review. For example, "host" (e.g., host name, they, and she) was mentioned 10 times, complementing the host(s) for being kind, responsive, and helpful. Attributes related to room (e.g., clean bathroom, comfortable beds, and physical appearance of the house) were mentioned positively. Accessibility to public transportation (location) and nice neighborhood also contributed to positive sentiment. However, in the positive critical incident review, accessibility to the property and quiet neighborhood were not mentioned.

Similar to most negative reviews, host-related words (host, hosts, or name of host) were not mentioned once. The guest complained about the absence of personal interaction with the host(s). Many SQ attributes appeared in a negative manner. For example, the guest mentioned the

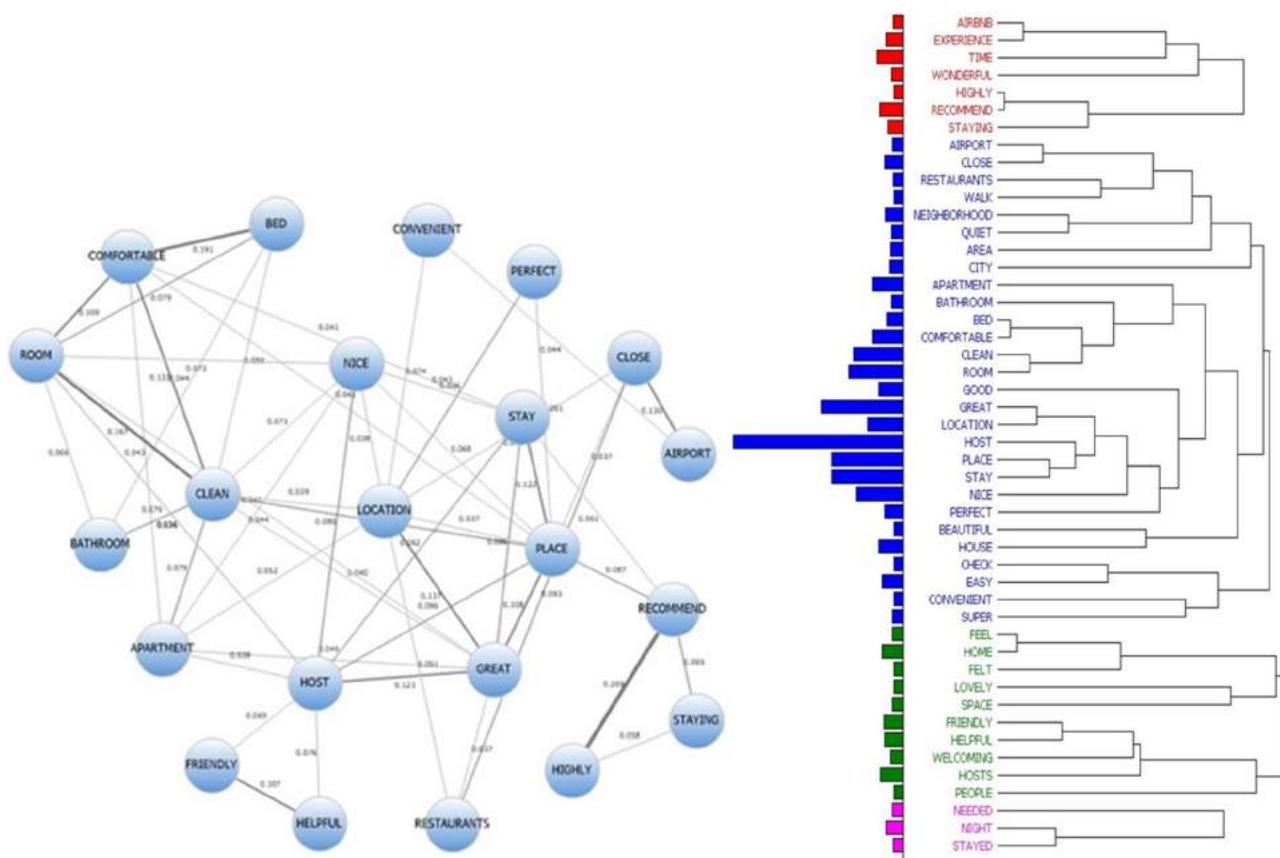


Fig. 1. Visual Representations of Co-occurrence Analysis Results: Link Analysis (Left) and Dendrogram (Right).

Table 5
Results of critical incident analysis.

Review with the Highest Positive Sentiment Score		
Topic	Identified Attributes	Contents
Host	Personality of host(s)	[Host] was great They were kind Easy to communicate with Helped accommodate
	Attitude of host(s)	Available to help with anything Bathroom is super clean and nice Beds were very comfortable Transit is nearby
Room/House	Clean bathroom Comfortable bed	Not far from the airport
Location	Accessibility to public transportation	None
Neighborhood	Accessibility to the property Quiet neighborhood Safe neighborhood	None Neighborhood is nice
Review with the Lowest Negative Sentiment Score		
Topic	Identified Attributes	Contents
Host	Personality of host(s)	None
	Attitude of host(s)	Dislike the 100% anonymous stay This place is only for making money
Room/House	Clean room	Room was dirty Bed smelling carpets Chair with [...] stains
	Clean bathroom	Bathroom disgusting [...], smells terrible
Location	Accessibility to public transportation	None
Neighborhood	Accessibility to the property Quiet neighborhood Safe neighborhood	None Neighborhood made a very bad impression

uncomfortable feeling of having an unlocked door. The guest criticized the level of cleanliness of the room/bathroom and expressed an unfavorable impression of the neighborhood. In the negative critical incident review, location and quiet neighborhood were not mentioned.

4. Study 2

Building upon the findings of Study 1, Study 2 used a quantitative approach (online survey) to evaluate and compare customers' expectation and actual performance of Airbnb and its operators. The main purpose of the quantitative study is to verify the dimensionality of SQ attributes and examine the asymmetric effects of SQ attributes on satisfaction.

4.1. Methodology of study 2

4.1.1. Questionnaire development

To conduct the online survey, measurement items of SQ and CS of Airbnb were developed. The initial set of Airbnb SQ attributes were generated from Study 1 based on results of content analysis of online reviews. Based on the results of qualitative study (Tables 4 and 5), several items were derived by focusing on host, room/house, location, and neighborhood. In addition, web quality attributes were added to assess the customers' perception about efficiency, system availability, and other electronic service-related quality attributes from the analysis of online reviews. Then, those attributes were compared with the current measurements of SQ studies in various scales including SERVQUAL (Parasuraman et al., 1985), SITEQUAL (Yoo and Donthu, 2001), WebQual (Loiacono et al., 2002), and E-S-QUAL (Parasuraman et al., 2005). As a result of comparison between qualitative results (Study 1) and critical reviews of current SQ measurements, 35 items were generated to fully understand the underlying structure of Airbnb SQ. In

addition, CS was measured with three items (i.e., overall SQ perception, guests' feelings toward provided service, and intention to use the service in the future) derived from [Oliver \(1980\)](#). A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to measure both SQ and CS.

4.1.2. Pilot test

An online survey was constructed using Qualtrics. To verify the comprehensibility of instruction, survey flow, and validity of measurement items, a pilot test was conducted with 43 respondents who stayed at one of the Airbnb property rentals. Based on the pilot test findings, the survey instruction was clarified, and the wording of ambiguous items was refined. Eight items were removed owing to overlapped meanings, thereby leaving 27 Airbnb SQ items.

4.1.3. Data collection

The survey was distributed using an online crowdsourcing platform, MTurk, in March 2017. Despite the possible limitations of using MTurk as a data collection method, recent studies have supported that data obtained from MTurk are no better or worse than other online survey platforms using convenient sampling methods and can be superior to the data collected from single convenient organization ([Landers and Behrend, 2015](#)). The online survey link was posted on MTurk and each participant was paid US\$0.75 upon the completion of survey. A total of 322 responses were collected from those 1) who reside in the US and Canada, 2) who meet the qualification requirement of human intelligence task approval rate greater than 95%, and 3) who stayed in Airbnb property rentals within the last three-month period. The survey data were screened for missing values and normal distribution. An exploratory factor analysis (EFA) was conducted to examine the dimensionality of SQ. This study then used IRPA and IAA to investigate the asymmetric effects of SQ attributes on satisfaction.

4.2. Findings of study 2

4.2.1. Survey participants

A similar proportion of male (49.4%) and female (48.8%) respondents participated in the survey ([Table 6](#)). Half of the respondents belonged to the 18–29 age group, followed by 30–49 (43.8%), and 50–64 (5.9%). The majority of the respondents were identified as having white ethnicity (72.7%) and college (28.3%) or university education (45.7%). Income level was diversely distributed. Similar to the findings of Study 1, the most common room type of Airbnb stay was private room (48.1%). The median rate for Airbnb stay was \$61–\$80, which was also similar to the mean of Airbnb listings (\$66) found in Study 1. Forty-nine percent of the respondents stayed in an Airbnb property two to four times. Thirty-five percent used Airbnb once a quarter, whereas thirty-two percent used Airbnb only when needed. Most respondents used Airbnb for leisure travel purposes (81.7%).

4.2.2. Exploratory factor analysis

An EFA using principle axis factoring with Promax rotation was conducted to examine the dimensionality of SQ attributes of Airbnb (see [Table 7](#)). When conducting IRPA and IAA, the number of independent variables must be reduced to avoid multicollinearity issue and complexity of correlations between variables ([Back, 2012](#)). After deleting seven items owing to low factor-loading (< 0.40) and cross-loading issues, EFA results suggest 20 SQ items with four dimensions: host service quality, web responsiveness quality, web efficiency quality, and facility service quality (FSQ). All four factors showed good reliability (Cronbach's alpha = 0.814–0.899).

4.2.3. Result of asymmetric effects of SQ attributes on CS

IRPA and IAA were conducted to investigate the asymmetric effects of SQ attributes on satisfaction. The first step of IRPA is penalty–reward contrast analysis, which identifies penalty indices (PI) and reward

Table 6
Profile of respondents (N = 322).

	Frequency	Percentage
Gender		
Male	159	49.4
Female	157	48.8
Missing	6	1.9
Age		
18–29	161	50.0
30–49	141	43.8
50–64	19	5.9
65 <	1	0.3
Education		
Some high school	1	0.3
High school	17	5.3
2-year college	91	28.3
4-year university	147	45.7
Postgraduate degree	66	20.5
Ethnicity		
African American	29	9.0
Asian	34	10.6
Hispanic	20	6.2
White	234	72.7
Other	4	1.2
Missing	1	0.3
Income		
Under \$25,000	72	22.4
\$25,000–\$34,999	47	14.6
\$35,000–\$49,999	65	20.2
\$50,000–\$74,999	71	22.0
\$75,000–\$99,999	40	12.4
More than \$100,000	27	8.4
Number of previous Airbnb stays		
1	68	21.1
2–4	159	49.4
5–7	61	18.9
8–10	15	4.7
10 <	19	5.9
Frequency of Airbnb stays		
Every week	2	0.6
Every other week	12	3.7
Once a month	35	10.9
Once a quarter	113	35.1
Once a year	57	17.7
Only when I need it	103	32.0
Room Type		
Shared room	18	5.6
Private room	155	48.1
Entire house	149	46.3
Rate		
Less than \$20	8	2.5
\$21–\$40	34	10.6
\$41–\$60	67	20.8
\$61–\$80	59	18.3
\$81–\$100	70	21.7
More than \$100	84	26.1
Purpose of stay		
Business	52	16.1
Leisure	263	81.7
Other	7	2.2

indices (RI) with a multiple regression analysis using two dummy variables ([Brandt, 1987](#)). The first dummy variable was created by coding the lowest attributes performance score (APS) as 1 and the other ratings as 0. The second dummy variable was generated by coding the highest APS as 1 and the other ratings as 0. Two dummy variables were then regressed on CS to generate PI and RI. PI refers to the incremental decrease in CS when the APS is low, and RI indicates incremental increase in CS when APS is high ([Back, 2012](#)).

The second step of IRPA is calculating impact asymmetry (IA) using the absolute value of PI and RI as well as the sum of two or attribute's range of effect on CS (RICS) for each attribute. IA index was then calculated to compare an attribute's satisfaction-generating potential (SGP) to its dissatisfaction-generating potential (DGP) ([Back, 2012](#)).

Table 7
Results of exploratory factor analysis.

	Factor loading	Eigen value	% Variance explained	Cronbach's alpha	Factor mean
Factor 1: Host service quality		8.353	39.732	0.899	4.040
Host is helpful	0.919				
Host is welcoming	0.910				
Host is friendly	0.892				
Host has your best interests at heart	0.625				
Host makes me feel like I am home	0.567				
Factor 2: Web responsiveness quality		1.983	7.934	0.867	3.865
It offers the ability to speak to a live person if there is a problem	0.907				
This site has a customer service representative available online	0.781				
This site provides a telephone number to reach the company	0.725				
This site compensates me for problems it creates	0.705				
It processes refunds as promised	0.553				
Factor 3: Web efficiency quality		1.516	5.356	0.853	4.188
This site is simple to use	0.848				
It loads its pages fast	0.761				
Information at this site is well organized	0.697				
This site makes it easy to find what I need	0.691				
Listings provided by this site are actually available	0.625				
Factor 4: Facility service quality		1.364	4.819	0.814	4.196
Room/house is located in a quiet neighborhood	0.807				
Bed is comfortable	0.733				
Room/house is located in a safe neighborhood	0.635				
Room/house provided by host is visually appealing	0.617				
Host provides a clean bathroom	0.418				
Total variance explained			57.841		

Note: KMO measure of sampling adequacy = 0.915; Bartlett's test of sphericity = 0.000.

The equations for calculating SGP, DGP, and IA index for SQ attribute i are as follows (Mikulic and Prebezac, 2008, p. 566):

$$SGP_i = \frac{RI}{RICS_i}$$

$$DGP_i = \frac{|RI|}{RICS_i}$$

$$IA_i \text{ index} = SGP_i - DGP_i$$

IA was then used as a criterion to categorize SQ attributes into five different asymmetric zones based on the cut-off point suggested by Mikulic and Prebezac (2008): frustrators ($IA \leq -0.7$), dissatisfiers ($-0.7 < IA \leq -0.4$), hybrids ($-0.4 < IA < 0.4$), satisfiers ($0.4 \leq IA < 0.7$), and delighters ($IA \geq 0.7$).

Findings in Table 8 show different attribute categories in each factor. In facility service quality, safe neighborhood (0.63), clean bathroom (0.62), and quiet neighborhood (0.33) were identified as satisfiers. Comfortable bed (-0.67) and visual appeal (-0.60) were categorized as dissatisfiers. In host service quality, welcoming (0.37) and best interests at heart (0.29) were considered as satisfiers. Helpful host (-0.68) and home-feeling (-0.39) were identified as dissatisfiers. Friendliness (-0.83) was categorized as a frustrator. Dissatisfiers and frustrators were dominant in web efficiency quality. Fast page loading (-0.83) and being easy to find (-0.75) were identified as frustrators. Available listings (-0.65), being simple to use (-0.47), and having well-organized information (-0.43) were categorized as dissatisfiers. Web responsiveness quality was also strongly characterized as a dissatisfier and frustrator. Available live person (-0.82) was a frustrator, whereas promised refund process (-0.57), compensation (-0.38), telephone number (-0.34), and online representative (-0.27) were identified as dissatisfiers.

4.2.4. Result of IRPA

An SQ attribute with higher RICS and lower APS suggests that improvement priority should be given to the attribute (Mikulic and Prebezac, 2008). Table 8 presents the results of IRPA.

For facility service quality, visually appealing room/house had the

most significant effect on CS (RICS = 1.32), followed by comfortable bed (RICS = 1.00). For host service quality, helpful host (RICS = 1.43) and friendly host (RICS = 1.15) were most powerful. In terms of web efficiency quality, being easy to find (RICS = 1.89) and available listings (RICS = 1.85) were strong. For web responsiveness quality, refund process was most significant (RICS = 1.89).

5. Discussion

5.1. Theoretical implications

The rapid growth of Airbnb represents the increasing popularity of the sharing economy in hospitality businesses. To articulate the key SQ attributes of Airbnb and examine its asymmetric effect on CS, this research conducted two main studies using a mixed method approach. The findings provide meaningful theoretical contributions to the Airbnb literature. For example, to identify and validate Airbnb SQ attributes, this study conducted thorough reviews of literature and content analysis with 16,430 online reviews, followed by online survey. Consequently, this study articulated Airbnb SQ attributes in the dimensions of facility service quality, host service quality, web efficiency quality, and web responsiveness quality. Although the prior Airbnb literature used quality attributes to examine Airbnb-related phenomena, previous studies (e.g., Ert et al., 2016; Guttentag, 2015; Guttentag and Smith, 2017; Wang and Nicolau, 2017) adopted the attributes from the literature and used them in varying degrees of numbers and dimensions of quality attributes because no previous research had developed and validated the attribute scale.

Following the comprehensive procedures of identifying Airbnb SQ attributes, this study presents the detailed list of SQ attributes and validates them in the domains of facility, host, web efficiency, and web responsiveness. This study identified the SQ attributes of web efficiency and responsiveness that were not explored in the prior literature. The findings provide empirical evidence supporting that website functions, design, usability, and responsiveness are important SQ attributes for Airbnb guests (Jia et al., 2014; Liang et al., 2018; Zervas et al., 2017). In accordance with previous studies on the sharing economy and peer-to-

Table 8

Results of IRPA and IAA.

	RI	PI	RICS	SGP	DGP	IA	Factor	APS
Facility Service Quality ($R^2 = 0.35$)								
Host provides a clean bathroom	0.51	0.12	0.63	0.81	0.19	0.62	Satisfier	4.30
Bed is comfortable	0.17	-0.84	1.00	0.17	0.83	-0.67	Dissatisfier	3.93
Room/house provided by host are visually appealing	0.26	-1.06	1.32	0.20	0.80	-0.60	Dissatisfier	3.98
Room/house is located in a quiet neighborhood	0.24	-0.12	0.36	0.67	0.33	0.33	Satisfier	3.83
Room/house is located in a safe neighborhood	0.24	0.05	0.29	0.81	0.19	0.63	Satisfier	4.17
Host Service Quality ($R^2 = 0.42$)								
Host has your best interests at heart	0.20	0.11	0.31	0.65	0.35	0.29	Satisfier	4.05
Host makes me feel like I am home	0.10	0.23	0.33	0.31	0.69	-0.39	Dissatisfier	4.04
Host is friendly	0.10	-1.05	1.15	0.09	0.91	-0.83	Frustrator	4.32
Host is welcoming	0.54	-0.25	0.79	0.68	0.32	0.37	Satisfier	4.26
Host is helpful	0.23	-1.20	1.43	0.16	0.84	-0.68	Dissatisfier	4.30
Web Efficiency Quality ($R^2 = 0.33$)								
This site makes it easy to find what I need	0.24	-1.65	1.89	0.13	0.87	-0.75	Frustrator	4.29
Information at this site is well organized	0.25	-0.62	0.87	0.29	0.71	-0.43	Dissatisfier	4.17
It loads its pages fast	0.13	-1.42	1.55	0.09	0.91	-0.83	Frustrator	4.13
This site is simple to use	0.18	-0.49	0.66	0.27	0.73	-0.47	Dissatisfier	4.18
Listings provided by this site are actually available	0.32	-1.53	1.85	0.17	0.83	-0.65	Dissatisfier	4.17
Web Responsiveness Quality ($R^2 = 0.16$)								
This site compensates me for problems it creates	0.10	-0.23	0.33	0.31	0.69	-0.38	Dissatisfier	3.65
It processes refunds as promised	0.41	-1.48	1.89	0.22	0.78	-0.57	Dissatisfier	3.91
This site provides a telephone number to reach the company	0.18	-0.36	0.53	0.33	0.67	-0.34	Dissatisfier	3.95
This site has a customer service representative available online	0.16	-0.28	0.44	0.36	0.64	-0.27	Dissatisfier	3.89
It offers the ability to speak to a live person if there is a problem	0.05	0.54	0.59	0.09	0.91	-0.83	Frustrator	3.92

Bold values: Unstandardized coefficients were significant at $p < 0.05$; RI: reward index; PI: penalty index; RICS: range of impact on customer satisfaction; SGP: satisfaction-generating potential; DGP: dissatisfaction-generating potential; IA: impact-asymmetry; APS: attribute-performance score.

peer market, this study found that Airbnb guests also look for traditional SQ attributes associated with tangibles (Priporas et al., 2017; Wang and Nicolau, 2017) and hosts (Ert et al., 2016; Yannopoulou et al., 2013). By capturing both online and offline service environments, the identified SQ attributes reflect pre-trip and on-site experiences. As the validated measures of SQ attributes are fundamental to Airbnb empirical research, the current findings would be instrumental in facilitating future Airbnb quantitative research, thereby contributing to the quantity and quality of Airbnb literature.

In addition, this study examined the asymmetric effects of SQ attributes on CS using IRPA and IAA. A popular way of assessing the effects of SQ attributes on CS is a symmetric linear relationship in empirical research. The symmetric linear relationships allow scholars to verify if the relationships show statistical significance in either a positive or negative direction. If the relationships are found to be statistically non-significant, attributes are interpreted as not affecting satisfaction without considering asymmetrical relationships. An understanding of the asymmetric relationships enables researchers to comprehend the dynamic effect of attributes on satisfaction which the symmetrical linear relationships cannot recognize. An assessment of the asymmetric effect in this study enables researchers to identify negative asymmetric (frustrators, dissatisfiers), positive asymmetric (satisfiers, delighters), or symmetric (hybrids) effects of SQ attributes on CS. For example, 10 attributes in the dimensions of web efficiency and web responsiveness quality were all found to be either dissatisfiers or frustrators, exhibiting a negative asymmetric effect. As dissatisfiers and frustrators are considered as must-have attributes, the attributes cause dissatisfaction when not properly managed. However, even when the attributes are available, customers are not satisfied because people take them for granted. Such a dynamic nature of SQ attributes on CS would not be detected when a symmetrical linear effect is considered. The asymmetric effect of attributes on CS provides an expanded insight into the dynamic nature of attributes. With a method of IRPA and IAA, the current study offers unique findings not discussed and explored in the extant Airbnb literature and contributes to the literature by recognizing the dynamic effect of attributes on CS.

5.2. Practical implications

An identification of the dynamic effect of SQ attributes on CS assists industry practitioners concerned in prioritizing attributes for Airbnb strategic management. The results of Study 1 were further elaborated by the results of Study 2. For example, “host” was the most frequently used word based on the text analysis and co-occurrence study, and host’s friendliness was regarded as a frustrator which had the highest effect in terms of determining customer dissatisfaction when it was absent. The result of sentiment analysis was further supported by the result of IRPA that a safe and quiet neighborhood had both highest and negative sentiment review scores, whereas those items were clearly categorized in satisfiers. Thus, IRPA and IPA results provide a more meaningful guideline for practitioners in prioritizing management strategies.

Findings in Table 8 indicate that SQ attributes in the Airbnb industry exhibit either negative asymmetric (dissatisfiers and frustrators) or positive asymmetric effect (satisfiers) on CS. For instance, Table 8 shows that the respondents perceived “comfortable bed” and “visually appealing room/house” as dissatisfiers with high RICS score. The host should carefully monitor those attributes with relatively high RICS and low APS scores. Being a dissatisfier, it could be destructive for the host’s reputation depending on their perceived performance score. Moreover, Airbnb hosts should not neglect the importance of “easy web navigation” and “fast loading,” which were categorized as frustrators. Their RICS scores were relatively higher than those for other attributes, so Airbnb hosts should carefully monitor the performance ratings for these items.

This study also found that most SQ attributes associated with the website were categorized as either dissatisfier or frustrator. Airbnb guests would be easily dissatisfied when confronted with technical website issues. Thus, Airbnb should carefully monitor that all must-have attributes of website meet their users’ expectations. In the process of service recovery, providing Airbnb users with easy access to the information on how to handle booking errors or resolve technical problems is also important. Although Airbnb currently operates its Help Center on the website, multiple clicks and search processes are

necessary to determine relevant information. As a strategy of the instant feedback system, the employment of live chat functions on the website would increase guests' convenience and a sense of social presence when exploring the website. To facilitate users' immediate communication with customer service representatives, providing diverse contact methods (through phone, email, and website) is also necessary.

This study found that one of the must-have attributes is related to refunds, but the refund process on the Airbnb website is sometimes not performed as promised (Elliott, 2017). As individual hosts' refund and cancellation policies may vary, Airbnb should set a bottom line (e.g., minimum refund amount and cancellation conditions) to prevent possible conflicts between guest and host.

Furthermore, the result of this study provides insightful information for the Airbnb management team. Although standardizing the conditions of the entire Airbnb properties (e.g., room type, size, location, and neighborhood) would be difficult, controlling the must-have attributes of facility, which are bed conditions and visual appearance of accommodation, is important. Given that SQ attributes are determined by individuals' subjective expectations (Parasuraman et al., 1985), the availability of information is important to set expectations. Airbnb should help their guests determine sufficient information on bed condition and visual appeal in the user rating system. Airbnb should also develop a system to carefully monitor property listings and online reviews to filter fake information on facility and host (e.g., different room photo and extra cost not mentioned).

Given the importance of personal transactions between hosts and guests, Airbnb should inform hosts that their attitude (e.g., being friendly and helpful) and home-like atmosphere are must-have SQ attributes for Airbnb guests. The important role of the host should be emphasized by providing an orientation handbook for host registration or sending out reminder messages when posting a property list.

5.3. Limitations and suggestions for future research

Although this study provides meaningful information to broaden the understanding of Airbnb SQ attributes, the findings are mainly based on the Airbnb market in North America (US and Canada). The qualitative data were driven from four destinations with the most number of Airbnb listings, namely, Miami, New York, San Francisco, and Chicago as convenience sampling (Airbnb.com, 2017). Given that Airbnb has been successful in the global market, future research should investigate how local culture and community influence host–guest relationships and guests' evaluation of SQ attributes. Online reviews collected in this study were biased toward positive evaluation. As some guests consider writing a review as an act of personal interaction (e.g., sending a thank you letter or message to friends), the close relationship between host and guest can be one possible reason behind overly positive Airbnb review scores. Others may point out the issue of fake reviews written or supported by hosts (Christie, 2017). However, this study cannot determine the authenticity of reviews. Identifying the mechanism to detect fake reviews or postings would be an interesting future research topic. A short data collection period of the online survey is a limitation of this study. Future study should collect data throughout the year to offset potential seasonality effects and examine seasonal differences regarding guests' perception of SQ attributes. Given that Airbnb attempts to penetrate a business travel market (Vidalon and Denis, 2017), comparing Airbnb SQ attributes between leisure and business travelers would be interesting.

Appendix A

Review with highest positive sentiment score (215):

[The host] was great. The place is beautiful. Pictures are totally great. So sweet they provide a nice small welcome snack basket and drinks, very kind! Coffee as well! The bathroom is super clean and nice. They were kind enough to have shampoo products and plenty of towels. Both of the beds were very

comfortable. The living space with the TV was great and they have a great collection of books. Neighborhood is nice, definitely do not need a car, the transit is nearby. And they are not far from the airport. My friend and I really enjoyed our stay at [host's]. Super easy to communicate with, everything was on point and they even helped accommodate us for our early flight in (they were quick to turn over the unit). It has beautiful lighting. Hardwood floors and just overall a really nice space. We sadly didn't get to meet the host but she was available to help with anything. I love this listing, a great place to stay (I stay in Airbnbs frequently and this one is great)!

Review with lowest negative sentiment score (-202):

We booked one night and didn't sleep there in the end. The room was dirty, the bathroom disgusting (piss and hairs in toilet, sink full of hair), the smell [was] terrible. In the room there were several bad-smelling carpets, a chair with something that looked like blood stains. Also, the neighborhood made a very bad impression on us and the fact that the door downstairs was unlocked all the time made us feel uncomfortable. The garden was full of junk and litter. Also, we really disliked the 100% anonymous stay - this place is only for making money out of tourists and travelers and not at all what Airbnb is supposed to be about (meeting people at least for a second, feeling at home). Although I absolutely know that the price is relatively affordable for San Francisco and I didn't expect any sort of luxury [,] this place was not acceptable. After checking out the room and the bathroom we left, very disappointed, and booked a new place to spend the night. I would NOT recommend this place to anyone.

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Scattertext: a Browser-Based Tool for Visualizing how Corpora Differ

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Abstract

Scattertext is an open source tool for visualizing linguistic variation between document categories in a language-independent way. The tool presents a scatterplot, where each axis corresponds to the rank-frequency a term occurs in a category of documents. Through a tie-breaking strategy, the tool is able to display thousands of visible term-representing points and find space to legibly label hundreds of them. Scattertext also lends itself to a query-based visualization of how the use of terms with similar embeddings differs between document categories, as well as a visualization for comparing the importance scores of bag-of-words features to univariate metrics.

1 Introduction

Finding words and phrases that discriminate categories of text is a common application of statistical NLP. For example, finding words that are most characteristic of a political party in congressional speeches can help political scientists identify means of partisan framing (Monroe et al., 2008; Grimmer, 2010), while identifying differences in word usage between male and female characters in films can highlight narrative archetypes (Schofield and Mehr, 2016). Language use in social media can inform understanding of personality types (Schwartz et al., 2013), and provides insights into customers’ evaluations of restaurants (Jurafsky et al., 2014).

A wide range of visualizations have been used to highlight discriminating words— simple ranked lists of words, word clouds, word bubbles, and word-based scatter plots. These techniques have a number of limitations. For example, the difficulty

in comparing the relative frequencies of two terms in a word cloud, or in legibly displaying term labels in scatterplots.

Scattertext¹ is an interactive, scalable tool which overcomes many of these limitations. It is built around a scatterplot which displays a high number of words and phrases used in a corpus. Points representing terms are positioned to allow a high number of unobstructed labels and to indicate category association. The coordinates of a point indicate how frequently the word is used in each category.

Figure 1 shows an example of a Scattertext plot comparing Republican and Democratic political speeches. The higher up a point is on the y-axis, the more it was used by Democrats, and similarly, the further right on the x-axis a point appears, the more its corresponding word was used by Republicans. Highly associated terms fall closer to the upper left and lower right-hand corners of the chart, while stop words fall in the far upper right-hand corner. Words occurring infrequently in both classes fall closer to the lower left-hand corner. When used interactively, mousing-over a point shows statistics about a term’s relative use in the two contrasting categories, and clicking on a term shows excerpts from convention speeches used.

The point placement, intelligent word-labeling, and auxiliary term-lists ensure a low-whitespace, legible plot. These are issues which have plagued other scatterplot visualizations showing discriminative language.

§2 discusses different views of term-category association that make up the basis of visualizations. In §3, the objectives, strengths, and weaknesses of existing visualization techniques. §4 presents the technical details behind Scattertext.

¹github.com/JasonKessler/scattertext

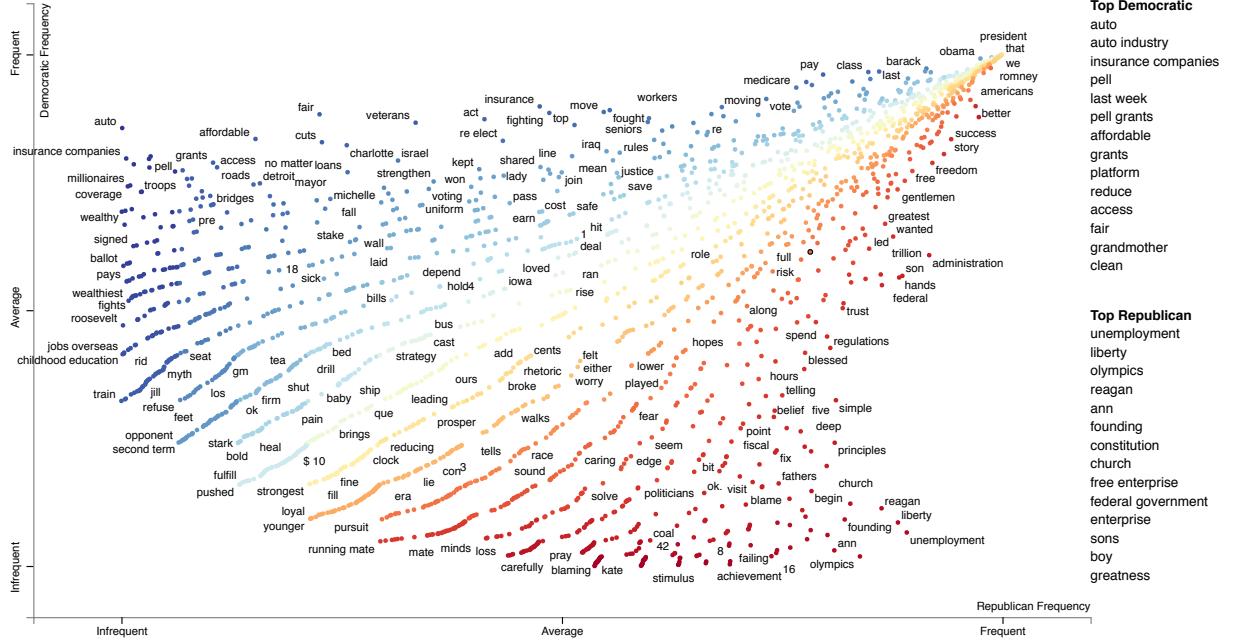


Figure 1: Scattertext visualization of words and phrases used in the 2012 Political Conventions. 2,202 points are colored red or blue based on the association of their corresponding terms with Democrats or Republicans, 215 of which were labeled. The corpus consists of 123 speeches by Democrats (76,864 words) and 66 by Republicans (58,138 words). The most associated terms are listed under “Top Democrat” and “Top Republican” headings. Interactive version: <https://jasonkessler.github.io/st-main.html>

§5 discusses how Scattertext can be used to identify category-discriminating terms that are semantically similar to a query.

2 On text visualization

The simplest visualization, a list of words ranked by their scores, is easy to produce, interpret and is thus very common in the literature. There are numerous ways of producing word scores for ranking which are thoroughly covered in previous work. The reader is directed to Monroe et al. (2008) (subsequently referred to as MCQ) for an overview of model-based term scoring algorithms. Also of interest, Bitvai and Cohn (2015) present a method for finding sparse words and phrase scores from a trained ANN (with bag-of-words features) and its training data.

Regardless of how complex the calculation, word scores capture a number of different measures of word-association, which can be interesting when viewed independently instead of as part of a unitary score. These loosely defined measures include:

Precision A word’s discriminative power regardless of its frequency. A term that appears once in the categorized corpus will have perfect precision. This (and subsequent metrics) presuppose a balanced class distribution. Words close to the x and

y-axis in Scattertext have high precision.

Recall The frequency a word appears in a particular class, or $P(\text{word}|\text{class})$. The variance of precision tends to decrease as recall increases. Extremely high recall words tend to be stop-words. High recall words occur close to the top and right sides of Scattertext plots.

Non-redundancy The level of a word’s discriminative power given other words that co-occur with it. If a word w_a always co-occurs with w_b and word w_b has a higher precision and recall, w_a would have a high level of redundancy. Measuring redundancy is non-trivial, and has traditionally been approached through penalized logistic regression (Joshi et al., 2010), as well as through other feature selection techniques. In configurations of Scattertext such as the one discussed at the end of §4, terms can be colored based on their regression coefficients that indicate non-redundancy.

Characteristicness How much more does a word occur in than the categories examined than in background in-domain text? For example, if comparing positive and negative reviews of a single movie, a logical background corpus may be reviews of other movies. Highly associated terms tend to be characteristic because they frequently

appear in one category and not the other. Some visualizations explicitly highlight these, ex. (Copersmith and Kelly, 2014).

3 Past work and design motivation

Text visualizations manipulate the position and appearance of words or points representing them to indicate their relative scores in these measures. For example, in Schwartz et al. (2013), two word clouds are given, one per each category of text being compared. Words (and selected n-grams) are sized by their linear regression coefficients (a composite metric of precision, recall, and redundancy) and colored by frequency. Only words occurring in $\geq 1\%$ of documents and having Bonferroni-corrected coefficient p-values of <0.001 were shown. Given that these words are highly correlated to their class of interest, the frequency of use is likely a good proxy for recall.

Coppersmith and Kelly (2014) also describe a word-cloud based visualization for discriminating terms, but intend it for categories which are both small subsets of a much larger corpus. They include a third, middle cloud for terms that appear characteristic.

Word clouds can be difficult to interpret. It is difficult to compare the sizes of two non-horizontally adjacent words, as well as the relative color intensities of any two words. Longer words unintentionally appear more important since they naturally occupy more space in the cloud. Sizing of words can be a source of confusion when used to represent precision, since a larger word may naturally be seen as more frequent.

Bostock et al. (2012)² features an interactive word-bubble visualization for exploring different word usage among Republicans and Democrats in the 2012 US presidential nominating conventions. Each term displayed is represented by a bubble, sized proportionate to their frequency. Each bubble is colored blue and red, s.t. the blue partition's size corresponds to the term's relative use by Democrats. Terms were manually chosen, and arranged along the x-axis based on their discriminative power. When clicked, sentences from speeches containing the word used are listed below the visualization.

The dataset used in Bostock et al. (2012) is used to demonstrate the capabilities of Scattertext

in each of these figures. The dataset is available via the Scattertext Github page.

3.1 Scatterplot visualizations

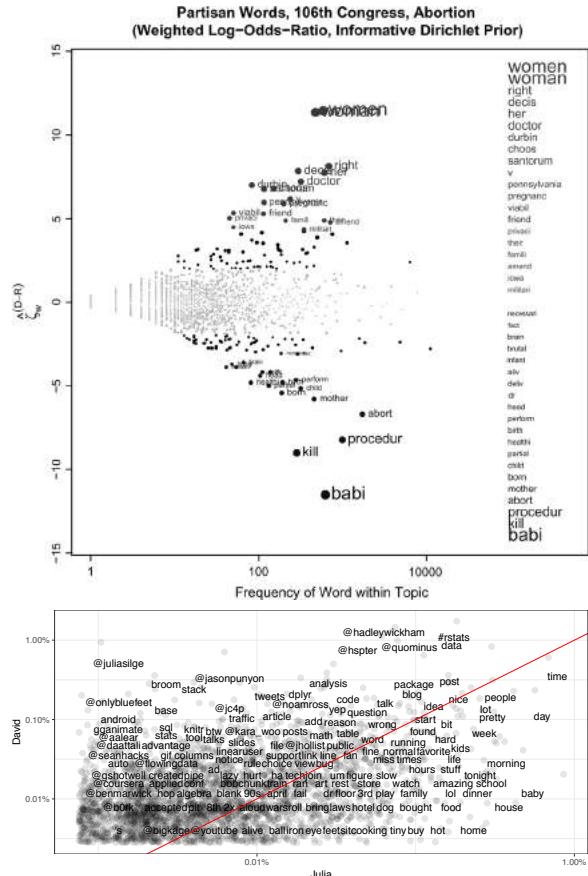


Figure 2: A sample of existing scatterplot visualizations. MCQ's is at the top. Tidytext is below.

MCQ present a visualization to illustrate the use of their proposed word score, log-odds-ratio with an informative Dirichlet prior (top of Figure 2). This visualization plots word-representing points along two axes. The axes are \log_{10} recall vs. the difference in word scores z-scores. Points with a z-score difference < 1.96 are grayed-out, while the top and bottom 20 are labeled, both by each point and on the right-hand side. The side-labeling is necessary because labels are permitted to overlap, hindering their on-plot readability. The sizes of points and labels are increased proportionally to the word score. This word score encompasses precision, recall, and characteristicness since it penalizes scores of terms used more frequently in the background corpus. MCQ used this type of plot to illustrate the different effects of various scoring techniques introduced in the paper. However, the small number of points which are possible to label limit its utility for in-depth corpus analysis.

Schofield and Mehr (2016) use essentially the

²nytimes.com/interactive/2012/09/06/us/politics/convention-word-counts.html

same visualization, but plot over 100 corresponding n-grams next to an unlabeled frequency/z-score plot. While this is appropriate for publication, displaying associated terms and the shape of the score distribution, it is impossible to align all but the highest scoring points to their labels.

The tidytext R-package (Silge and Robinson, 2016) documentation includes a non-interactive ggplot2-based scatter plot that is very similar to Scattertext. The x and y-axes both, like in Scattertext, correspond to word frequencies in the two contrasting categories, with jitter added.³ In the example in Figure 2 (bottom), the contrasting categories are tweets from two different accounts. The red diagonal line separates words based on their odds-ratio. Importantly, compared to MCQ, less of this chart’s area is occupied by whitespace.

While tidytext’s labels do not overlap each other (in contrast to MCQ) they do overlap points. The points’ semi-transparency makes labels in less-dense areas legible, the dense interior of the chart is nearly illegible, with both points and labels obscured. Figure 3 shows an excerpt of the same

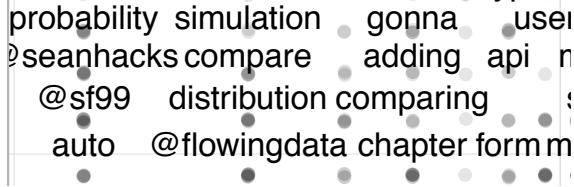


Figure 3: A small cropping from an un-jittered version at the bottom of Figure 2. The dark, opaque points indicate stacks of points.

plot, but with no jitter. Words appearing with the same frequency in both categories all become stacked atop each other, however, this provides more interior space for labeling.

As a side note, many text visualizations plot words in a 2D space according to their similarity in a high dimensional space. For example, Cho et al. ? uses the Barnes-Hut-SNE to plot words in a 2D space s.t. those with similar representations are grouped close together. Class-association does not play a role in this line of research, and global position is essentially irrelevant.

The next section presents Scattertext and how its approach to word ordering solves the problems discussed above.

³This type of visualization may have first been introduced in Rudder (2014).

4 Scattertext

Scattertext builds on tinytext and Rudder (2014). It plots a set of unigrams and bigrams (referred to in this paper as “terms”) found in a corpus of documents assigned to one of two categories on a two-dimensional scatterplot.

In the following notation, user-supplied parameters are in bold typeface.

Consider a corpus of documents C with disjoint subsets A and B s.t. $A \cup B \equiv C$. Let $\phi^T(t, C)$ be the number of times term t occurs in C , $\phi^T(t, A)$ be the the number of times t occurs in A . Let $\phi^D(t, A)$ refer to the number of documents in A containing t . Let t_{ij} be the j th word in term t_i . In practice, $j \in \{1, 2\}$. The parameter ϕ may be ϕ^T or ϕ^D .⁴ Other feature representations (ex., tf.idf) may be used for ϕ .

$$Pr[t_i] = \frac{\phi(t_i, C)}{\sum_{t \in C \wedge |t| \equiv |t_i|} \phi(t, C)}. \quad (1)$$

The construction of the set of terms included in the visualization V is a two-step process. Terms must occur $geqm$ times, and if bigrams, appear to be phrases. In order to keep the approach language neutral, I follow Schatz et al. (2013), and use a pointwise mutual information score to filter out bigrams that do not occur far more frequently than would be expected. Let

$$PMI(t_i) = \log \frac{Pr[t_i]}{\prod_{t_{ij} \in t_i} Pr[T_{ij}]} \quad (2)$$

The minimum PMI accepted is p . Now, V can be defined as

$$\{t | \phi(t, C) \geq m \wedge (|t| \equiv 1 \vee PMI(t) > p)\} \quad (3)$$

Let a term t ’s coordinates on the scatterplot be (x_t^A, x_t^B) , where A and B are the two document categories. Although x_t^K is proportional to $\phi(t, K)$, many terms will have identical $\phi(t, K)$ values. To break ties the word that appears last alphabetically will have a larger x_t^K .

Let us define r_t^K s.t. $t \in V$ and $K \in \{A, B\}$ as the ranks of $\phi(t, K)$, sorted in ascending order, where ties are broken by terms’ alphabetical order. This allows us to define

$$x_t^K = \frac{r_t^K}{\operatorname{argmax} r^K} \quad (4)$$

⁴ ϕ^D is useful when documents contain unique, characteristic, highly frequent terms. For example, names of movies can have high ϕ^T when finding differences in positive and negative film reviews. The may lead to them receiving higher scores than sentiment terms.

This limits x values to $[0, 1]$, ensuring both axes are scaled identically. This keeps the chart from becoming lopsided toward the corpus that had a larger number of terms.⁵

The charts in Figures 1, 4, and 5, were made with parameters $m=5$, $p=8$, and $\phi=\phi^T$.

Breaking ties alphabetically is a simple but important alternative to jitter. While jitter (i.e., randomly perturbing x_t^A and x_t^B) breaks up the stacked points shown in Figure 3, it eliminates empty space to legibly label points. Jitter can make it seem like identically frequent points are closer to an upper left or lower right corner. Alphabetic tie-breaking makes identical adjustments to both axes, leading to the horizontal (lower-left to upper-right) alignments of identically frequent points. This angle does not cause one point to be substantially closer to either of the category associated corners (the upper-left and lower-right).

These alignments provide two advantages. First, they open up point-free tracts in the center of the chart which allow for unobstructed interior labels. Second, they arrange points in a way that it is easy to hover a mouse over all of them, to indicate what term they correspond to, and be clicked to see excerpts of that term.

In the running example, 154 points were labeled when a jitter of 10% of each axis and no tie-breaking was applied. 210 points (a 36% lift) were labeled when no jitter was applied. 140 were labeled if no tie breaking was used.

Rudder (2014) observed terms closer to the lower-right corner were used frequently in A and infrequently in B , indicating they have both high recall and precision wrt category A . Symmetrically, the same relationship exists for B and the upper-right corner. I can formalize this score between a point's coordinates and its respective corner. This intuition is represented by a score function $s_K(t)$ ($K \in \{A, B\}$ and $t \in V$) where

$$s_K(t) = \begin{cases} \|\langle 1 - x_t^A, x_t^B \rangle\| & \text{if } K = A, \\ \|\langle x_t^A, 1 - x_t^B \rangle\| & \text{if } K = B \end{cases}. \quad (5)$$

Other term scoring methods (e.g., regression weights or a weighted log-odd-ratio with a prior) may be used in place of Formula 5.

Maximal non-overlapping labeling of scatterplots is NP-hard (Been et al., 2007). Scattertext's heuristic is labeling points if space is available in

one of many places around a point. This is performed iteratively, beginning with points having the highest score (regardless of category) and proceeding downward in score. An optimized data structure automatically constructed using Cozy (Loncaric et al., 2016) holds the locations of drawn points and labels.

The top scoring terms in classes B and A (Democrats and Republicans in Figure 1) are listed to the right of the chart. Hovering over points and terms highlights the point and displays frequency statistics.

Point colors are determined by their scores on s . Those corresponding to terms with a high s_B colored in progressively darker shades of blue, while those with a higher s_A are colored in progressively darker shades of red. When both scores are about equal, the point colors become more yellow, which creates a visual divide between the two classes. The colors are provided by D3’s “RdYlBu” diverging color scheme from Colorbrewer⁶ via d3⁷.

Other point colors (and scorings) can be used. For example, Figure 4 shows coefficients of an ℓ_1 penalized log. reg. classifier on V features. Scattertext, in this example, is set to color 0-scoring coefficients light gray. Terms' univariate predictive power are still evident by their chart position. See below⁸ for an interactive version.

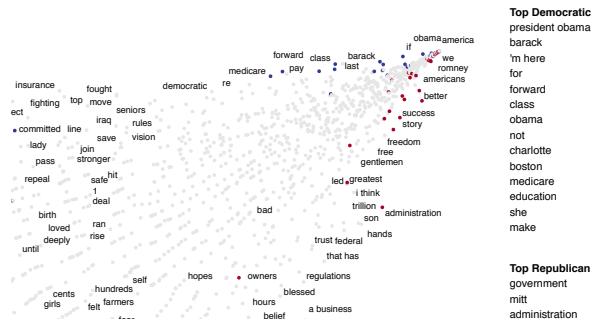


Figure 4: A cropped view of points being colored using ℓ_1 -logreg coefficients. Interactive version: jasonkessler.github.io/st-sparse.html

5 Topical category discriminators

In 2012, how did Republicans and Democrats use language relating to “jobs”, “healthcare”, or “military” differently? Figure 5 shows, in the running example, words similar to “jobs” that were characteristic of the political parties.

⁵While both are available, ordinal ranks are preferable to log frequency since uninteresting stop-words often occupy disproportionate axis space.

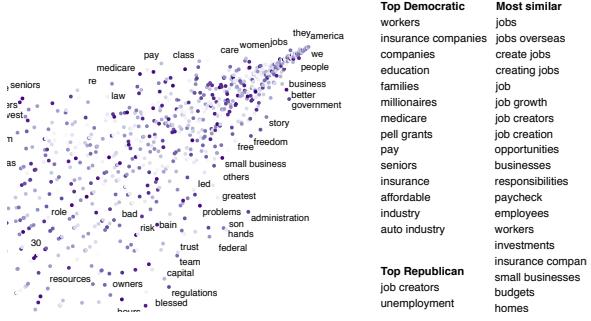


Figure 5: Words and phrases that are semantically similar to the word “jobs” are colored darker on a gray-to-purple scale, and general and category-specific related terms are listed to the right. Note that this is a cropping of the upper left-hand corner of the plot. Interactive version: jasonkessler.github.io/st-sim.html.

In this configuration of Scattertext, words are colored by their cosine similarity to a query phrase. This is done using spaCy⁹-provided GloVe (Pennington et al., 2014) word vectors (trained on the Common Crawl corpus). Mean vectors are used for phrases.

The calculation of the most similar terms associated with each category is a simple heuristic. First, sets of terms closely associated with a category are found. Second, these terms are ranked based on their similarity to the query, and the top rank terms are displayed to the right of the scatterplot (Figure 5).

A term is considered associated if its p-value is <0.05 . P-values are determined using MCQ’s difference in the weighted log-odds-ratio with an uninformative Dirichlet prior. This is the only model-based method discussed in Monroe et al. that does not rely on a large in-domain background corpus. Since I am scoring bigrams in addition to the unigrams scored by MCQ, the size of the corpus would have to be larger to have high enough bigram counts for proper penalization.

This function relies the Dirichlet distribution’s parameter $\alpha \in \mathbf{R}_+^{|V|}$. Following MCQ, $\alpha_t = 0.01$. Formulas 16, 18 and 22 are used to compute z-scores, which are then converted to p-values using the Normal CDF of $\hat{\zeta}_w^{A-B}$, letting $y_t^{(K)} = \phi(t, K)$ st $K \in \{A, B\}$ and $t \in V$.

As seen in Figure 5, the top Republican word related to “jobs” is “job creators”, while “workers” is the top Democratic term.

6 Conclusion and future work

Scattertext, a tool to make legible, comprehensive visualizations of class-associated term frequencies, was introduced. Future work will involve rigorous human evaluation of the usefulness of the visualization strategies discussed.

Acknowledgments

Jay Powell, Kyle Lo, Ray Little-Herrick, Will Headden, Chuck Little, Nancy Kessler and Kam Woods helped proofread this work.

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⁹spacy.io

A model of tourists' loyalty: the case of Airbnb

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Abstract

Purpose – Airbnb, a popular peer-to-peer accommodation platform, exceeds the yearly revenue of hotel chains, such as Marriot and Hilton. However, the reason why consumers engage with peer-to-peer accommodations and become loyal is not completely clear yet. This study aims to investigate Airbnb as a service setting. In doing so, more insights into the relevance of concepts, such as service quality (SQ) and hospitality factors, to explain consumers' behavioral intentions with peer-to-peer accommodations and its effect on loyalty can be gained.

Design/methodology/approach – Through an online survey among Airbnb users and structural equation modeling, the model connecting the measurement constructs is analyzed.

Findings – This study shows that SQ and importance of having social and authentic experiences are significant antecedents of tourists' loyalty toward Airbnb hosting services. Interestingly, perceived economic benefits do not impact the level of loyalty, neither does feelings of perceived reduce risk.

Originality/value – The theoretical contributions reveal tourists' behavioral patterns in the peer-to-peer accommodation context influenced by standard service factors used for other types of accommodations. This study has particular implications for the accommodation sector when segmenting customers according to their needs and designing appropriate marketing strategies.

Keywords Loyalty, Service, SEM, Airbnb

Paper type Research paper

论游客忠诚模型：Airbnb案例分析

摘要

研究目的 – Airbnb是目前流行的大众提供住宿民宿的在线平台，其年收益已经超过很多连锁酒店，包括万豪和希尔顿在内。然而，关于消费者如何消费和热衷于这种Airbnb民宿的原因还知之尚浅。本研究主要以Airbnb为题进行研究，其研究结果深刻讨论Airbnb相关概念，比如服务质量与酒店管理因素等，以解释分析消费者行为动机和游客忠诚的联系纽带。

研究设计 – 本研究采用在线问卷采样的形式，Airbnb客人在线填写问卷，其样本经过结构方程模型(SEM)技术，以分析相关模型结构。

研究结果 – 本研究结果表明服务质量、社交体验、以及正宗的当地游客体验对于游客Airbnb忠诚度有着显著促进作用。饶有趣味的地方是，游客对于省钱和感知风险等方面并未对其Airbnb忠诚度有任何显著影响。

研究价值 – 在理论意义方面，本研究深刻探讨游客对于大众提供住宿服务的行为模式。在实践意义方面，本研究结果对细分客户市场的需求探索和营销策略制定方面有着特别贡献。



1. Introduction

The role of loyal consumers in the changing landscape of the hospitality industry is a crucial strategic asset. Given an expected revenue growth of Airbnb by \$3.5bn in 2020, exceeding hotel chains such as Marriot and Hilton, this matters more than ever before (Gallager, 2017; Guttentag and Smith, 2017). Recent studies demonstrate how the rise of this alternative accommodation type impacts hotel revenues, tourism employment, destination management and tourist behavior (Choi *et al.*, 2015; Guttentag, 2015; Tussyadiah, 2015; Fang *et al.*, 2016; Guttentag and Smith, 2017). Predominantly, tourists book an Airbnb accommodation because of the social interaction with the host and to explore the destination in an authentic way. Furthermore, guests like to book Airbnb accommodations because of the favorable prices and the chance to contribute to the sharing economy (Guttentag, 2015; Tussyadiah, 2015, 2016). Guttentag *et al.* (2017) called for more research that explains why tourists choose peer-to-peer accommodations over hotels, but more importantly, turn into loyal consumers. A clear understanding of consumers' engagement with innovative business models, such as Airbnb, will help marketers design informed strategies, figure out how to best address consumers' needs and adjust their service and product offerings accordingly (Tussyadiah and Pesonen, 2015; Oskam and Boswijk, 2016; Varma *et al.*, 2016; Liu and Mattila, 2017; Wang and Nicolau, 2017).

To gain insights into consumers' behavioral intentions, the relevance of concepts, such as service quality (SQ) and hospitality factors, needs to be tested. In hospitality research, there is comprehensive literature on service factors enhancing tourists' loyal behaviors. However, little is known whether consumers choosing peer-to-peer accommodations over hotels also evaluate them in the same manner (Tussyadiah and Zach, 2015; Tussyadiah, 2016; Heo, 2016). Thus, which service-related elements influence tourists' behavioral intentions for peer-to-peer accommodation, such as Airbnb, remains unclear. Therefore, the present study aims to investigate which factors contribute to tourists' loyalty toward the Airbnb accommodation usage. Theoretical contributions reveal tourists' behavioral patterns in the peer-to-peer accommodation context influenced by factors of the standard service framework used for other types of accommodations. For practitioners, recommendations will be given on how to adjust their marketing and hosting strategies to facilitate tourists.

2. Theory building

2.1 Service quality

Tourists who engage in peer-to-peer sharing are highly educated with a higher income, travel frequently and are open to different types of accommodations (Tussyadiah, 2015). Furthermore, these tourists show a higher level of innovativeness, aim to be different and try out new ways of traveling (Guttentag *et al.*, 2017), they are called "*novelty seeking travelers*." However, these tourists might, thus, be accustomed to different standards of quality as they are not used to less conventional types of accommodation and expect a similar quality standard in alternative accommodation settings (Tussyadiah and Zach, 2015; Guttentag *et al.*, 2017).

Tussyadiah and Zach (2015) performed an in-depth analysis of reviews of peer-to-peer accommodations compared to hotels and stated that for tourists, peer-to-peer accommodations with basic services are still comparable to a hotel. This implies that the basic service framework is applicable. Service literature demonstrates consumers' past experience as a significant reference point for analyzing SQ (Cronin *et al.*, 2000). At first, SQ is perceived as the primary determinant of consumer satisfaction and behavioral

intentions (Bodet, 2008; Cronin *et al.*, 2000; de Ruyter *et al.*, 1997). Second, in a hospitality context, there is an obvious link between quality, value and loyalty (Cronin *et al.*, 2000; Tarn, 1999), as the theory of disconfirmation demonstrates that customer satisfaction depends on the extent to which the received service matches expectations (Shankar *et al.*, 2003). The most prominent model to assess consumers' confirmation is the SERVQUAL instrument. De Ruyter *et al.*, 1997 referred to the instrument as a function of the different levels between consumers' expectations and perceptions. Five key determinants of SQ are identified reliability, responses, assurance, empathy and tangibles. Various studies demonstrated how SQ directly affects various behavioral intentions (Parasuraman *et al.*, 1988; Oliver, 1999; Liu *et al.*, 2000; Bodet, 2008). Studies in an Airbnb setting highlight the role of amenities to be subjective to guests' intentions to return (Tussyadiah and Zach, 2015; Liang *et al.*, 2017). Given the recent entry of Airbnb, the framework needs to be further developed, and preferably tested in the light of existing service theories. Thus, in the case of understanding consumers' behavioral intentions toward peer-to-peer accommodation, the concept of perceived SQ cannot be ignored but rather has to be tested for its appropriateness. Following the disconfirmation paradigm, it is expected that consumers' SQ evaluations positively influence tourists' loyalty toward Airbnb. This leads to following hypothesis:

H1. Service quality has a direct positive effect on loyalty.

2.2 Hospitality hosting behavior

The interaction and home benefits are one of the main motivations for consumers to book an Airbnb accommodation (Guttentag *et al.*, 2017). In a traditional accommodation setting (i.e. hotel), these elements would be referred to as "peripheral service elements," that enhance our understanding of consumer repurchase behavior (De Ruyter *et al.*, 1997). However, as demonstrated by Guttentag *et al.* (2017), for peer-to-peer accommodations, they belong to the core of the experience, leading tourists to enjoy Airbnb much more.

Research performed on guests' homes demonstrates that the role of the host determines the guests' overall experience and intentions to return (Wang *et al.*, 2007). The host's competence is called the hospitality hosting behavior (HHB), which is explained as a service provided by the host to guests. This means that the hosts have the responsibility to provide an environment where guests feel secure and comfortable (Arrifin *et al.*, 2013; Lashley *et al.*, 2004). Furthermore, the quality of the hosts' behavior not only develops a strong bond between the tourist and the accommodation but also enhances the emotional value of the experience (Arrifin and Maghzi, 2012; Su and Wall, 2010; Arrifin *et al.*, 2013). Recent studies have demonstrated the significant role of hosts in choosing an Airbnb accommodation over other types of accommodation (Guttentag and Smith, 2017). Tussyadiah (2016) showed how tourists value the distinct role of the host and accompanying intimacy as a part of their travel experience. Guttentag *et al.* (2017) indicated that tourists value the hosts' efforts and hereby want to return to a similar type of accommodation setting. In other words, it is anticipated that the quality of the hosts affects tourists' loyalty toward the use of Airbnb, which leads to the second hypothesis:

H2. Hospitality hosting behavior has a direct positive effect on loyalty.

2.3 Perceived risk reduction

Consumers often calculate the tolerance of the risk, which is positively related with the perceived benefits. Thus, the greater the perceived benefit, the more willing the consumer is

to take the risk (Mitchell and Vassos, 1998). Also, consumers tend to perceive risk they are familiar with as less harmful (Mitchell and Vassos, 1998). The extent of the risk, which implies the number of other consumers exposed to the risk, shapes the consumers' risk aversion behavior (Slovic, 1993; Mitchell and Vassos, 1998). Hotels and restaurants, for example, imply various risk reduction methods associated with food safety, such as quality assurance, brand image and loyalty, and also word-of-mouth and price reduction. Yeung and Morris (2001) demonstrated that the likelihood that consumers will purchase again is much higher if the perceived risk is lower. In the case of Airbnb, consumers risk perceptions are related to their concerns about receiving poor-quality service. Studies related to the Airbnb review-system demonstrated that this helps consumers to feel more secure and safe when booking and staying at someone's home (Liu and Mattila, 2017). For example, a trustworthy host photo has a positive effect on consumers' intentions to book (Ert et al., 2016). Furthermore, the level of transparency about the host behavior while hosting guests facilitates risk reduction for the booking process (Lee et al., 2015; Ert et al., 2016). Also while hosting, the host has a significant role to deal with risk reduction of their guests (Tussyadiah and Zach, 2015; Guttentag et al., 2017; Liang et al., 2017). Hence, it is suggested that:

H3. Perceived risk reduction has a direct positive effect on loyalty.

2.4 Economic and social authentic appeals

Tourists' expenditures are related to motivations and experiences (Alegre and Cladera, 2010). Consumers spending money wisely on accommodation, food or trips relevant to their holiday tend to perceive their trip as more satisfying, resulting in a likelihood of repurchasing these elements in the future again (Díaz-Pérez et al., 2005). In addition, the motivation to travel influences the number of days spent at a destination (Alegre and Cladera, 2010). In an Airbnb setting, consumers tend to stay longer and seek for authentic experiences by staying in more residential neighborhoods (Tussyadiah, 2016). On top of that, consumers who believe that engagement in sharing practices provides them with economic benefits, which then answers the consumers' call for a less costly but similar or higher value and, thus, positive experiences (Hamari et al., 2015). In line with the tourist expenditure literature, it is anticipated that:

H4. Economic appeal has a direct positive effect on loyalty.

Various authors show that it is the desire for community and social interaction that drives many customers to choose peer-to-peer accommodations over any other type of accommodation (Ert et al., 2016; Guttentag, 2015; McArthur, 2015; Tussyadiah, 2015). Another reason for tourists to engage in peer-to-peer accommodation, according to Tussyadiah (2015), is the novelty-seeking aspect. Tourists tend to strive to fulfill their desire for new experiences, and to satisfy their curiosity and novelty seeking (Sweeney and Soutar, 2001; Tussyadiah, 2015; Liang et al., 2017). According to Cohen (1988), it is the value of authenticity that drives tourists to travel to different places in new ways. Various authors refer to authenticity as a motivational force that influences tourists to make novel choices (Wang, 1999; Steiner and Reisinger, 2006). Furthermore, authenticity is perceived as an input of tourist behavior that subsequently leads to loyalty (Grayson and Martinec, 2004). In the framework of this study, authenticity is sought through enjoyment, escape and novelty seeking by booking peer-to-peer accommodations as well as interacting with the local host community (Tussyadiah, 2015; Kolar and Zabkar, 2007). Liang et al. (2017) demonstrated

how perceived authenticity of the experience influences perceived value and behavioral intentions, while choosing an Airbnb accommodation. Therefore, it is suggested that:

H5. Social authentic appeal has a direct positive effect on loyalty.

3. Methodology

3.1 Data collection and sampling

Data were gathered in May 2016 by means of an online survey in English facilitated by SSI Sawtooth software. The online questionnaire was stored on a Web server running in Austria and was distributed with the help of international bachelor students via social media channels. The survey was designed in a way that anonymity and confidentiality of the respondents were ensured. There were no participation incentives given to the respondents. Given that users can only book an Airbnb accommodation through its website, the online survey mode is the best option to reach the potential target group. Because of the online data collection approach, convenience sampling is the only option and commonly used in studies analyzing peer-to-peer settings, such as Airbnb (Leiner, 2014; Varma *et al.*, 2016; Pezenka *et al.*, 2017). Furthermore, the Airbnb platform is interlinked with social media platforms, such as Facebook and Google+. This implies that users can be reached through those platforms too (Varma *et al.*, 2016; Pezenka *et al.*, 2017). Consequently, respondents were invited via a link to the online questionnaire through the before-mentioned platforms. As a probabilistic attempt was not possible because of an undefined entire population of Airbnb users, profile comparisons with Airbnb user characteristics found in the literature were conducted and later on in the descriptive result section further elaborated. With regard to the sampling appropriateness, at least one of the detected studies comes close to a valid online random selection approach (Zekanovic-Korona and Grzunov, 2014). Within the social media spaces, an inclusion criterion was implemented so that only those respondents who had used Airbnb in the past were presented with Airbnb-related questions. The following question being the first one was used to separate users from non-users: "Have you used Airbnb?" (scale: yes vs no). A total of 557 respondents classified themselves as Airbnb users in response to this question with an average booking frequency of 2.7 times.

3.2 Questionnaire development

All constructs were measured in an Airbnb setting. Respondents were asked to evaluate their Airbnb experiences in general rather than focusing on a specific overnight stay or destination at an Airbnb accommodation. They rated the importance of five dimensions: *service quality*, *hospitality hosting behavior*, *perceived risk reduction (PRR)*, *social authentic appeal (SAA)* and *economic appeal (EA)* on a five-point rating scale (1 = extremely unimportant, 2 = unimportant, 3 = neutral, 4 = important and 5 = extremely important). See Table II for an overview of items per construct.

Service quality was measured on the basis of So *et al.*'s study (2016) and adapted to the study setting. (Note: One of the SQ items was deleted because of its low factor loading.) The *hospitality hosting behavior* was based on a scale proposed by Ariffin *et al.* (2013) capturing the importance of the hosts' hospitality skills. *Perceived risk reduction* was developed on the basis of the main idea of capturing a preferably broad part of dimensions used in the tourism context (Tussyadiah, 2015; Tussyadiah and Zach, 2015). *Social authentic appeal* as well as *economic appeal* were measured on a scale developed by Tussyadiah and Pesonen (2015) and Hamari *et al.* (2015). The *loyalty (L)* construct was based on Cronin *et al.*'s (2000) and So *et al.*'s (2016) scale

measured on a five-point Likert scale (1 = disagree strongly, 2 = disagree a little, 3 = neither agree nor disagree, 4 = agree a little and 5 = agree strongly). Responses, a negatively worded *loyalty* item, were reversed to avoid distortions of e.g. Cronbach's α values.

3.3 Measurement

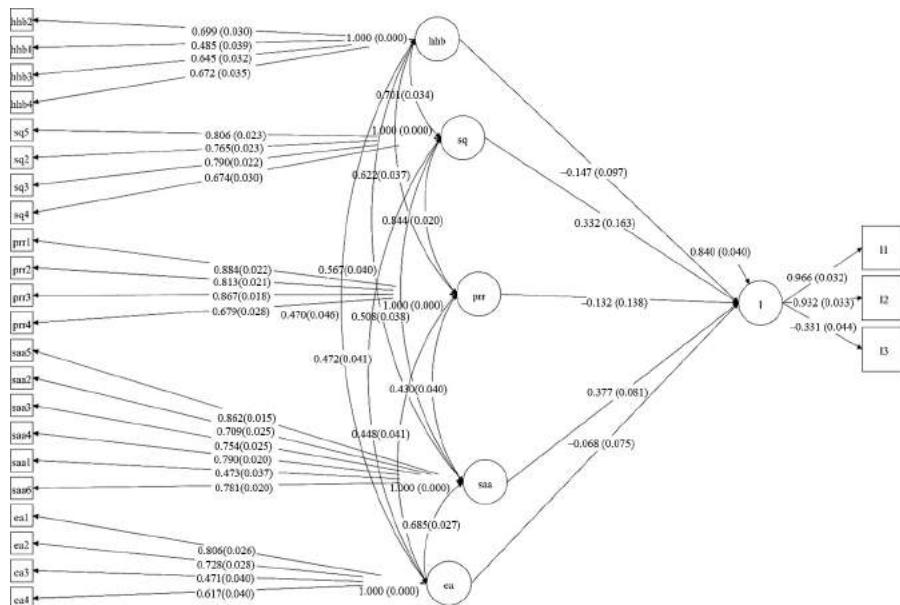
The structural equation modeling in **Figure 1** was estimated using *Mplus* (Muthén and Muthén, 1998). The underlying measurement models were brought to a latent level by means of confirmatory factor analysis. The weighted least squares means and variance adjusted (WLSMV) estimator was used to derive parameter estimates. It is an appropriate estimator for ordinal scaled variables, like all items used here. Furthermore, WLSMV circumvents non-normality problems and performs better on several characteristics in comparison to other appropriate estimators, such as the robust maximum likelihood estimator or the mean- and variance-adjusted unweighted least square estimator (Li, 2014).

4. Results

4.1 Sample description

Table I provides a detailed overview of the sample. Of the 557 respondents, 194 were male and 363 female. The overhang of women compared to men matches with a study that placed a link to an online questionnaire on the official Airbnb Facebook wall (Zekanovic-Korona and Grzunov, 2014).

The majority of participants of the current study were born in Europe (324), 188 in Asia, 21 in North America, 4 in Africa and Oceania and 3 in South America. A total of 13 respondents did not indicate the country they were born in. In comparison with typical Airbnb users, the average age of 24.14 years matches with the age range of millennial travelers situated between



Case of Airbnb

Figure 1.
Structural model

Notes: χ^2 -value: 1,413.239; df: 260; *p*-value < 0.001; RMSEA 0.089; CFI 0.909; TLI 0.896

Table I.

Descriptive statistics

Gender	Male: 194	Female: 363
Origin (continent)	Europe: 324	Africa: 4
	Asia: 188	Oceania: 4
	North America: 21	South America: 3
Age (years)	Mean: 24.14 (min.: 16, max.: 62)	
Marital status	Single: 336	Married: 47
	Partnership: 170	Divorced: 4
Highest level of education	No high school degree: 6	Bachelor degree: 181
	High school: 222	PhD degree: 7
	College/vocational degree: 94	Master degree: 40
Profession	Other: 7	
	Employed: 132	Student: 367
	Self-employed: 29	Retired: 2
	Unemployed: 14	Other: 4
Income	Mean: €1,021.67	

18 and 35 years ([Airbnb, 2016](#); [Pentescu, 2016](#)), or the average age of 25 years determined from another random sample ([Zekanovic-Korona and Grzunov, 2014](#)).

The majority indicated that they were single (336), 170 lived in a partnership, 47 were married and 4 divorced. Regarding the highest level of education completed, the majority had finished high school (222). The main profession was classified as student (367), and 132 were employed. The higher number of students in the sample can be explained by a few recent trends. A recent study based on a sample of nearly 4,800 US adults showed that sharing economy service users, such as rideshare or home-sharing users, are likely to be college educated ([Independent, 2016](#)).

The average income was €1,021.67. Compared with a different peer-to-peer setting, only 24 per cent of people having a household income of +75,000\$ use ride-hailing or home-sharing services ([Independent, 2016](#)). A lately published study ([Airbnb, 2016](#)) identified that millennials tend to spend money on experiences, travel more often and seek for authentic experiences, even though they have a low income.

Respondents annually traveled five times on average, with an average accommodation price of €95.17/night. They primarily traveled with friends (247).

4.2 Validity and reliability

Given that some of the detected measurement constructs were modified according to the study context, Cronbach's α was determined. The values of all six constructs were close to or above the threshold level of 0.7 ([Hair et al., 2006](#)) and therefore deemed acceptable ([Table II](#)). Apart from the mean values contained in [Table II](#), composite reliability (CR) values are listed to highlight the measurement construct reliability. Furthermore, [Table III](#) lists the average variance extracted (AVE) in its main diagonal, tackling the convergent validity of the measurement constructs. All constructs exceeded the recommended CR threshold of 0.5 ([Fornell and Larcker, 1981](#)), whereby two out of the six constructs fell somewhat below the AVE threshold, namely, HHB with a value of 0.398 and EA with a value of 0.446. Furthermore, [Table III](#) lists discriminant validity statistics in the lower triangle matrix. [Fornell and Larcker \(1981\)](#) supposed that the AVE of each construct should exceed the shared variance between the constructs. As the used items were collected from different sources to account for as much variance of the dependent variable as possible, overlaps are very likely to occur. However, just three constructs shared more variance (SV) with other constructs compared to the variance explained by its own indicators: HHB with

Construct (abbrev.)	Survey question (abbrev.)	Means	Composite reliability	Cronbach's α	Case of Airbnb
Hospitality hosting behavior (HHB)	The host knows my name and/or nationality (hhb1)	3.23	0.722	0.67	87
	Warm welcome (hhb2)	3.90			
	The host understands my special requirements (hhb3)	3.93			
	The host should not try to impress but rather take care (hhb4)	3.79			
Service quality (SQ)	Host's responsiveness (sq2)	4.20	0.845	0.77	
	Host's assurance (sq3)	4.01			
	Host's empathy (sq4)	3.76			
	Host's reliability (sq5)	4.43			
Perceived risk reduction (PRR)	Host's trustworthiness (prr1)	4.51	0.887	0.80	
	Financial safeness (prr2)	4.30			
	Physical safeness (prr3)	4.42			
	Host's confidentiality (prr4)	4.09			
Social authentic appeal (SAA)	To know people from the local neighborhoods (saa1)	2.95	0.875	0.81	
	Get insider tips on local attractions (saa2)	3.93			
	Have nice interactions (saa3)	3.77			
	Understand local culture (saa4)	3.97			
	Experience local life (saa5)	4.09			
	Authentic experience (saa6)	4.07			
Economic appeal (EA)	Support local residents (ea1)	3.46	0.756	0.62	
	Sustainable business model (ea2)	3.38			
Loyalty (L)	Save money (ea3)	3.90			
	Value-for-money (ea4)	4.18			
	I would recommend AirBnB again (l1)	4.31	0.692	0.69	
	I will use AirBnB again (l2)	4.30			
	I will switch from AirBnB to another service provider (l3)	3.42			

Table II.
Measurement constructs and items

Latent constructs	HHB	SQ	PRR	SAA	EA	L
HHB	0.398					
SQ	0.491	0.578				
PRR	0.387	0.712	0.664			
SAA	0.321	0.258	0.185	0.546		
EA	0.221	0.223	0.201	0.469	0.446	
L	0.034	0.077	0.036	0.129	0.048	0.637

Table III.
Shared variance and average variance extracted

SQ: AVE = 0.398 vs SV = 0.491, SQ with PRR: AVE = 0.578 vs SV = 0.712 and SAA with EA: AVE = 0.446 vs SV = 0.469. This means that discrimination validity is given for 12 out of 15 pairs and is not markedly violated for the remaining three.

4.3 Model testing

Figure 1 portrays the whole model as hypothesized, including the measurement models and the structural model. Standardized parameter estimates for factor loadings, correlation

coefficients and regression weights are accompanied by their standard errors. According to the most often used fit indices (Hu and Bentler, 1999), the results come close to a good model fit. Recommended thresholds are >0.9 and >0.95 , respectively, for Tucker–Lewis index (TLI) and the comparative fit index (CFI), and <0.06 for the root mean squared error of approximation (RMSEA). For the actual model, CFI (0.909) and TLI (0.896) are satisfactory, and RMSEA is close to the acceptable cutoff value (0.089). The *p*-value derived from the χ^2 distribution is significant indicating a poor fit of the overall model. However, for the WLSMV estimator dealing with ordered categories, it is unreliable.

All five importance dimensions show significant correlations between each other ($p < 0.001$) and therefore some overlapping or related content is determined. Out of these five important constructs, two significantly influence *loyalty* (*L*), namely, the SAA (0.377, $p < 0.001$) and the SQ (0.332, $p = 0.043$). Thus, *H1* and *H5* are accepted, whereas *H2*, *H3* and *H4* cannot be accepted. Furthermore, 16 per cent of the variance (R^2) of *loyalty* (*L*) can be explained by the independent measurement constructs. If importance of the SAA increases, *loyalty* (*L*) increases too. The same is true for the SQ. The underlying items of *loyalty* (*L*) have high communalities, namely, 93.2 per cent for l1 ("I would recommend Airbnb again") and 86.8 per cent for l2 ("I will use Airbnb again"). The third loyalty variable l3 ("I will switch from Airbnb to another service provider.") shows a very low communality value of 10.9 per cent. However, this item tackles switching behavior.

5. Discussion

5.1 Conclusion

The growing research on Airbnb demonstrates the various motivations of engaged consumers, effects on employment and adoptive pricing strategies for the hospitality industry. However, the important question of which factors led consumers to develop loyal behaviors toward the Airbnb community has not been fully answered. This study integrated service-related factors, such as SQ and hosting behavior. Furthermore, more context-related factors, such as PRR, were integrated to assess their effect on the behavioral intentions. In doing so, the study was able to enhance existing studies related to Airbnb guests' satisfaction and behavioral intentions.

5.2 Theoretical contributions

The first insights derive from the service perspective taken in this study. It turns out that the hosting quality is positively evaluated by the respondents. However, even though tourists positively analyze items representing this concept, this does not seem to influence the intentions to engage with Airbnb experiences or to repurchase an accommodation from the Airbnb community in the future again. Interestingly, the second service-oriented variable, SQ shows positive evaluations and subsequently leads to higher levels of loyalty. This study confirms that in sharing practices, a significant link between quality and loyalty is present. This hints at the first suitability of the study at hand, namely, that generic service concepts can also be used to explain consumer behavior in a peer-to-peer accommodation context.

Second, the context-related factors reveal contradicting outcomes. For example, the perceived economic benefits do not influence Airbnb guests' loyalty, as supposed to other studies in the field (Hamari *et al.*, 2015). Furthermore, because of an increase in demand, there is a large supply creating a fierce competition, forcing hosts to set the standards high and adjust the prizes accordingly (Ikkala and Lampinen, 2014). Given these developments, where Airbnb homes are commercializing, the EA is of less relevance for consumers. Thus, this can be one explanation of why EA is not useful for explaining loyalty. Furthermore, a

recent study of Airbnb demonstrated that most millennials would prioritize travel over buying a home or paying off debt (Airbnb, 2016). Expenditures during the holidays are of less importance compared to the experience as “travelling is a core of their identity” and they care about extra amenities they pay for in addition to get the experience they desire (Airbnb, 2016).

The role of PRR does not determine loyalty. Jiang *et al.* (2017) found a direct effect of perceived risk on behavioral intentions; however, PRR does not seem to influence loyalty. Guests seem to value the experience of social and authentic items much more, as they lead to higher levels of loyalty in this study. This is partially in line with Tussyadiah and Pesonen’s (2015) study demonstrating tourists’ engagement because of social appeal. Also Guttentag *et al.* (2017) demonstrated values such as interaction, novelty and authenticity to be important explanatory variables for Airbnb guests. In particular, the concept of authenticity shows to be a dominant factor to provide a better understanding of consumers’ involvement and perceived risk levels (Hamari *et al.*, 2015; Liang *et al.*, 2017). This study furthermore confirms that consumers tend to become more loyal if they were able to experience the local culture and perceive a sense of authentic experience, and thus, are willing to take the risk of trying out a peer-to-peer accommodation rather than a standard hotel. This is in line with Jaing *et al.*’s study (2017) showing how perceived authenticity mediates the perceived risk and subsequently leads to behavioral intentions. Given the early stage of research related to the Airbnb phenomenon, this study was able to assess a set of factors to explain the concept of loyalty for the Airbnb community in more details (Guttentag *et al.*, 2017; Tussyadiah, 2016; Liang *et al.*, 2017).

5.3 Managerial implications

This study has various implications for the Airbnb community. As SQ plays an important role in engaging consumers in Airbnb experiences, hosts should be aware of the fact that guests request a specific standard, besides the interactive part of the hosting experience. As shown by this study, SQ is still an important competitive element for any type of accommodation, also for Airbnb homes. Airbnb can provide hosts with an SQ check-list to ensure standardization and quality assurance across manifold Airbnb listings. Furthermore, hosts might benefit from possible trainings or workshops around the role of hosting and service management to provide what the guests ask for. Airbnb has a great consumer service support; however, the hosts have to be informed and guided as well and respond to these expected standards of SQ.

Furthermore, as this study shows, hosts have to continuously focus on enhancing the social and authentic experience in the destination as this positively influences guests repurchase intentions. Thus, for hosts it is a necessity to incorporate services, such as local guidance, offering information or providing an easy way to explore the city, like city guides designed by local hosts. These attempts lead to loyal behavior. For marketers, the role of authentic and social appeal might lead to new tourism offerings that allow for experiencing these elements more in-depth. Airbnb can develop partnerships with local initiatives to develop a community where tourists are much more integrated. Sharing then goes beyond accommodation but more into the local life experiences too.

5.4 Limitations and future research

This study faces some limitations that are worth mentioning. First of all, replication of this study with a larger sample is needed for the generalizability of the results. Replication studies making use of different data collection techniques could confirm or disprove present findings. Alternatively, future guest profile studies might allow for the weighting of one’s

own sample according to the population's characteristics. Tackling the non-response problem could enhance the quality of the convenience sample. In addition, follow-up studies could incorporate a pre-test to rule out item ambiguity. The operationalization of social and authentic appeal should be validated, which also holds true for the PRR construct. In addition, future studies should include brand theories that can help to explain the users' engagement with peer-to-peer accommodation practices as well as brand communalities. Furthermore, brand identification can contribute to the explanation of further behavioral patterns among tourists, in particular price sensitivity. This would allow marketers to continuously design more appropriate marketing strategies for various segments.

Apart from touristic related items, it would be fruitful to incorporate demographic variables in the whole model to embed the proposed model in an objectively measurable context. This study focused on the issue of PRR, whereas future studies could also integrate trust, in particular brand trust, as a mediating factor of user engagement and participation.

Another interesting research avenue relates to booking behavior under the light of social network analysis. As Airbnb is often an agglomeration of tight networks of friends, it would be interesting to see the patterns in booking behavior within such specific networks and the loyalty-measure could be examined in this respect. On a destination level, tourists' expenditures and behavioral patterns within a destination could be measured through the use of innovative techniques.

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Exploring the customer experience with Airbnb

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Abstract

Purpose – *The purpose of this study is to investigate the multi-dimensional structure of the Airbnb customer experience and to examine the influences of this experience on behavioral outcomes.*

Design/methodology/approach – *A multi-phase methodology was adopted using a survey questionnaire to explore the dimensions. Data were collected from a sample of 561 Airbnb users in the USA. Exploratory factor analysis and confirmed factor analysis were conducted to evaluate the reliability and validity of the scale.*

Findings – *First, the results support the hypothesis that the Airbnb customer experience comprises four dimensions: home benefits, personalized services, authenticity and social connection. Second, the study demonstrates that these dimensions significantly influence customers' behavioral intentions.*

Research limitations/implications – *The use of a US Airbnb users sample may affect the generalizability of the results.*

Practical implications – *The findings of this study provide insights for Airbnb hosts and hotel managers. More specifically, this study offers suggestions to Airbnb hosts about how to enhance their services to customers based on the four experience dimensions and to hotels about how they can compete with Airbnb on the four experience dimensions.*

Originality/value – *This study provides an important theoretical framework for measuring the Airbnb customer experience through an empirical examination.*

Keywords Airbnb, Experience, Scale development

Paper type Research paper

1. Introduction

The sharing economy is having a disruptive influence on the travel industry as a whole (Guttentag, 2015) and is significantly impacting the hospitality and tourism sector (Zhu et al., 2017). Entire communities and cities around the world are using network technologies to do more with less, by renting, lending, swapping, bartering, gifting and sharing products on a scale never seen before (Botsman and Rogers, 2011). The companies driving the sharing economy cross different sectors; Airbnb and CouchSurfing in lodging, Lyft and Uber in transportation and Feastly and EatWith in the restaurant sector. For consumers, these companies are attractive because they offer lower prices, better accessibility, greater flexibility, ease of use and 'a user focused mission', including transparency and interactive communication (Clark, 2014; ITB, 2014).

In the global tourism industry, Airbnb is significantly changing consumption patterns with the social and economic appeals of this new phenomenon affecting expansion in destination selection, increase in travel frequency, length of stay and the range of activities participated in tourism destinations (Tussyadiah and Pesonen, 2016b). The aim of Airbnb is to let tourists "live like a local". In 2016, the company rolled out a new feature called Trips designed to provide travelers with a one-stop shop. The feature focuses on three areas – experiences, places and homes, providing not only accommodations, but also local

Received 30 October 2018
Revised 12 April 2019
Accepted 9 May 2019

experiences. The hallmark of Airbnb Experiences is a new category of bookable one- or two-day excursions, which are designed and led by inspiring locals. Also, Airbnb advertisements address the whole experiential aspect of staying with Airbnb in contrast to the experience of a hotel stay. Airbnb hosts can offer unique experiences and meaningful interactions, allowing customers to try different activities while traveling.

The rise of Airbnb has resulted in an emerging body of academic literature on the topic, covering areas such as: the acceptance of online purchase technology, risk, trust, regulation and reputation of the sharing platform (Chen and Xie, 2017; Ert *et al.*, 2016; Lamberton and Rose, 2012; Mao and Lyu, 2017; Mauri *et al.*, 2018); motivations and constraints to use Airbnb (Cheng and Jin, 2019; Gibbs *et al.*, 2018; Guttentag *et al.*, 2017; Lalicic and Weismayer, 2018; So *et al.*, 2018; Tussyadiah and Pesonen, 2016a; Tussyadiah and Zach, 2017); adoption and participation intention (Amaro *et al.*, 2018; Boateng *et al.*, 2019; Kim *et al.*, 2018; Parguel *et al.*, 2017; Zhu *et al.*, 2017); repurchase intention (Liang *et al.*, 2018a; Liang *et al.*, 2018b; Mao and Lyu, 2017; Wang and Jeong, 2018); pricing strategies (Gibbs *et al.*, 2018; Wang and Nicolau, 2017; Zhang *et al.*, 2018); value co-creation and co-destruction with Airbnb (Camilleri and Neuhofer, 2017; Sthapit, 2018; Johnson and Neuhofer, 2017; Zhang *et al.*, 2018); and the impact of Airbnb on the hotel industry (Akbar and Tracogna, 2018; Blal *et al.*, 2018; Cheng and Foley, 2018; Guttentag, 2015; Zervas *et al.*, 2017). More specifically, So *et al.* (2018) found that the price value, enjoyment and home benefits significantly influence customers overall attitude toward Airbnb. Regarding behavioral intentions, only enjoyment showed great significant effect.

These studies have enriched the literature on the consumer perspectives of Airbnb, yet little is known about the actual consumer experience. Despite an increasing interest in consumer experiences in tourism and hospitality in general (Agapito *et al.*, 2013; Gentile *et al.*, 2007; Oh *et al.*, 2007), empirical research on the conceptualization and measurement of customer experience in the Airbnb sector remains sparse. According to Gilmore and Pine (2002), the society has moved from the commodities economy, goods economy and service economy to the fourth economic stage – experience economy. This transition has significant implications for the tourism and hospitality industry. In the experience economy, people not only seek high-quality products and services, but also want unique and memorable experiences (Guttentag, 2015). Therefore, to better attract and satisfy customers, there is a need for accommodation providers in the sharing economy to understand their customers from an experiential perspective. Hotels would also benefit from a deeper understanding of the sharing economy experience. Hotels often cannot compete with Airbnb on price, but they can compete on experiences (Mody *et al.*, 2017). The research objective of this current study, therefore, is to conceptualize and examine the multi-dimensional structure of Airbnb customer experience and to measure the influence of this experience on customer behavioral intentions.

2. Literature review

This section provides an extensive review of the literature pertaining to customer experience and specifically the dimensions of the Airbnb customer experience proposed in this study. The discussion of previous research and relative theories serves to provide the theoretical foundation for this study.

2.1 Customer experience

The definition of customer experience has been discussed by researchers in the field of business, marketing, tourism and hospitality. But there is no consensus about this definition. Pine and Gilmore (1998) were the first to define customer experience as "events that engage individuals in a personal way". Similarly, Sheth *et al.* (1999)

demonstrated that customer experience is shaped by social, cultural and personal variables. Furthermore, customer experience has been conceptualized as a psychological construct, which "originates from a set of interactions between a customer and a product, a company, or part of its organization" (Shaw and Ivens, 2005, p.16). Gentile *et al.* (2007) defined customer experience as a multi-dimensional construct of elementary components, including sensorial, emotional, cognitive, pragmatic, lifestyle and relational components. Finally, according to Meyer and Schwager (2007, p.118), "customer experience is the internal and subjective response customers have to any direct or indirect contact with a company".

In the context of tourism and hospitality, various studies have examined the dimensions of customer experience (Clemes *et al.*, 2011; Ismail, 2011; Hemmington, 2007; Khan and Rahman, 2017; Knutson *et al.*, 2009; McIntosh and Siggs, 2005; Otto and Ritchie, 1996; Oh *et al.*, 2007; Rageh and Melewar, 2013; Ren *et al.*, 2016; Walls *et al.*, 2011; Zhang *et al.*, 2018) and these studies are summarized in Table I. For example, Knutson *et al.* (2009) identified the dimensions of a hotel experience and found such an experience consists of four factors: benefit, convenience, incentive and environment. More recently, Khan and Rahman (2017) developed a scale to measure hotel brand experiences which include five dimensions – hotel location, hotel stay and ambience, hotel staff competence, hotel website and social media experience and guest-to-guest

Table I Prior studies on customer experience in hospitality services

Autor(s), Year	Dimensions	Study context	Related concept
Otto and Ritchie (1996)	Hedonics, peace of mind, involvement and recognition	Across three different tourism industries: hotels, airlines and tours and attractions	Service experience
Mcintosh and Siggs (2005)	Unique character, personalized service, hominess, quality and value added	Boutique hotels in New Zealand	Experiential consumption and specialist accommodation
Hemmington (2007)	Host–guest relationship, generosity, theater and performance, numerous small surprises and safety and security	A commercial environment	Personal, memorable and add value
Oh <i>et al.</i> (2007)	Entertainment, education, escapism and esthetics	B&B setting	Overall perceived quality, customer satisfaction and memory
Zhang <i>et al.</i> (2008)	Theme and activities, social interactions and physical environment	Economy hotels in China	Cognitive, affective and behavioral aspects of guests
Knutson <i>et al.</i> (2009)	Environment, convenience, driving benefit and incentive	Hotels	Value, service quality, satisfaction and experience
Clemes <i>et al.</i> (2011)	Interaction, physical environment and outcome quality	Motels	Service quality and customer satisfaction
Ismail (2011)	Advertising, price, employees, servicescape, core service, word-of-mouth and mood	Resort hotel brands in British	Perceived service quality and brand loyalty
Rageh and Melewar (2013)	Comfort, educational, hedonic, novelty, recognition, relational, safety and beauty	Resort-hotels in Egypt	
Walls <i>et al.</i> (2011)	Physical environment, human interactions	Three hotel market segments: select-service, mid-scale and upscale/luxury	Emotive value, cognitive value
Ren <i>et al.</i> (2016)	Tangible and sensorial experience, staff aspect, aesthetic perception and location	Budget hotels in China	Customer satisfaction
Khan and Rahman (2017)	Hotel location, hotel stay and ambience, hotel staff competence, hotel website and social media experience and guest-to-guest experience	Hotel brand	Revisit intention and word-of-mouth

experience. Similarly, five experiential dimensions were identified in the boutique accommodation sector: unique character, personalized service, hominess, quality and value added ([Mcintosh and Siggs, 2005](#)). Relatedly, [Ren et al. \(2016\)](#) identified four dimensions of customer experience with budget hotels in China, namely, tangible-sensorial experience, staff relational and interactional experience, aesthetic perception and location. Finally, [Oh et al. \(2007\)](#) have developed a measurement scale of tourists' destination lodging experiences in the bed-and-breakfast (B&B) setting on the basis of [Pine and Gilmore's \(1998\)](#) four realms of experience – entertainment, education, escapism and esthetics – and found that these experiences influence customers' memories and satisfaction. However, the dimensionalities mentioned above are based on full-service hotel setting, boutique accommodation setting and B&B setting, which may not apply into the new consumption model offered by Airbnb sector. Given a lack of reliable and valid scale to measure the Airbnb customer experience, this study initially attempted to develop such a scale.

A few studies have explored the dimensions or variables that influence customer intentions in the sharing economy ([Amaro et al., 2018](#); [Camilleri and Neuhofer, 2017](#); [Wang and Nicolau, 2017](#)). [Amaro et al. \(2018\)](#), for example, conducted an empirical study to explore millennial's intentions to book Airbnb. The results showed that subjective norm, economic benefits and attitude are important determinants of booking intentions for millennials. Millennials prefer authenticity, value for money, flexibility and experiences-over-possessions in their consumption. However, neither did [Amaro et al. \(2018\)](#) consider the social interactions perspective of Airbnb nor did Wang and Nicolau (2018), who identified five categories that determine the price of sharing economy, namely, host attributes, site and property attributes, amenities and services, rental rules and number of online reviews and ratings. More specifically, they found that factors such as accommodation location, the number of bathrooms, bedrooms, real bed, wireless internet and free parking have a significantly positive influence on Airbnb price. Relatedly, [Camilleri and Neuhofer \(2017\)](#) identified the factors in shaping customer value formation, which include welcoming, expressing feelings, evaluating location and accommodation, helping and interaction, recommending and thanking. Their study underlined the importance of basic elements of Airbnb accommodations and addressed the interactions between hosts and guests. More recently, [Ju et al. \(2019\)](#) found that social interaction influences the overall consumer experience in the sharing economy.

2.2 Dimensions of the Airbnb customer experience

Four dimensions were identified in this current study as a result of a comprehensive review of the extant literature on Airbnb experience, namely, home benefits, personalized service, social interactions and authenticity. Each of these dimensions is discussed further in the ensuing section.

Home benefits: More than 85 per cent of people choose Airbnb because of its home benefits ([Guttentag, 2015](#)), and several researchers have found that home benefits and physical utility are important aspects of the Airbnb customer experience ([Lyu et al., 2018](#); [Wang and Jeong, 2018](#)). Previous literature indicates that physical environment ([Knutson et al., 2009](#)), amenities ([Tussyadiah, 2015](#); [Wang and Jeong, 2018](#)), physical utility ([Guttentag, 2015](#); [So et al., 2018](#)) and the location convenience ([Guttentag, 2015](#)) of Airbnb are attractive to customers. [Camilleri and Neuhofer \(2017\)](#) also addressed the importance of basic elements of value co-creation with Airbnb accommodations, such as locations and quiet and local environments. Compared to traditional hotels, Airbnb users are able to choose from a shared airbed to a luxury villa and can use home basic offering like kitchenware, washer and dryer during their stay with Airbnb. These functional attributes of a home enhance the customer experience ([Guttentag, 2015](#)). Atmospherics theory, proposed by [Kotler \(1973\)](#), provides a theoretical foundation for this dimension. As suggested by

[Kotler \(1973\)](#), the term atmospherics was used to describe the layout and designing of the surrounding environment to create effects on customers, which aims to enhance customers' purchasing intention. The theory emphasizes the influence of the physical environment on customer experience and purchase decision. Therefore, home benefits were proposed as one dimension of the Airbnb customer experience.

Personalized service: In the service area, personalization refers to the interaction between different parties ([Tseng and Piller, 2011](#)), and Google's data show that 36 per cent of consumers are willing to pay more for personalized experiences ([Deloitte, 2015](#)). Personalization can also be defined as the process of using a customer's information to deliver a targeted solution to that customer based on interaction ([Vesanen, 2007](#)). Marketers are increasingly addressing the importance of personalization knowing that it influences customer satisfaction and loyalty ([Ball et al., 2006](#)). In the lodging industry, customers respond positively to accommodations that deliver services based on their names, preferences and other personal information ([Nyheim et al., 2015](#)). Airbnb users expect to be treated uniquely ([Lyu et al., 2018](#)). As Airbnb does not provide standardized rooms or service, customers may often obtain special and unexpected experiences from their hosts ([Lyu et al., 2018](#)). Relatedly, [Mody et al. \(2017\)](#) confirmed that in the provision of accommodation experiences, Airbnb outperformed hotels in localness, communitas and personalization. The above-mentioned discussion underlines the importance of personalization service to the Airbnb customer experience. The theory of self-identity supports this dimension of the Airbnb customer experience. In line with the nature of Airbnb, the self-identity theory suggests that customers can identify their values, status, preference and activities ([Becker, 1974](#)) and it further explains why people want personalized products and services ([Marathe and Sundar, 2011](#)). Therefore, personalized service was also proposed as another dimension of the Airbnb customer experience.

Social interaction: Another dimension identified in the Airbnb customer experience literature is social interaction, which refers to the interactions between customer and host and customer and customer ([Lyu et al., 2018](#)). [Mattila and Enz \(2002\)](#) indicated that interpersonal relationships are a crucial part of the customer experience, and in the Airbnb context, the interaction and relationship between guest and host are important in shaping the customer experience ([Guttentag, 2015; Ren et al., 2016](#)). Airbnb customers like to communicate with their hosts via social media in advance of visiting and often expect to meet the hosts on arrival ([Camilleri and Neuhofer, 2017; Lyu et al., 2018](#)). In addition, a shared house with Airbnb provides the opportunity for customer-to-customer interaction ([Tussyadiah, 2015](#)). These interactions and relationships between guests have been shown to provide a pleasant experience ([Lyu et al., 2018; Huang and Hsu, 2010](#)). In addition, the favorable interactions between guests and hosts, such as showing guests around the house and providing a tour around the neighborhood, help shape the co-creation value formation ([Camilleri and Neuhofer, 2017](#)).

The theoretical underpinning of the social interaction dimension is social sharing of emotions theory ([Baumeister and Leary, 1995](#)). Social sharing of emotions is a phenomenon in the field of psychology that concerns the tendency to recount and share emotional experiences with others ([Baumeister and Leary, 1995; Christophe and Rimé, 1997](#)). Numerous tourism researchers have used the social sharing of emotions theory to explain why people express emotions in their social media accounts and to explain how people interact with each other based on their emotions ([Bazarova, et al., 2015; Kivran-Swaine et al., 2103](#)). The empirical findings from these studies have demonstrated that people's overall satisfaction after sharing emotions and experiences are highly based on interaction and social communication. For these reasons, social interaction constitutes an important dimension of Airbnb customer experience.

Authenticity: The link between customer experience and authenticity has been discussed by tourism researchers for decades ([Sharpley, 1994; Wang, 1999](#)). In the

context of tourism and hospitality, authenticity refers to a sense of uniqueness which originates from the local culture (Sharpley, 1994). Previous research has also shown how authenticity plays a crucial role in cultural tourism and that it helps in understanding tourists' behavior, motivation and customer loyalty (Chhabra *et al.*, 2003; Hargrove, 2002; Grayson and Martinec, 2004; Kolar and Zabkar, 2010). For example, in heritage tourism, authenticity has been perceived as a critical factor of a meaningful customer experience (Hargrove, 2002). In the context of sharing economy, researchers have consistently highlighted authenticity as a critical dimension of the Airbnb customer experience (Birinci *et al.*, 2018; Lyu *et al.*, 2018; Paulauskaite *et al.*, 2017), especially for millennials (Amaro *et al.*, 2018). Self-determination theory provides the theoretical base for the dimension of authenticity. According to the self-determination theory, when customers' actions reflect their true-self, in other words, when they are self-determining, they are authentic (Ryan and Deci, 2000).

In retrospect, it is proposed that the Airbnb customer experience is composed of four reflective dimensions; home benefits, personalized service, social interaction and authenticity (Table II), and it is the objective of this research to test this hypothesis to develop a reliable measurement scale for the Airbnb customer experience.

3. Method

Following Churchill (1979) and Netemeyer *et al.* (2003), a multi-phase study was conducted to develop the Airbnb experience measurement scale, which included item generation, item purification and reliability and validity assessment.

3.1 Item generation

Based on the research reviewed above, an initial pool of 25 items was generated to measure the Airbnb customer experience (Table III). The content validity was assessed by a panel of experts, which included three professors, experienced in hospitality and tourism research. They were invited to discuss and evaluate the degree to which each item represented the Airbnb customer experience. They were asked to provide comments on the survey layout, content, wording and understandability and to identify the redundant scale items and other scale problems to improve the proposed survey. Based on their suggestions, all of the items were revised and reorganized.

Table II Potential dimensions of Airbnb customer experience

Dimension	Conceptual definition	Theoretical foundation	Relevant literature
Home benefits	The functional attributes of a home, including home environment, physical utility and security	Atmospherics theory (Kotler, 1973)	Lyu <i>et al.</i> (2018), Wang and Jeong (2018), Guttentag <i>et al.</i> (2017), So <i>et al.</i> (2018) and Camilleri and Neuhofer (2017)
Personalized service	The services that guests can obtain from hosts, including basic services, personalized services and surprise	Theory of self-identity (Becker, 1974)	Lyu <i>et al.</i> (2018), Vesanen (2007) and Nyheim <i>et al.</i> (2015)
Social interaction	The interaction between guest and host and customer and customer	Social sharing of emotions theory (Baumeister and Leary, 1995; Christophe and Rimé, 1997)	Mattila and Enz (2002), Guttentag (2016) and Lyu <i>et al.</i> (2018)
Authenticity	A sense of uniqueness which originates from the local culture (Sharpley, 1994)	Self-determination theory (Ryan and Deci, 2000)	Lyu <i>et al.</i> (2018), Wang and Nicolau (2007) and So <i>et al.</i> (2018)

Table III Source and description of initial item pool

Construct	Source and item description	Total items
Social interaction	Adapted from Richards and Wilson (2006) IN1. The hosts/local community were interacted with me IN2. The hosts/local community were genuinely friendly IN3. The hosts/local community were genuinely helpful IN4. Staying with Airbnb allowed for interaction with other guests IN5. Staying in an Airbnb accommodation helped me make more friends IN6. The hosts/local community were knowledgeable IN7. Airbnb provided me the opportunity to meet people from different ethnic backgrounds	7
Authenticity	Adapted from Ramkissoon and Uysal (2011) AU1. I felt more like a local when I stayed with Airbnb AU2. I felt more engaged with the local community when I stayed with Airbnb AU3. I closely experienced the local culture when I stayed with Airbnb AU4. I was exposed to authentic local villages and markets when I stayed with Airbnb AU5. I could immerse myself in local festivals and other cultural ceremonies during my stay with Airbnb AU6. I visited authentic local restaurants/ food outlets during my stay with Airbnb AU7. Airbnb gave me an opportunity to experience the real day-to-day life of locals	7
Home benefits	Adapted from Guttentag (2016) and Johnson and Neuhofer (2017) HB1. The design and decoration of my Airbnb accommodation were attractive HB2. Airbnb offered a feeling of a real home for my trip HB3. Using Airbnb when traveling delivered a sense of belonging HB4. I like home-like amenities when I stayed with Airbnb HB5. I felt a sense of harmony when I stayed with Airbnb	5
Personalized services	Adapted from Nyheim et al. (2015) CS1. Airbnb offered an entertaining accommodation experience CS2. During my stay with Airbnb, local hosts provided me with personalized guidance CS3. Airbnb communications and services provided me with recommendations that were tailor-made for me CS4. Personalized communication and services from Airbnb made me feel that I was a unique customer CS5. I received unexpected benefits during my stay with Airbnb CS6. I experienced unexpected good experiences during my stay with Airbnb	6

3.2 Item purification

Subsequently, a pilot study with a convenience sample of 191 college students was conducted. An online data collection company, Amazon's Mechanical Turk (MTurk), was employed to access and approach the potential respondents. Respondents were asked to comment on a seven-point Likert scale (from 1 = strongly disagree to 7 = strongly agree) and to indicate the extent to which they disagreed or agreed with the 25 items regarding their overall Airbnb experience.

Of the 300 potential respondents, 191 respondents completed the survey, a response rate of approximately 63.7 per cent. Kaiser–Meyer–Olkin (KMO) of sampling adequacy and Bartlett's test of sphericity were calculated to ensure the adequacy of the sample and the appropriateness of exploratory factor analysis (EFA). KMO values for social interaction, authenticity, home benefits and personalized services were 0.91, 0.88, 0.84 and 0.87, respectively. All the values were greater than the recommended level of 0.60 (Tabachnick and Fidell, 2001). Additionally, the Bartlett's test of sphericity was 2,592.86 ($p < 0.01$), indicating EFA is appropriate. Subsequently, an EFA was conducted and six items (IN5, IN6, IN7, AU1, AU6 and HB5) with factor loadings lower than 0.4, and items with cross-loadings (i.e. one item was loaded on two factors with factor loading higher than 0.4) were eliminated (Field, 2013). To expect correlated factors, a factor analysis using the maximum likelihood estimation method with oblique rotation was performed on the remaining 19 items. After the factor extraction, a final four-factor model with 19 items explaining 69.61 per cent of the total variance was achieved. As shown in [Table IV](#), the Cronbach's α value of each factor was higher than 0.7 ([Hair et al., 2006](#)) and all items loaded on the intended factor.

Table IV Exploratory factor analysis results for initial measurement

Dimension and item description	Social interaction	Authenticity	Home benefits	Personalized services	δ
<i>Social interaction</i>					0.91
IN1. The hosts/local community were interacted with me	0.81				
IN2. The hosts/local community were genuinely friendly	0.85				
IN3. The hosts/local community were genuinely helpful	0.81				
IN4. Staying with Airbnb allowed for interaction with other guests	0.43				
<i>Authenticity</i>					0.88
AU2. I felt more engaged with the local community when I stayed with Airbnb		0.56			
AU3. I closely experienced the local culture when I stayed with Airbnb		0.75			
AU4. I was exposed to authentic local villages and markets when I stayed with Airbnb		0.81			
AU5. I could immerse myself in local festivals and other cultural ceremonies during my stay with Airbnb		0.67			
AU7. Airbnb gave me an opportunity to experience the real day-to-day life of locals		0.80			
<i>Home benefits</i>					0.84
HB1. The design and decoration of my Airbnb accommodation were attractive			0.80		
HB2. Airbnb offered a feeling of a real home for my trip			0.48		
HB3. Using Airbnb when traveling delivered a sense of belonging			0.72		
HB4. I like home-like amenities when I stayed with Airbnb			0.73		
<i>Personalized services</i>					0.87
CS1. Airbnb offered an entertaining accommodation experience				0.55	
CS2. During my stay with Airbnb, local hosts provided me with personalized guidance				0.71	
CS3. Airbnb communications and services provided me with recommendations that were tailor-made for me				0.66	
CS4. Personalized communication and services from Airbnb made me feel that I was a unique customer				0.72	
CS5. I received unexpected benefits/advantages during my stay with Airbnb				0.74	
CS6. I experienced unplanned and unexpected good experiences during my stay with Airbnb				0.63	

3.3 Reliability and validity assessment

To refine the measurement items, a main study was conducted. The target population included adult consumers (i.e. individual over the age of 18) who had used Airbnb during their previous trips in the USA within past 12 months. The survey was developed on Qualtrics and the data were collected through MTurk in March 2018. To begin with, one screening question “Have you ever used Airbnb in the last 12 months?” was used to identify eligible respondents. Thus, only respondents that had used Airbnb in the past 12 months were qualified in this current study. In addition, three attention questions were included to identify careless responses. Respondents who failed to check the attention questions were eliminated from this study. Finally, each respondent who completed the survey was compensated US\$0.50. In total, 789 respondents participated in the survey. After data cleaning, 561 valid samples were retained for data analysis, resulting in a response rate of approximately 71.1 per cent.

Within the sample, 55.6 per cent of the respondents were female and 44.4 per cent of the respondents were male. Regarding the distribution of age, there were 55.8 per cent of the respondents were between age 21 and 30 years, 27.6 per cent were between age 31 and 40 years, 11.2 per cent were between age 41 and 50 years, 3.4 per cent were between age

51 and 60 years, 1.7 per cent were between age 61 and 70 years and 0.3 per cent were over age 70 years. Hence, among the 561 respondents representing adults in the USA who have stayed with Airbnb during their previous trips, gender was evenly distributed with slightly more female respondents in the sample. Most of the respondents were between 21 and 40 years old (83.4 per cent). The demographic variables of this study are in line with a recent industry report. According to the report provided by [Pew Research Center \(2016\)](#), the general age of Airbnb users is between 18 and 35 years.

3.1.1 Calibration sample. To establish the construct reliability and validity, the entire sample ($N = 561$) was randomly split into two subsamples: calibration sample ($N = 281$) and validation sample ($N = 280$) ([Hinkin, 1995](#); [Netemeyer et al., 2003](#)). Subsequently, a confirmatory factor analysis (CFA) was conducted on the calibration sample to assess the measurement model. AMOS 22.0 was used to analyze the data. The initial CFA was evaluated with all four latent factors correlated with each other as first-order factors. The model goodness-of-fit indices indicated a moderately fitted model: $\chi^2 = 569.09$, $df = 164$, $\chi^2/df = 3.47$, $p < 0.01$, comparative fit index (CFI) = 0.87, Tucker–Lewis index (TLI) = 0.92, normed fit index (NFI) = 0.86, root mean square error of approximation (RMSEA) = 0.09 and standardized root mean square residual (SRMR) = 0.09.

To improve the model fit, [Kline \(2011\)](#) indicated that modification indices should be examined. Allowing covariance between pairs of error will significantly improve the model fit. Covariance was drawn between the error of “CS3” (Airbnb communications and services provided me with recommendations that were tailor-made to me) and “CS2” (During my stay with Airbnb, local hosts provided me with personalized guidance). Additionally, modification indices indicated that covariance between error of “HB1” (The design and decoration of my Airbnb accommodation were attractive) and “HB4” (I like home-like amenities when I stayed with Airbnb); covariance between error of “AU4” (I was exposed to authentic local villages and markets when I stayed with Airbnb) and “AU5” (I could immerse myself in local festivals and other cultural ceremonies during my stay with Airbnb) improved the model fit. After allowing the covariance between three pairs of errors, the revised model indicated a reasonable model fit: $\chi^2 = 458.758$, $df = 143$, $\chi^2/df = 3.20$, $p < 0.01$, CFI = 0.947, TLI = 0.94, NFI = 0.925, RMSEA = 0.064 and SRMR = 0.079. [Table V](#) shows the results.

3.1.2 Construct reliability and validity. Cronbach’s α value was adopted to assess the construct reliability ([Fornell and Larcker, 1981](#)). As shown in [Table IV](#), Cronbach’s α values of all factors were greater than the cut-off value of 0.7 ([Fornell and Larcker, 1981](#)), with composite reliability values ranging from 0.85 to 0.89. Additionally, the average variance extracted (AVE) of all the constructs was above the accepted cut-off value of 0.5 ([Fornell and Larcker, 1981](#)).

Construct validity was tested through convergent and discriminant validity of the measured constructs. Convergent validity was evaluated by inspecting the magnitude and statistical significance of the factor loadings of the measurement items, as well as the AVE of each factor exceeded 0.50 ([Netemeyer et al., 2003](#); [Hair et al., 2006](#)). As [Table IV](#) shows, standardized factor loadings for all items were greater than 0.7 ([Hair et al., 2006](#)). The t -values for all loadings exceeded the critical value of 2.57, supporting the convergent validity ([Netemeyer et al., 2003](#)). Furthermore, discriminant validity was also supported – the square root of the AVE of each factor is greater than their correlations with other factors ([Fornell and Larcker, 1981](#)). Therefore, the results show that the scales were valid and reliable. [Table VI](#) presents the results.

3.1.3 Dimensionality. To confirm the appropriateness of the dimensionality of the scale, a comparison between different dimensional models was examined ([DeVellis, 2016](#); [So et al., 2014](#)). First, a CFA was conducted with all 19 items loading on one factor, as suggested by [So et al. \(2014\)](#). The one-factor model demonstrated worse model fit than the four-factor model with $\chi^2 = 1,678.47$, $p < 0.01$ ([Table VII](#)). Additionally, a three-factor model was

Table V Confirmatory factor analysis results (calibration sample)

Dimension and item description	SL	TV	CR	AVE
<i>Social interaction</i>				0.89 0.67
IN1. The hosts/local community were interacted with me	0.84	13.97		
IN2. The hosts/local community were genuinely friendly	0.85	14.23		
IN3. The hosts/local community were genuinely helpful	0.82	13.56		
IN4. Staying with Airbnb allowed for interaction with other guests	0.76	N/A		
<i>Authenticity</i>				0.89 0.61
AU2. I felt more engaged with the local community when I stayed with Airbnb	0.73	12.80		
AU3. I closely experienced the local culture when I stayed with Airbnb	0.82	14.87		
AU4. I was exposed to authentic local villages and markets when I stayed with Airbnb	0.79	14.12		
AU5. I could immerse myself in local festivals and other cultural ceremonies during my stay with Airbnb	0.75	13.14		
AU7. Airbnb gave me an opportunity to experience the real day-to-day life of locals	0.81	N/A		
<i>Home benefits</i>				0.85 0.58
HB1. The design and decoration of my Airbnb accommodation were attractive	0.73	14.96		
HB2. Airbnb offered a feeling of a real home for my trip	0.73	11.99		
HB3. Using Airbnb when traveling delivered a sense of belonging	0.82	13.71		
HB4. I like home-like amenities when I stayed with Airbnb	0.77	N/A		
<i>Personalized services</i>				0.88 0.56
CS1. Airbnb offered an entertaining accommodation experience	0.79	11.36		
CS2. During my stay with Airbnb, local hosts provided me with personalized guidance	0.74	10.62		
CS3. Airbnb communications and services provided me with recommendations that were tailor-made for me	0.74	10.81		
CS4. Personalized communication and services from Airbnb made me feel that I was a unique customer	0.79	11.42		
CS5. I received unexpected benefits during my stay with Airbnb	0.70	11.29		
CS6. I experienced unexpected good experiences during my stay with Airbnb	0.72	N/A		

Notes: $\chi^2 = 458.758$; $df = 143$; $\chi^2/df = 3.2$; $p < 0.01$, comparative fit index = 0.947; Tucker–Lewis index = 0.94; normed fit index = 0.925; root mean square error of approximation = 0.064 and standardized root mean square residual = 0.079; SL = standardized loadings; TV = *t*-value; CR = composite reliability and AVE = average variance extracted

Table VI Discriminant validity analysis from confirmatory factor analysis

	Social interaction	Authenticity	Home benefits	Personalized service
Social interaction	0.82			
Authenticity	0.71	0.78		
Home benefits	0.32	0.34	0.76	
Personalized service	0.3	0.37	0.56	0.73

Notes: The italicized diagonal numbers are the square root of the variance shared between the constructs and their measures. Off-diagonal numbers represent the correlations between constructs

Table VII Model comparisons for dimensionality

Competing models	X ²	df	p-value	NFI	TLI	CFI	RMSEA
One-factor model	1,678.47	152	0	0.49	0.45	0.51	0.20
Three-factor model	454.43	149	0	0.86	0.89	0.90	0.09
Four-factor model	390.39	143	0	0.89	0.95	0.93	0.08

Notes: NFI = normed fit index; TLI = Tucker–Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation

tested by allowing two factors unchanged and allowing two most highly correlated factors (social interaction and authenticity) into one factor. The three-factor model showed worse model fit than the four-factor model with $\chi^2 = 454.43$, $p < 0.01$ (**Table VII**). Therefore, the results of dimensionality analysis supported the appropriateness of the four-factor model.

3.1.4 Validation sample. Similarly, a CFA was conducted on the validation sample ($N = 280$) (Table VIII). The composite reliability (CR) of all four factors were greater than the recommended cut-off of 0.7 and the AVEs were greater than 0.5. In addition, the standardized factor loadings were strong and t -values exceeded the critical value of 2.75. The results supported the proposed model with $\chi^2 = 509.05$, $\chi^2/df = 3.51$, $p < 0.01$, CFI = 0.94, TLI = 0.93, NFI = 0.92, RMSEA = 0.07 and SRMR = 0.08.

3.1.5 Factor invariance test. To get a valid scale, a multi-group CFA was conducted to examine the equality of the factor loadings across the calibration and validation samples. Both the unconstrained model and fully constrained model were tested. The results of both unconstrained and constrained models suggested good model fit. The chi-square difference between the two models was non-significant ($p > 0.05$), indicating that the factor loadings were invariant across the calibration and validation samples.

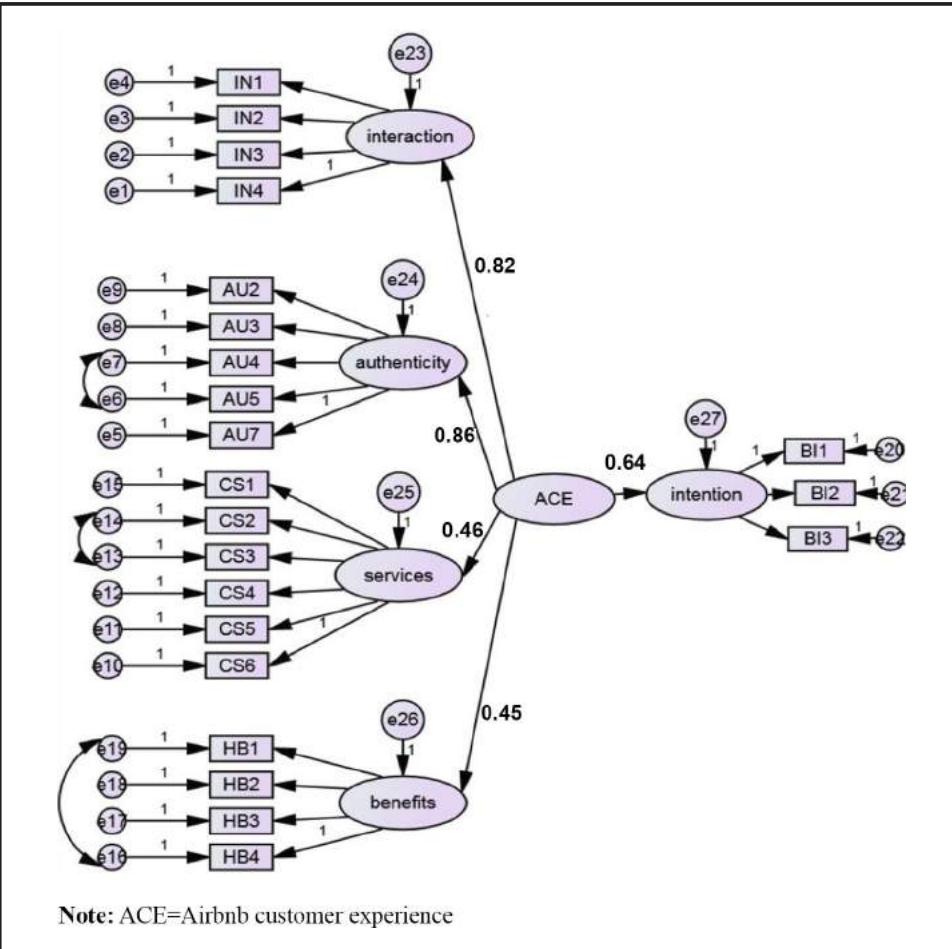
3.1.6 Test the effect of Airbnb customer experience on behavioral intentions. To examine the predictive validity, this study used behavioral intentions as a predictive variable. Past research has shown that customer experience has an impact on behavioral intentions (Brakus et al., 2009; Kim et al., 2012; Ren et al., 2016; Oh et al., 2007). Therefore, Airbnb customer experience was hypothesized to significantly influence customer behavioral intentions. The results of the model test showed that the model fit was accepted for the entire sample ($N = 581$) with $\chi^2 = 1,143.52$, $\chi^2/df = 5.61$, $p < 0.01$, CFI = 0.88, TLI = 0.92, NFI = 0.87, RMSEA = 0.07 and SRMR = 0.06 (Figure 1). The results suggested that Airbnb customer experience is a significant predictor of behavioral intentions ($\beta = 0.64$, $t = 11.23$, $p < 0.001$), explaining 62 per cent of the variance. Therefore, the results show that the Airbnb customer experience plays an important role in influencing customers' behavioral intentions.

Table VIII Confirmatory factor analysis results (validation sample)

Dimension and item description	SL	TV	CR	AVE
<i>Social interaction</i>				
IN1. The hosts/local community were interacted with me	0.85	18.72	0.88	0.65
IN2. The hosts/local community were genuinely friendly	0.83	18.32		
IN3. The hosts/local community were genuinely helpful	0.81	17.81		
IN4. Staying with Airbnb allowed for interaction with other guests	0.72	N/A		
<i>Authenticity</i>			0.88	0.59
AU2. I felt more engaged with the local community when I stayed with Airbnb	0.76	18.74		
AU3. I closely experienced the local culture when I stayed with Airbnb	0.83	20.93		
AU4. I was exposed to authentic local villages and markets when I stayed with Airbnb	0.73	17.91		
AU5. I could immerse myself in local festivals and other cultural ceremonies during my stay with Airbnb	0.71	17.38		
AU7. Airbnb gave me an opportunity to experience the real day-to-day life of locals	0.80	N/A		
<i>Home benefits</i>			0.83	0.54
HB1. The design and decoration of my Airbnb accommodation were attractive	0.7	20.64		
HB2. Airbnb offered a feeling of a real home for my trip	0.71	15.59		
HB3. Using Airbnb when traveling delivered a sense of belonging	0.81	17.59		
HB4. I like home-amenities when I stayed with Airbnb	0.72	N/A		
<i>Personalized services</i>			0.89	0.57
CS1. Airbnb offered an entertaining accommodation experience	0.78	16.31		
CS2. During my stay with Airbnb, local hosts provided me with personalized guidance	0.72	14.36		
CS3. Airbnb communications and services provided me with recommendations that were tailor-made for me	0.73	15.50		
CS4. Personalized communication and services from Airbnb made me feel that I was a unique customer	0.78	16.39		
CS5. I received unexpected benefits during my stay with Airbnb	0.70	13.84		
CS6. I experienced unexpected good experiences during my stay with Airbnb	0.71	N/A		

Notes: $\chi^2 = 509.05$; $\chi^2/df = 3.51$; $p < 0.01$; goodness-of-fit index = 0.91; comparative fit index = 0.94; Tucker–Lewis index = 0.93; normed fit index = 0.92; root mean square error of approximation = 0.07 and standardized root mean square residual = 0.08; SL = standardized loadings; TV = t -value, CR = composite reliability; AVE = average variance extracted and N/A = not applicable

Figure 1 Structural model tested in AMOS



4. Discussion

The study aimed to understand the multi-dimensions of the customer experience with Airbnb and to develop a reliable and valid measurement scale. To achieve this, a multi-phase research study was designed to explore four dimensions of the Airbnb customer experience – home benefits, personalized services, authenticity and social interactions. Factor analysis was used to identify the latent factors and CFA was used to refine the measurement scale. The comparison of three competing models provided strong support for the proposed four-factor model. Reliability and validity were assessed based on the results. The study also investigated the relationships between Airbnb experiences and behavioral intentions.

The results confirmed that the basic elements of accommodation, like cleanliness, home atmosphere and home amenities, were important for Airbnb customers. Consumers are eager to explore different styles of accommodations (Elizaveta, 2016), and the Airbnb platform provides various types of accommodations all over the world, from cabins to boats to castles. For all these categories of accommodation, home benefits are important. This finding is in line with prior research. For example, Guttentag *et al.* (2017) suggest that functional value, like home facilities and convenient location, often explain why customers choose Airbnb.

Personalized service is also found to be a critical component of customer experience with Airbnb. Personalized service is not only a major motivation that attracts customers but also

a highlight of their stay ([Lyu et al., 2018](#)). The personalized service creates a feeling of “a home away from home” for the customers ([Trivett and Staff, 2013](#)). In addition, this personalized service means that customers get access to the local knowledge and culture with the help of Airbnb hosts. That local information adds to the enjoyment of customers. Customers feel more unique and more satisfied with personalized service, which also helps to build customer loyalty ([Mcintosh and Siggs, 2005](#)).

But the two dimensions of authenticity and social interaction were particularly important for consumers of Airbnb. Through the Airbnb experience platform, customers can immerse themselves in the local community by attending hand-made classes hosted by local residents. In addition to Airbnb, there are other types of sharing economy platforms that have focused on authenticity. For example, ToursbyLocals and Your Local Cousin are offering visitors with authentic tours from ‘people who loved their cities’ ([Hudson and Li, 2018](#)). Social interaction with hosts and local community is also a critical construct to be considered when looking at the Airbnb lodging experience ([Mody et al., 2017](#)). This supports previous research that suggests that travelers are demanding unique experiences which involve meaningful interactions with locals ([Grayson and Martinec, 2004; Tussyadiah and Pesonen, 2016a, 2016b](#)).

4.1 Theoretical implications

The results demonstrate that the Airbnb customer experiences are reflected in the four underlying dimensions proposed in this study. From a theoretical perspective, the scale can serve as a foundation for future studies and enhance the understanding of Airbnb customer experience by empirically exploring the determinants and outcomes of the experience. For example, [Larsen \(2007\)](#) and [Wijaya et al. \(2013\)](#) proposed that factors influencing Airbnb customer experience include past experience, familiarity, personal memories and brand image. [Knutson et al. \(2010\)](#) proposed that customer experience influences both brand-related behaviors (i.e. brand attachment, brand loyalty and brand satisfaction) and behavioral-related intentions (i.e. repurchases intentions, willingness to pay and word-of-mouth). These relationships can be empirically examined using the Airbnb customer experience scale presented in this study.

4.2 Managerial implications

The sharing economy has expanded in recent years but is facing increased competition, particularly from budget hotels and boutique hotels. Players in the sharing economy, therefore, need to develop distinctive markets and brand positions to differentiate themselves from the competition. A deeper understanding of the customer experience will allow them to do this. For example, Airbnb hosts should continue to enhance each of the dimensions identified in this study, especially by focusing on authenticity and social interaction, given their high factor loadings. To improve authenticity, hosts could provide more local information and cultural resources, like local cuisine, local festival and events and local activities ([Ramkissoon and Uysal, 2011](#)). Social interaction can be enhanced by providing engagement opportunities between customers and local community, between customers and hosts ([Levy et al., 2011](#)). Today’s consumers are seeking activities in local neighborhoods and communities, like carving, cooking, painting, dancing and hat-making classes ([Airbnb, 2018](#)).

Furthermore, this study indicates that the Airbnb experience has a positive influence on customer future behavioral intentions. Therefore, marketers and Airbnb hosts should focus on creating comfortable, clean and attractive lodging attributes, along with providing personalized services and access to unique local cultures.

The scale developed in this study could also be applied outside the sharing economy. In the past few years, Airbnb has taken more and more market share from the hotel industry –

particularly from lower-end hotels ([Zervas et al., 2017](#)). While big hotel chains are satisfied to simply monitor the development of Airbnb, others are seeking to counteract the possible threat of loss of business ([Varma et al., 2016; Hudson and Li, 2018](#)). By applying this measurement scale, hotel managers could better understand how to compete with Airbnb and focus on the enhancement of each experience dimension. For example, a sense of home can be enhanced by room decoration and providing customers a communal room to share a kitchen, dining room and lounge area. Marriott's Element hotel has already done this ([Trijos, 2017](#)). Moreover, to increase social interaction, hotel managers need to establish an emotional connection with guests, to address place identity and psychological connection to a destination ([Taylor, 2016](#)). In response to a growing demand for authentic experiences on behalf of travelers, hotels need to introduce experiences and excursions that offer a sense of place and insight into their locality ([Hudson and Li, 2018](#)). Finally, personalized service at hotels may be improved before the stay (i.e. targeted advertisement), during the stay (i.e. meet customers' preferences) and after the stay (i.e. send personal email to check satisfaction) ([Lad, 2018; Mody et al., 2016](#)). In sum, to compete with the sharing economy, hotels of future need to completely change and build more personal connections with and between guests ([Deloitte, 2016](#)).

5. Conclusion

This study furthered our understanding of consumer evaluations of Airbnb by presenting the conceptualization and measurement of the Airbnb customer experience. As a result of conducting this research, a reliable and valid four-dimensional Airbnb customer experience scale was developed through the multi-stage scale development process. Three competing models were compared, and the results confirmed that the proposed four-factor model fits the data best and indicated that the Airbnb customer experience predicts future behavioral intentions. The Airbnb customer experience scale can be used to examine the linkages between focal construct of the Airbnb customer experience and other theoretically relevant but underexplored constructs within the growing body of literature. Overall, the findings in this study provide a fruitful foundation for future research.

5.1 Limitations and future research directions

Like most studies, this research does have some limitations. First, the sample frame of this study were Airbnb users in the USA, which may influence the generalizability of the scale. Future studies could explore the differences between the Airbnb experience of US users and those of other countries. More research of this type across different cultures and regions would be beneficial to both Airbnb hosts and hotel managers. Second, the demographic characteristics of the respondents may limit the generalization of this study. More than half of the respondents were aged between 21 and 30 years. Such a young sample may not represent the whole population. Future research could, therefore, explore the Airbnb customer experience across different generations (i.e. baby boomers, generation X and millennials). Additionally, this study has investigated the Airbnb customer experience from a positive perspective. However, the experience can also be influenced by negative dimensions. Therefore, future studies could explore how negative Airbnb customer experiences may influence related outcomes.

Finally, to build on this study, future research could conduct an empirical study to compare and contrast customers' experiences of Airbnb and hotels. As more customers are choosing Airbnb over traditional hotels, the results would be of particular interest to hotel managers. Future research can also assess factors that might be affected by the Airbnb customer experience. For example, the experience can lead to various consequences, such as brand attachment ([Brakus et al., 2009; Malär et al., 2011; Thomson et al., 2005](#)), customer emotions ([Lee and Kim, 2018; Ryu et al., 2010](#)), customer values ([Smith and Colgate, 2007](#)), brand-related behaviors and behavioral-

related intentions ([Knutson et al., 2010](#)). These consequences can be tested using the scale presented in this study. This would provide a holistic understanding of the customer experience in the context of Airbnb.

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Further reading

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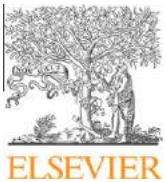
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From virtual community members to C2C e-commerce buyers: Trust in virtual communities and its effect on consumers' purchase intention

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ARTICLE INFO

Article history:

Received 10 April 2008

Received in revised form 9 May 2009

Accepted 13 July 2009

Available online 17 July 2009

Keywords:

Virtual communities

Trust

Information search

Purchase

ABSTRACT

In China, major C2C websites are focusing on increasing their customer bases by converting members of their virtual communities (VCs) into C2C buyers and sellers. This phenomenon is called e-commerce based on social networks (ESN). The current research analyzes what factors affect trust building among VC members and how this trust influences the trust in the C2C website or vendor. We propose and empirically test a model of trust in VCs based on the trust formation mechanism. Using data collected from Taobao Virtual Community, we show that familiarity, perceived similarity, structural assurance, and trust propensity are important antecedents to trust in members in VCs. Analyses of the two kinds of trust show that trust in members' ability significantly affects three dimensions of trust in the vendor/website in terms of ability, integrity, and benevolence. In addition, trust in members' integrity and benevolence stimulates the purchase intention and trust in the vendor/website's ability positively affects the intention to get information and the purchase intention.

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1. Introduction

Search and virtual communities are reliable underpinnings of consumer-to-consumer e-commerce.

— Yanhong Li, CEO of Baidu.com, Inc. (Xu 2007)

With the development of the Internet and Web 2.0, many new business models have emerged, among which are virtual communities (VCs). iResearch Consulting Group, an Internet marketing research firm in China, revealed that 45.3% of the country's VCs emerged in 2007 (iResearch 2007b). In China, VCs have become the forums where Web users express themselves, get information, interact with each other, and establish their social networks. These VCs provide effective platforms for the development of e-commerce based on social networks (ESN), which refers to e-commerce based on the contents on and user base of VCs (iResearch 2008c). ESN, which involves transactions by VC members, is a new business trend emerging in China with the development of Web 2.0. Practitioners and researchers consider ESN promising for several reasons. First, the popularity of VCs in China makes ESN possible. VCs appeal to a large number of Web users because of their open-

ness, interactivity, and the ability to connect many people with similar interests. This is evident in that there were more than 105 million VC users at the end of 2007 (iResearch 2008b). Second, VCs allow companies to more easily execute targeted marketing campaigns since VC forums usually attract individuals with similar interests and preferences. For example, notebook or automobile manufacturers can advertise their products in those VCs that focus on computers or cars, respectively. Finally, VCs enjoy a higher customer conversion rate than other business models, such as portals, service providers, and content providers. They also allow companies to increase customer loyalty (Bughin and Zeisser 2001, iResearch 2007b).

Many companies that provide Internet services in China have already attempted to provide their existing VC users transaction functions such as buying and selling products and services or to enhance VC services for their existing transaction platforms. Consumer-to-consumer (C2C) e-commerce, the most successful e-commerce business model in China accounting for 93% of all Internet transactions in the second quarter of 2008, is one such example (iResearch 2008a). As Table 1 shows, there are four main C2C platforms in China, whose providers are Alibaba, TOM and eBay, Tencent, and Baidu, respectively. Taobao (provided by Alibaba) had the largest C2C market share (83.9%), followed by Eachnet (eBay China, 8.7%) and PaiPai (provided by Tencent, 7.4%) (CNNIC 2008). What is evident in Table 1 is that these major C2C providers all rely on VCs to promote member communication and knowledge sharing, which is a prominent characteristic of the

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Table 1

C2C platforms and VC services provided in China.

Provider	Virtual community service		C2C platform	
	Name	Description	Name	Description
Alibaba	Taobao VC	A forum established in 2003 for buyers and sellers of Taobao	Taobao	Time founded: May 2003 C2C market share: 83.9% http://www.taobao.com
	Taobao Wangwang	An instant messaging (IM) tool provided by Taobao to encourage the communication among members.		
	Taobao Ask	A new function established in 2008 for Taobao members to share knowledge		
	Eachnet VC	A forum established in 2007 for buyers and sellers of Eachnet	Eachnet	Time founded: 2007 C2C market share: 8.7% http://www.eachnet.com
Tencent	Tencent QQ	An IM software launched in 1999 with 800 million registered users and 318 million active users now.	Paipai	Time founded: March 2006 C2C market share: 7.4% http://www.paipai.com
	Q-Zone	An online space started in 2005 with more than 200 million users for presentation, information exchange, and interaction with each other		
	QQ Game	A platform for online games with 200 million registered players and 4 million playing QQ games simultaneously		
	SOSO Ask	A website started in 2006 for knowledge sharing with 65 million questions answered already		
Baidu	Tieba	A forum started in 2003 with more than 300 thousand sub-forums and two billion posts. Users can create sub-forums for new topics	Youa	Time founded: October 2008 C2C market share: N/A http://youa.baidu.com
	Baidu Baike	The largest online encyclopedia in China started in 2006 with more than 1.38 million topics now		
	Baidu Zhidao	A website started in 2005 for knowledge sharing with 44 million questions answered so far		
	Baidu Hi	An IM software rolled out in 2008 for communication with others		

Note: Market share data are from CNNIC (2008).

Chinese e-commerce marketplace. In addition, these VCs help increase website stickiness and encourage VC members to participate in C2C transactions (iResearch 2007b). This is also evident in a case study Chen et al. (2007) conducted on Taobao and Eachnet, where they found that participation in online communities enhances customer loyalty to C2C websites. Though previous research has examined VCs in detail, no such research has empirically tested the link between VCs and C2C e-commerce. Due to the special e-commerce landscape in China and the emergence of ESN, it is important that we examine factors that affect this conversion process.

For C2C platform providers, using VCs to facilitate members' communication and converting VC members to C2C buyers and sellers are critical to their success. To achieve this goal, trust is a major issue that baffles C2C development in China as more than half of the offline-only consumers do not purchase online because of their distrust of the digital channel (Analysys 2008). For example, a large number of counterfeit products are sold on these websites (Fitzpatrick 2006, Wang 2009). Though some C2C websites such as Taobao and Youa have taken actions to prevent the sale of counterfeit products (B2B Trade International 2009, China Tech News 2006), the phenomenon still exists. Some C2C sellers post fake product pictures taken from magazines or other websites and send buyers inferior knockoff products. An informal survey by Sina.com revealed that more than 70% of the respondents had bought fake products online and worried about making purchases on C2C websites in the future (Sina 2009). Hence, we believe trust is especially important for the success of C2C websites in China. VCs are considered an effective way to overcome this obstacle for two reasons. First, VCs allow members to obtain information or support from each other. Many people go to VCs to search product-related information. They are influenced by the opinions of VC leaders and other members. A recent report shows that word-of-mouth marketing has great potential in VCs (iResearch 2007b). Second, VCs can be an effective medium to facilitate trust building in the digital marketplace. Ba (2001) used game theory to show that a community agent will be more effective than an individual agent in assuring the continuity of trust building processes because a community with an infinite life would overcome the limitation that an individual agent might cheat during the last transaction.

She also proved that building trust at the community-level has lower costs than at the individual-level (Ba 2001). Hagel and Armstrong (1997) predicted that community-based transaction will be the future of community-based marketplace.

In this research, we examine trust building in VCs provided by C2C websites and how it affects consumers' intentions to get information and purchase from these websites. The main contributions of our research are relating VCs to C2C e-commerce and examining the conversion from VC members to C2C buyers. Here we focus on C2C buyers only as the factors that affect transaction behaviors may be different for buyers and sellers. Our research is motivated by the strong tie between VCs and C2C websites in China and the increasing popularity of ESN. We investigate the roles of familiarity and perceived similarity in building online interpersonal trust. These two factors were not examined in previous research on trust and VCs. We also decompose trust in the vendor or website into three constructs – ability, integrity, and benevolence – and study the relationships between these dimensions and trust in members. Neither of the two previous researches on trust in VCs examined these relationships.

Our paper is organized as follows. In Section 2, we first discuss the various definitions of VC and identify different types of VCs in China, then we review the extant literature on trust. Next, we propose the research model and explain in detail our hypotheses in Section 3. In Section 4, we discuss the research methodology including the processes of instrument development, data collection, and analysis, followed by the results, their implications, limitations, and suggestions for future work in Section 5. Finally, we conclude with Section 6.

2. Literature review

In this section, we discuss different types of VCs and review the related literature on trust in e-commerce.

2.1. Definitions and types of virtual communities

Researchers have defined VC or online community differently. Rheingold (1993) focused on the technological aspect of VC and

defined it as “social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace”. He argued “whenever computer-mediated communications technology becomes available to people anywhere, they inevitably build communities with it”. Fernback and Thompson (1995) recognized the importance of “social relationships” and defined a VC as “social relationships forged in cyberspace through repeated contact within a specified boundary of place (e.g., a conference or chat line) that is symbolically delineated by topic of interest”. Hagel and Armstrong (1997) distinguished between member-generated contents in VCs and provided information service. Williams and Cothrel (2000) pointed out “common interests” as an important aspect of VCs.

Four common characteristics of a VC can be summarized based on previous research: (1) it exists in the cyberspace; (2) it uses information technologies; (3) it is used for communication and interaction around common interests, and most of its contents are user generated; and (4) it allows the formation of social relationships. In this study, we adopt the definition Lee et al. (2003) gave, where “*a virtual community is a cyberspace supported by computer-based information technology, centered upon communication and interaction of participants to generate member-driven contents, resulting in a relationship being built up*”.

Researchers have also developed different classification schemes of VCs. In this study, we use the widely adopted four categories that Armstrong and Hagel (1996) identified including: (1) *interest communities* in which people who share an interest or expertise on a specific topic gather together to communicate with each other; (2) *relationship communities* in which people with similar experiences come together and form meaningful personal relationships; (3) *fantasy communities* which usually refer to online games and in which people come together to get fantastic experiences; and (4) *transaction communities* that focus on transaction needs and where people can get trading information. Moreover, transaction communities can be further classified into business-to-business (B2B) and consumer-focused VCs. The former includes various types as vertical industry, geographic, functional, and business type publics, whereas the later consists of geographic, demographic, or topical publics (Jones and Rafaeli 2000). Based on this classification scheme, we show in Table 2 the most popular VCs in China.

Table 2
Popular virtual communities in China.

<i>Transaction communities:</i> VCs that focus on transaction needs and people can get trading information	
Alibaba	http://club.china.alibaba.com A B2B website that provides discussion forums for small enterprises to communicate and exchange business information
Taobao	http://forum.taobao.com A C2C website that provides discussion forums for individual buyers and sellers to communication
Paipai	http://bbs.paipai.com A C2C website founded recently. Its fast development is based on the large user base of Tencent QQ, an IM software
Taskcn	http://witkey.taskcn.com/ A Witkey website founded in 2005. It is a knowledge exchange platform where companies and individuals can solicit solutions or answers to their posted questions and give rewards to providers of the winning solutions or answers
<i>Interest communities:</i> VCs in which people who share an interest or expertise on a specific topic gather together to communicate with each other	
Sohu Blog	http://blog.sohu.com/ One of the blog websites in China where bloggers can chronicle their lives and share them with others
Donews	http://home.donews.com/ An online forum on IT and Internet development
<i>Relationship communities:</i> VCs in which people with similar experiences come together and form meaningful personal relationships	
Hepatitis B Carriers BBS	http://bbs.hbvhbv.com/ A BBS forum aimed at providing a communication platform for Hepatitis B carriers and eliminating discrimination against this group
Fetion PICA	Two wireless IM tools. Fetion is provided by the largest wireless network operator in China—China Mobile
<i>Fantasy communities (entertainment communities):</i> VCs which usually refer to online games and in which people come together to get fantastic experiences.	
Youku	http://www.youku.com One of the largest video sharing websites in China. Members can upload video files and watch the ones uploaded by others. Similar to YouTube
UC	An IM software with video chat rooms. Users can show themselves and engage in discussions using videos and audios
The world of legend	An online game that mimics the real world where players can play specific roles. Similar to Second Life
<i>Mixed communities</i>	
Tianya Club	http://www.tianya.cn A large online club that provides several functions including blogs, groups, and forums
Mop	http://www.mop.com A large platform that provides services such as making friends, blogging, and online games

2.2. Trust in vendor/website and trust in virtual communities

In e-commerce, trust has been long recognized as a critical success factor, and much research has been conducted on trust (Gefen and Straub 2004, Kim et al. 2003, Lee and Turban 2001). Trust is “*the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party*” (Mayer et al. 1995). Researchers have also agreed that trust is multidimensional, and the most cited three dimensions of trust are *ability*, *integrity*, and *benevolence* (Gefen and Straub 2004). Ability is the skills or competencies that allow a trustee to be perceived competent in a specific area. Integrity is the expectation that the trustee will act in accordance with social norms or principles that the trustor accepts. Benevolence is that the trustee will care about and do good to the trustor.

There are two kinds of trust in our study: trust in the vendor/website and trust in members. Trust in the vendor/website refers to the beliefs that the C2C website or the VC sponsor is capable of providing quality services and would do good to its consumers or users. It is the assessment toward the performance of an institution or organization rather than an individual. Institutional trust affects consumers’ purchase behaviors (Gefen et al. 2003b, Pavlou and Gefen 2004). It contains three dimensions: trust in the ability, integrity, and benevolence (Gefen 2002).

Trust in members can be a major factor that affects the prosperity and success of VCs as, in a virtual environment where participants are usually anonymous and do not engage in direct face-to-face communication, trust can be a significant issue. In VCs, trust also plays an important role in affecting members’ behavior as people would act more proactively when they trust the environment and other people (Kankanhalli et al. 2005, Rothaermel and Sugiyama 2001).

Different from trust in online stores or systems (Gefen 2000), trust in the online vendor (Gefen et al. 2003b), or trust in online shopping or e-commerce (Lee and Turban 2001) that previous research examined, trust in VCs can also be understood as interpersonal trust (Ridings et al. 2002). It exists between an individual and other unfamiliar members in the community, and it is a general trust toward others and the community, not necessarily toward a specific person. People share information and experiences online with others they have never met. This implies that a certain level

of trust may exist because the information owners' privacy may be at risk, and the information acquirers may be cheated by others that they do not know. Rotter (1967) defined such trust as "an expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied upon," and developed a scale to measure interpersonal trust.

The literature on trust usually uses the model "antecedents–trust–outcomes" to investigate trust (Shankar et al. 2002). There are several classifications for the antecedents to trust, one of which based on the trust formation mechanism. Gefen et al. (2003b) classified the antecedents to trust into: (1) *knowledge-based trust*, which focuses on trust building through repeated interactions; (2) *cognition-based trust* or *initial trust*, which focuses on trust building through first impression rather than repeated interactions over a longer period of time; (3) *institution-based trust*, which focuses on relying upon an institution or third party to build trust; and (4) *personality-based trust*, which refers to individual personalities that influence trust building. Zucker (1986) identified three mechanisms to establish trust: (1) *process-based trust*, which has similar meanings to knowledge-based trust; (2) *characteristic-based trust*, which implies that trust is established based on social similarities, such as families, ethnicities, or racial origins; and (3) *institution-based trust*.

Such classifications of trust antecedents are applicable in VCs, though some revisions may be necessary to reflect the special characteristics of VCs that affect trust building in this context. For example, individuals interacting with each other through computer-mediated communications may experience a trust building process that is similar to the one in the offline environment. They get familiar with each other through interactions, and this establishes trust between them, as people tend to trust others who they know. Similar interests of the members in a VC may also foster the development of trust. We combine the two classifications to categorize the antecedents to trust in VCs into knowledge-based, characteristic-based, institution-based, and personality-based trust, and give detailed explanations in Section 3.

Although many researchers considered three components of trust, Ridings et al. (2002) believed that, in the context of VCs, two dimensions apply in trust in members: ability and a combined benevolence and integrity dimension. Their rationale was that integrity and benevolence both lead to the same behavior—maintaining conversations—in VCs. Gefen (1997) also found that, in VCs, integrity will be exhibited by benevolence behavior which is in accordance with the norms of the VC. Hence, we adopt this view of trust in members.

In a VC, trust in other members will prompt an individual's participation such as sharing knowledge with others or getting

information from the VC (Ridings et al. 2002). This trust may also affect the member's trust in the vendor or supplier of the VC, as Tung et al. (2001) found that, when trust between members is established, members with higher involvements in the VC will perceive a greater level of trust in the website or vendor than those less involved members. Meanwhile, Smith (2002) investigated the influence of recommendations in VCs, and found that trust between members will cause members to be more willing to accept future recommendations from peer recommenders. That is to say, when a member recommends a vendor or supplier with a good reputation in the VC, other members will more likely believe or accept such information when they have a higher level of trust in this member. In a word, the higher the trust between members, the higher the trust in the vendor or supplier with a positive word-of-mouth in the VC.

3. Research model and hypotheses

Based on previous research, we propose our research model and summarize it in Fig. 1. Using this model, we explain which factors affect trust in VCs, how this trust influences members' trust in the website, and how these two kinds of trust affect the consumer purchase decision. We next develop each of our hypotheses.

3.1. Knowledge-based trust antecedent: familiarity

Familiarity refers to the trust building mechanism where individuals get to know each other through interactions and then predict others' behaviors based on the information they obtain from this interactive process. In the extant literature, familiarity is usually used to describe the extent to which consumers know about a website or vendor, and it has been shown to positively influence trust in the website or vendor (Gefen 2000, Gefen et al. 2003b).

Familiarity can also be applied to interpersonal trust, as people are usually prone to trust others that they are familiar with. Familiarity with other members involves interaction, as one needs time to accumulate trust-relevant knowledge resulting from experience with other parties. Hence, there is a positive relationship between interaction and trust. Rousseau et al. (1998) identified several kinds of trust, one of which is relational trust that emerges as a result of repeated interactions over time. Gulati (1995) found that repeated ties can influence trust between firms in an alliance and further affect the types of contract adopted. Wallace (1999) also found that frequent communications between team members are helpful to trust building. He especially suggested that the initial willingness to show trusting actions quickly leads to the actual trust.

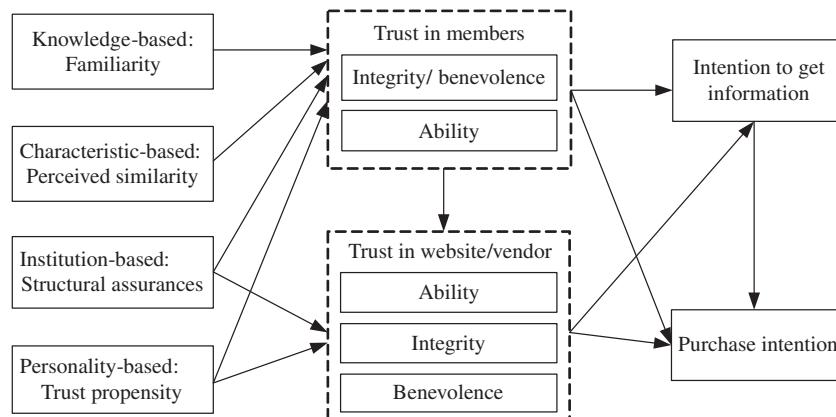


Fig. 1. The research model.

Research has shown that interactions can stimulate trust in VCs. For example, Wu and Chang (2005) studied the interactivity and trust between online travel community members and website administrators. Their results showed that the more members interact with administrators, the more they trust the administrators, indicating a significant correlation between interactivity and trust. In addition, perceived responsiveness is positively related to trust in other members in VCs, because reciprocity in an exchange relationship builds trust (Ridings et al. 2002).

In VCs, when an individual interacts with others, she becomes familiar with at least the IDs or writing styles of those who participate frequently. She may evaluate the trustworthiness of these members by judging the consistency of their messages and behaviors. Accordingly, familiarity with other members in VCs should increase the trust in members because a higher familiarity implies a larger amount of accumulated knowledge derived from experiences during previous successful interactions. Familiarity reduces uncertainty and prompts trust in long-term relationships.

H1a. Familiarity with other members in a VC will positively affect trust in other members' ability.

H1b. Familiarity with other members in a VC will positively affect trust in other members' integrity and benevolence.

3.2. Characteristic-based trust antecedent: perceived similarity

Perceived similarity refers to the trust building mechanism where trust is established based on common characteristics the trustor perceives of the trustee, including interests, values, and demographic traits. Considerable empirical studies in the traditional environment support the positive effects of similarity on the trust behavior. Evidence drawn from literatures in social psychology, counseling, and communication suggests that, in a relational context, relationship satisfaction is influenced by the similarity among individuals (Crosby et al. 1990). In the marketing literature, researchers found that shared values and beliefs about behavior, goals, and policies significantly affect trust (Dwyer et al. 1987, Morgan and Hunt 1994). Doney and Cannon (1997) found that a buying firm's trust of a seller's salesperson is significantly impacted by similarity, which assesses the buyer's belief that the salesperson shares common interests and values with people in the buying firm.

In the online environment, the same relationship exists. For instance, in book recommender systems, people are inclined to adopt recommendations from those that are more similar to them (Ziegler and Golbeck 2007). When people are grouped together in the same community, they tend to perceive each other in a positive way, which enhances their trust beliefs (McKnight et al. 1998). In a research on trust transfers on the Internet, perceived similarity between a trusted website and an unknown linked website has positive effects on trusting beliefs regarding the unknown target (Stewart 2003). Although perceived similarity between two websites is quite different from that between two persons, Stewart's findings showed that trust can transfer through perceived similarity. An individual identifies with another one who is similar to her, and this identification usually results in trust toward the identified one.

In VCs, people get together for common interests or goals. Similar interests or experiences allow for trust building among members. Feng et al. (2004) found that empathic accuracy has a significant influence on interpersonal trust online, and the strength of empathy is related to the similarity the trustor identifies with the trustee. As mentioned earlier, similarity can involve several aspects such as demographic characteristics, interests, and values.

This study focuses on interests and values as VCs are very often formed based on common goals or interests.

H2a. Perceived similarity with other members in a VC will positively affect trust in other members' ability.

H2b. Perceived similarity with other members in a VC will positively affect trust in other members' integrity and benevolence.

3.3. Institution-base trust antecedent: structural assurances

Institution-based trust is another trust building mechanism that refers to one's sense of security from impersonal structures that exist in a particular context such as guarantees or recommendations from third parties (Shapiro 1987, Zucker 1986). It contains two types of trust: situational normality and structural assurances.

Situational normality is a belief that the circumstance is normal or customary, and the transaction will be successful as things are in proper order (Baier 1986, Lewis and Weigert 1985). When the new environment is similar to normal contexts, people will feel assured as everything is as it ought to be and they can easily and directly understand what is happening. For example, stores with salespeople that look like salespeople can build trust, while those without salespeople impede trust building (McKnight et al. 1998). However, VCs in China are very similar in context. For example, in a research on online community users in China, iResearch examined 468 online communities, the majority of which took the forms of BBS, forums, IM, and blogs (iResearch 2006). Reports by iResearch showed that 75.8% of VC members had educational level of college or above, and about 70% spent one to six hours per day in VCs (iResearch 2006, iResearch 2007b). Thus, we believe that VC members have enough knowledge and spend enough time getting familiar with the functions and operations of most VCs. Hence, situational normality might not have much influence on members' trust, so we do not take it into account in this study.

Structural assurances are the beliefs that, when contextual conditions such as regulations and guarantees exist in a context, success is likely (McKnight et al. 1998). As a social network, a VC should have its own rules and regulations. Rothaermel and Sugiyama (2001) pointed out that, at the community-level, management of the community has a positive effect on members' engagement in transactions. Leaders' enthusiasm, which is related to leaders' involvement in community management, facilitates members' sense of community that is positively related to trust (Koh and Kim 2004). Privacy guarantees, community rules, and safety assurances provided by a VC will enhance trust in members and in the provider of the VC. Moreover, if the website maintains community rules and manages the VC well, members may have better confidence and trust in the website. Thus, we have:

H3a. Perception of structural assurances will positively affect trust in other members' ability.

H3b. Perception of structural assurances will positively affect trust in other members' integrity and benevolence.

H3c. Perception of structural assurances will positively affect trust in the website or vendor's ability.

H3d. Perception of structural assurances will positively affect trust in the website or vendor's integrity.

H3e. Perception of structural assurances will positively affect trust in the website or vendor's benevolence.

3.4. Personality-based trust antecedent: trust propensity

Trust propensity, also called disposition to trust, reflects one's tendency to believe or not to believe in others (Gefen et al. 2003b). It is "a general willingness based on extended socialization and life experience to depend on others" (Ridings et al. 2002).

Trust propensity has been shown to relate to trust, though it might be more effective when the trustor is still unfamiliar with the trustee (Mayer et al. 1995). Research shows that, when developing initial trust in a business-to-consumer (B2C) environment, trust propensity positively influences the initial trust in the website (Lu and Zhou 2007).

In VCs, trust propensity also affects an individual's trust in other people (Gefen 2000). Ridings et al. (2002) found that propensity to trust has a positive relationship with trust in members in VCs. Hence, we have:

H4a. Trust propensity will positively affect trust in other members' ability.

H4b. Trust propensity will positively affect trust in other members' integrity and benevolence.

H4c. Trust propensity will positively affect trust in the website or vendor's ability.

H4d. Trust propensity will positively affect trust in the website or vendor's integrity.

H4e. Trust propensity will positively affect trust in the website or vendor's benevolence.

3.5. Trust in the website or vendor

Communication among members in VCs plays an important role in the trust transfer from members to the vendor or community service provider. First, with such communication, firms that cheat will be punished and the honest ones will be rewarded by the consumers (Jin and Robey 1999, Klein and Leffler 1981). For a C2C website, members can share information about the service of the VC through the forums there. This would motivate members to believe that the VC provider would keep on improving its service quality. Second, trust between members makes them view the site as a shared family, and they develop a sense of community, which reduces their privacy concern. For example, Tung et al. (2001) found that involvement in VCs and trust between members facilitate trust in vendors. In addition, efforts the VC provider exerts to manage the VC will foster members' beliefs that the VC provider has shared value with them and respects its members. All these beliefs will cultivate the trust in the VC provider (Porter and Donthu 2008). Thus, we have:

H5a. Trust in other members' ability will positively affect trust in the website or vendor's ability.

H5b. Trust in other members' ability will positively affect trust in the website or vendor's integrity.

H5c. Trust in other members' ability will positively affect trust in the website or vendor's benevolence.

H6a. Trust in other members' integrity and benevolence will positively affect trust in the website or vendor's ability.

H6b. Trust in other members' integrity and benevolence will positively affect trust in the website or vendor's integrity.

H6c. Trust in other members' integrity and benevolence will positively affect trust in the website or vendor's benevolence.

3.6. Outcomes of trust related to consumer purchase behavior

A rational consumer's purchase decision-making process will follow the stages of requirement cognition, information gathering, and the purchase behavior (Ives and Learmonth 1984, Kalakota and Winston 1997). Today, VCs have profoundly changed consumers' purchase decision-making process. For example, many people nowadays examine other consumers' reviews and experiences posted in VCs before purchasing new products. In this case, members engage in knowledge sharing to reduce their uncertainty prior to the consumption experience. Survey research showed that about 61.7% of VC members would consider other members' opinions before making purchase decisions (iResearch 2007b). In addition, about 88% of Web users gathered product/service-related information before making purchases (iResearch 2008c).

Empirical studies have shown that the intention to get information positively influences the purchasing behavior (Gefen 2002, Pavlou and Fygenson 2006). According to the Theory of Planned Behavior, behavioral intention is the most influential predictor of behavior (Ajzen 1991). In much research on consumer behavior, researchers often use intention to represent the actual behavior (Lin 2006, Lu and Zhou 2007). Thus, we use the intention to get information and the purchase intention to represent get information and purchase behaviors, respectively.

Trust between members in VCs positively affects members' behaviors such as obtaining or contributing information. For example, Ridings et al. (2002) found that trust in members significantly influences the desire to get and give information in VCs. Kankanhalli et al. (2005) revealed that general trust positively affects knowledge contribution using electronic repositories. From the view of transaction cost theory, trust prompts knowledge sharing as trust can reduce the transaction cost in the interactions between buyers and sellers (Fussell et al. 2006). We have:

H7a. Trust in other members' ability will positively affect the intention to get information.

H7b. Trust in other members' integrity and benevolence will positively affect the intention to get information.

When a consumer trusts an online store, she will be more likely to purchase there. Previous studies on e-commerce have revealed the importance of trust in affecting consumers' behavior (Everard and Galletta 2005, Gefen et al. 2003a). Thus, we propose that trust in a website or vendor will positively affect members' purchase intention.

H8a. Trust in the website or vendor's ability will positively affect the purchase intention.

H8b. Trust in the website or vendor's integrity will positively affect the purchase intention.

H8c. Trust in the website or vendor's benevolence will positively affect the purchase intention.

In VCs for a C2C website, members can be either sellers or buyers. If they trust each other, they are more likely to purchase products and services from other members who sell on the C2C website. A recent survey showed that 47.9% of VC members had purchased from VCs, and 46.8% had not yet but wanted to try in the future (iResearch 2008c). Thus, we have:

H9a. Trust in other members' ability will positively affect the purchase intention.

H9b. Trust in other members' integrity and benevolence will positively affect the purchase intention.

Consumers are likely to get information from a vendor or website if they trust it and believe that it will provide credible information. Pavlou and Fygenson (2006) found that the trust belief positively affects consumers' attitude toward getting information from a Web vendor. Gefen (2002) also found that trust in the ability of Amazon.com significantly influences consumers' intention to inquire information on a book. Thus, we believe that, when consumers trust a vendor or a website, they will be more likely to get information from the VCs it sponsors. We have:

H10a. Trust in the website or vendor's ability will positively affect the intention to get information.

H10b. Trust in the website or vendor's integrity will positively affect the intention to get information.

H10c. Trust in the website or vendor's benevolence will positively affect intention to get information.

When examining consumer e-commerce adoption, Pavlou and Fygenson (2006) hypothesized that the intention to get information positively influences the purchase intention. In their research, purchase intention refers to the desire for products of a specific type, but the consumers have not decided which specific product to buy yet. As a result, their purchase intention is an intention in the requirement cognition stage. In our research, we examine the purchase intention to buy a specific product, i.e., the purchase intention that will next result in the actual purchase. For example, a consumer who recognizes the need of a digital camera but who has no idea about which specific model to buy may go to a VC to obtain relevant product reviews and usage experiences from other consumers. In this information search process, she gradually refines her requirements and finally decides to buy a specific model by a particular manufacturer. Therefore, in this study, we propose that the intention to get information would positively affect the purchase intention. Thus:

H11. The intention to get information will positively affect the purchase intention.

4. Methodology

We next explain our research methodology. First, we introduce the VC we used to test our hypotheses. Next, we describe the process we went through to develop our research instrument. After that, we discuss the instrument validation and refinement process. Finally, we report the hypothesis testing results.

4.1. Taobao Virtual Community

The VC we examine is Taobao Virtual Community (<http://www.taobao.com/forum.php>), a transaction community established by Taobao.com, the largest C2C website in China. Taobao was established in May 2003 and had 39.9 million members by June 2007. The transactions on Taobao totaled 16.9 billion yuan in 2006 and reached 15.7 billion yuan in the first half of 2007. Taobao Virtual Community is one functional part of Taobao and also one of the most active VCs on the Internet. There are three reasons that we chose Taobao Virtual Community. First, to test our hypotheses about the purchase intention, we needed to use a transaction community. Taobao Virtual Community fits such a requirement. Second, Taobao is the largest C2C platform in China with heavy website traffic and mature operations. According to Alexa.com,

an Internet traffic tracking company, Taobao is the most visited e-commerce website in China and its website traffic was ranked 22nd in the world and 7th in China (Taobao.com 2007). Third, Taobao Virtual Community is a vital component of Taobao and has a close relationship with the Taobao transaction platform, as buyers and sellers are all encouraged to participate in the Taobao Virtual Community. For example, Taobao sellers can publicize their stores and learn more about consumers' preferences and needs from the VC. Meanwhile, Taobao buyers can share their purchase experiences and get product information using the VC. So the behaviors of consumers who are also members of the Taobao Virtual Community may be influenced by what they experience in the VC, thus allowing us to test our hypotheses.

4.2. Instrument development

Whenever possible, we developed items measuring the constructs by adapting existing scales developed and tested in previous research. As the original items were in English, we used the following procedures to ensure the translation validity. First, a researcher whose native language is Chinese forward translated the items into Chinese. Next, another researcher independently backward translated the items into English. Subsequently, the two researchers compared and discussed the two English versions to develop the first Chinese version of the items. We then asked two Chinese researchers in the e-commerce area and three members of the Taobao VC for feedbacks on the instrument. We made minor revisions to the instrument based on their feedbacks. Finally, the two initial translators checked this version together and finalized our Chinese questionnaire. Please see the Appendix for the scales. We measured all items using seven-point Likert scales ranging from strongly disagree to strongly agree.

There was no existing scale for familiarity with other members in VCs. Thus, taking the scale of familiarity with a Web store as reference (Gefen 2000), we developed a four-item scale for our study. These items measure the extent to which an individual becomes familiar with other members in a VC through interactions with them. Items used to measure perceived similarity were adapted partially from Crosby et al.'s (1990) research, in which they measured similarity from three aspects including appearance, lifestyle, and status similarity. In VCs, appearance and status similarities are not applicable, so we preserved four items of lifestyle similarity and replaced one item measuring political view similarity with one measuring experience similarity. Structural assurances were measured by four items adapted from Gefen et al. (2003b). We adapted items from Ridings et al. (2002) to measure trust propensity, the two components of trust in members, and the intention to get information. Items adapted from Bhattacherjee (2002) were used to measure the three dimensions of trust in the website or vendor. Three items measuring the purchase intention were adapted from Pavlou and Gefen (2004).

4.3. Data collection

We used three methods to collect data from subjects who were members of the Taobao Virtual Community. First, we distributed paper questionnaires to undergraduate and graduate students in a university in Wuhan, China. Second, we developed an online version of our survey and posted its URL on the e-market board of the Byhh BBS at Huazhong University of Science and Technology for half a month. In addition, we approached the Alliance of Universities in Taobao Virtual Community², which helped us to distribute

² A special alliance in Taobao Virtual Community, whose members are college students in China. The goal of this alliance is to help student ventures (student stores selling products or services) on Taobao.

Table 3
Sample demographics ($N = 376$).

Measure	Item	Count	%
Gender	Male	210	44.1
	Female	166	55.9
Age	18 or below	2	0.6
	>18 and ≤ 24	336	89.3
	>25 and ≤ 30	31	8.2
	>31 and ≤ 35	5	1.3
	>36 and ≤ 40	2	0.6
Education	High school or below	3	0.8
	Two-year college	39	10.4
	Four-year college	260	69.1
	Graduate school or above	74	19.7
Length of member history	<3 months	86	22.9
	>3 and ≤ 6 months	86	12.0
	>6 months and ≤ 1 year	76	22.9
	>1 year and ≤ 2 years	83	20.2
	>2 years and ≤ 3 years	33	22.0
	Over 3 years	86	8.8
Have purchased on Taobao	Yes	278	73.9
	No	98	26.1
Types of products purchased on Taobao	Clothing and footwear	143	38.0
	Cosmetics and jewelry	73	19.4
	Computers and accessories	46	12.2
	Books	84	22.3
	Foods and health products	39	10.4
	Household appliances and audio equipments	19	5.1
	Personal digital products	50	13.3
	Household products	38	10.1
	Audio products	20	5.3
	E-card/digital card/virtual currency	67	17.8

the URL of our online survey to its student members. We received 428 responses in total. Out of the 360 paper questionnaires we distributed, 93.6% were completed. We were unable to calculate the response rates for the other two methods of data collection. After removing invalid responses including those containing more than five missing values, those with the same answer to all questions, and those who had never used Taobao Virtual Community, we had 376 valid responses, resulting in a valid rate of 87.9%.

Table 3 shows the descriptive information of the dataset. About 44.1% of the subjects were male, and 55.9% were female. As the questionnaires were delivered in universities, a majority (97.5%) of the respondents were students aged between 18 and 30 and 88.8% had education of undergraduate or above. Even though we mainly surveyed well-educated young adults, they without a doubt are the main shoppers on C2C websites. According to iResearch, more than 60% of C2C shoppers in China are between 18 and 30 years old (iResearch 2007a), and more than 60% of Taobao shoppers have undergraduate education or above (iResearch 2008d). Hence, we believe that our sample represents the major segment of C2C shoppers in China. Among our subjects, 45.8% were new members with member history of less than six months, and 12% were senior members with history over two years. Although the sample mainly consisted of new members, 73.9% showed that they had purchased on Taobao. According to the “2006 Survey Report on C2C Online Purchases in China”, the top three types of products purchased on Taobao were clothing and footwear, cosmetics and jewelry, and computers and accessories (CNNIC 2006). The top three types of products purchased by our sample were clothing and footwear, books, and cosmetics and jewelry. The difference was mainly due to our student sample and their need for books and the limited income they had for the purchase of such expensive products as computers.

4.4. Data analysis

Using structural equation modeling (SEM), we first examine our measurement model and then test our hypotheses. The softwares we used are LISREL and SPSS 13.0.

4.4.1. Analysis of reliability and validity

We first used the principal components factor (PCF) analysis to examine the factorial validity of the scales. The Bartlett's Test of Sphericity generated a Kaiser-Meyer-Olkin (KMO) statistic of 0.846, which was significant at the 0.01 level, indicating that it was suitable to use the principle components factor analysis on the data. We extracted nine factors with eigenvalues above 1, and they explained about 67.512% of the variance. Based on the Cronbach's alphas and factor loadings, we deleted Items FA4 and INB4.

As all measures were self-reported, we used Harman's one-factor test to check the common method variance based on Podsakoff and Organ's (1986) suggestions. We extracted nine factors with eigenvalues greater than 1, and the first factor accounted for 23% of the total variance. Because more than one-factor emerged from the factor analysis and no factor accounted for most of the covariance in the variables, our data did not have the common method variance. Table 4 displays the factor loadings of the remaining items after the varimax rotation. The loadings of items on the expected factors are higher than 0.5, while loadings on other factors are lower than 0.5, indicating good convergent and discriminant validities. It should be pointed out that though items VAB1–VBE8 loaded on the same factor, it is reasonable as they all measure the subdimensions of trust in website/vendor.

Table 5 summarizes additional validity measures of the scales. The standard loadings of the remaining items were mostly above 0.7. The average variance extracted (AVE) for every construct was above 0.5, which means the scales had a good convergent validity (Bagozzi and Yi 1988). We used composite reliabilities (CRs) to evaluate the internal consistency of the measurement model. As shown in Table 5, the CRs were all above 0.7, indicating the scales had good reliabilities (Nunnally 1978). Other statistics of the items are shown in the Appendix; all Cronbach's alpha values were above the 0.70 threshold, indicating that the scales had high reliabilities (Nunnally 1978).

We show the correlation matrix and the square roots of the AVEs in Table 6. The square roots of the AVEs are the diagonal elements and they were all larger than their corresponding correlation coefficients with other factors. This suggests that the scales had good discriminant validity.

4.4.2. Hypothesis testing

We tested our research model and summarized the results with LISREL coefficients in Fig. 2. We omit the insignificant paths in the figure. Some paths between the trust antecedents and trust were insignificant, including the path between familiarity and trust in members' integrity/benevolence ($\gamma_{1b} = 0.09$, $t_{1b} = 1.40$), the path between perceived similarity and trust in members' ability ($\gamma_{2a} = 0.15$, $t_{2a} = 1.86$), the path between structural assurances and trust in members' integrity/benevolence ($\gamma_{3b} = 0.13$, $t_{3b} = 1.74$), the paths between structural assurances and the three dimensions of trust in website/vendor ($\gamma_{3c} = 0.01$, $t_{3c} = 0.16$; $\gamma_{3d} = 0.03$, $t_{3d} = 0.48$; $\gamma_{3e} = 0.05$, $t_{3e} = 0.76$), and the path between trust propensity and trust in website/vendor's benevolence ($\gamma_{4e} = 0.04$, $t_{4e} = 0.56$). Thus, H1b, H2a, H3b, H3c, H3d, H3e and H4e were not supported. Trust in members' ability had significant influences on the three dimensions of trust in vendor/website, whereas trust in members' integrity/benevolence did not significantly affect any dimension of trust in vendor/website ($\beta_{6a} = 0.06$,

Table 4

Principal components factor analysis with varimax rotation.

Factors	1	2	3	4	5	6	7	8	9
FA1	.034	-.026	.022	.042	.104	.029	.850	.054	.060
FA2	.069	.031	.004	.084	.098	.061	.861	-.009	.034
FA3	.064	.118	-.043	.095	.114	.005	.835	.075	.089
PS1	.082	.094	.037	.041	.695	.086	.111	.079	.158
PS2	.060	.167	.093	.105	.756	.058	.082	-.007	.073
PS3	.054	.231	.016	.136	.708	-.033	.061	.134	.177
PS4	.061	.145	-.039	.103	.719	-.020	.092	.100	.062
SA1	.143	.729	.066	.056	.171	-.019	.075	.089	.183
SA2	.107	.852	.004	.126	.173	.049	.008	.027	.124
SA3	.126	.829	-.013	.100	.099	.121	-.006	.117	-.003
SA4	.021	.712	.004	.030	.194	.131	.057	.102	-.020
TP1	.178	.055	-.019	.168	.053	.051	.073	.789	.089
TP2	.120	.084	.066	.063	.118	.013	.019	.837	.137
TP3	-.007	.155	.077	.010	.099	.002	.031	.748	.021
ABI1	.154	-.010	.199	.766	.148	.033	.080	-.002	.072
ABI2	.151	.148	.028	.796	.187	.059	.000	.005	.102
ABI3	.257	.129	.089	.720	-.025	.117	.073	.145	.053
ABI4	.233	.073	.047	.701	.107	.124	.128	.147	.023
INB1	.062	.059	-.100	-.011	.122	.019	.005	.102	.755
INB2	.100	.090	-.016	.091	.158	-.001	.055	.073	.838
INB3	.204	.094	.032	.172	.169	.131	.163	.067	.659
VAB1	.576	.080	.336	.143	-.115	.094	-.045	.146	.085
VAB2	.677	.162	.283	.063	-.163	.053	.090	.071	.157
VIN1	.739	.080	.132	.115	-.033	.049	-.039	.096	.099
VIN2	.697	.048	.075	.123	.092	.147	-.043	.093	.089
VIN3	.728	.040	.064	.106	.080	.042	-.003	.073	.116
VBE1	.655	.058	.020	.110	.098	.006	.222	.023	-.005
VBE2	.748	.048	-.065	.113	.155	.126	.034	-.072	.003
VBE3	.683	.035	.061	.149	.142	.198	.068	.022	-.027
GII1	.211	.077	.229	.118	.021	.820	.016	.049	.054
GII2	.222	.154	.104	.130	.038	.860	.036	.019	.016
GII3	.128	.067	.241	.061	.039	.832	.059	.006	.070
PI1	.177	.026	.863	.139	.008	.194	-.028	.051	-.012
PI2	.109	.006	.866	.068	.061	.200	.016	.044	-.033
PI3	.204	.005	.855	.108	.061	.140	-.006	.032	-.083
Eigenvalues	4.345	2.761	2.667	2.572	2.498	2.402	2.340	2.085	1.960
Percentage of variance	12.413	7.889	7.621	7.349	7.136	6.862	6.686	5.956	5.600
Cumulative	12.413	20.302	27.923	35.272	42.408	49.270	55.955	61.912	67.512

$t_{6a} = 0.89$; $\beta_{6b} = 0.11$, $t_{6b} = 1.60$; $\beta_{6c} = 0.12$, $t_{6c} = 1.77$). H6a, H6b, and H6c were not supported.

As to the outcomes of trust, neither of the two dimensions of trust in members had a significant impact on the intention to get information ($\beta_{7a} = 0.18$, $t_{7a} = 1.74$; $\beta_{7b} = 0.02$, $t_{7b} = 0.31$). Trust in members' ability was found to have no positive influence on the purchase intention ($\beta_{9a} = 0.13$, $t_{9a} = 1.32$). Thus, H7a, H7b and H9a were not supported. Only the ability dimension of trust in vendor/website had a positive relationship with the intention to get information and the purchase intention. H8b, H8c, H10b, and H10c were not supported.

The proportions of variances explained were 24% for trust in members' ability, 28% for trust in members' integrity and benevolence, 31%, 38%, and 35% for trust in website/vendor's ability, integrity, and benevolence, respectively, 21% for the intention to get information, and 35% for the purchase intention. As shown in Table 7, most fit indices were within acceptable ranges except GFI, indicating a good fit between the theoretical model and the data (Chau 1997).

5. Discussion

5.1. Summary of results

Major C2C providers in China provide VCs to support their C2C platforms. The strong tie between these two types of websites has given rise to ESN. In this research, we examine trust among mem-

bers of a VC, how it affects their trust in the C2C vendor/website, and how these two kinds of trust influence their purchase behavior. Based on data collected from members of the Taobao Virtual Community, an online forum associated with the largest C2C website in China Taobao.com, we find that trust plays an important role in influencing members' trust in the website and the consumer information getting and purchasing behaviors. We find that the trust building mechanism is also applicable to interpersonal trust building in VCs and examine the relationships between the fundamental dimensions of these two kinds of trust. Specifically, we have the following results.

First, familiarity is positively related to trust in members, which supports the finding that interactions among members would facilitate interpersonal trust (Wu and Chang 2005). Familiarity and structural assurances based on institutional trust both have significant effects on trust in members' ability but not on trust in members' integrity or benevolence. Interactions among members in VCs are helpful in allowing them to know others' ability but not integrity nor benevolence. This difference may be due to the nature of such a community, whose aim is to provide a platform for communicating purchase and usage experiences of products. In such a VC, there might be limited information for a member to learn about others' integrity and benevolence. Also, the loose ties among members in VCs may also present them with fewer opportunities to learn about each other's integrity and benevolence. The effects of structural assurances on trust in website/vendor are not significant either. This result is inconsistent with those from previous research on

Table 5
Results of reliability and validity analysis.

Factor	Item	Standard loading	t-Value	AVE	CR
Familiarity	FA1	0.76	15.93	0.64	0.84
	FA2	0.82	17.64		
	FA3	0.81	17.15		
Perceived similarity	PS1	0.64	12.49	0.50	0.79
	PS2	0.67	13.40		
	PS3	0.77	15.78		
	PS4	0.68	13.55		
Structural assurances	SA1	0.72	15.06	0.55	0.83
	SA2	0.86	19.31		
	SA3	0.75	15.85		
	SA4	0.61	12.32		
Trust propensity	TP1	0.73	14.28	0.54	0.78
	TP2	0.87	17.11		
	TP3	0.57	10.96		
Trust in members' ability	ABI1	0.72	14.86	0.52	0.81
	ABI2	0.75	15.76		
	ABI3	0.71	14.65		
	ABI4	0.71	14.58		
Trust in members' integrity and benevolence	INB1	0.61	11.49	0.51	0.76
	INB2	0.81	15.75		
	INB3	0.71	13.69		
Trust in website/vendor's ability	VAB1	0.76	15.70	0.64	0.78
	VAB2	0.84	17.82		
Trust in website/vendor's integrity	VIN1	0.78	16.77	0.57	0.80
	VIN2	0.76	16.15		
	VIN3	0.72	15.05		
Trust in website/vendor's benevolence	VBE1	0.66	13.21	0.55	0.78
	VBE2	0.79	16.64		
	VBE3	0.76	15.67		
Intention to get information	GII1	0.81	18.23	0.70	0.87
	GII2	0.88	20.25		
	GII3	0.82	18.35		
Purchase intention	PI1	0.91	21.55	0.72	0.88
	PI2	0.80	17.86		
	PI3	0.83	18.88		

institution-base trust where it is found effective institutions can build trust in the online vendor or website (Pavlou and Gefen 2004). This might be because the items we used to measure structural assurances only described one's sense of security from impersonal structures, such as community rules and management in VCs. Other mechanisms, such as third party, feedback mechanisms, and guarantees that facilitate trust in website/vendor, however, were not included here.

Second, as expected, perceived similarity positively relates to trust in members, which is consistent with the findings in more

traditional contexts (Doney and Cannon 1997, Morgan and Hunt 1994). Our results show that, in the online environment, more shared characteristics between the trustor and the trustee will help build trust even if they cannot communicate face-to-face. Nevertheless, we find that the effects of perceived similarity on integrity and benevolence are larger than that on ability. This indicates that, in interpersonal trust, the first impression and the cognition of others' characteristics are important. The more an individual perceives to be similar to another person, the more she believes the other person to be trustworthy.

Third, trust propensity is positively related to trust in members and the ability and integrity dimensions of trust in the website or vendor, which again shows that personality has a significant influence on one's attitude toward other subjects (Gefen 2000, Ridings et al. 2002). We find the relationship between trust propensity and trust in website/vendor's benevolence to be consistent with the results of Wang and Benbasat's (2007) research on online recommendation agents. Trust propensity also has a stronger influence on trust in members than on trust in website/vendor.

Fourth, we find trust in members has a positive relationship with trust in the website or vendor. When a member trusts the community in general, she will identify with the community and trust the provider of the community. In addition, trust can transfer from members to the website or vendor, similar to the mechanism where trust transfers between websites (Stewart 2003). We take the three dimensions of trust in vendor/website into consideration and find that trust in members' ability plays an important role in prompting trust in vendor/website as it has significant influences on the three dimensions of trust in the vendor/website. However, trust in members' integrity/benevolence has no effect on any dimension of trust in the vendor/website.

Finally, trust in members does not positively affect the intention to get information. This result is inconsistent with Ridings et al. (2002) where they found both dimensions of trust in members are positively related to the desire to get information. The ability dimension of trust in vendor/website positively relates to the intention to get information, which corroborates the findings by Gefen (2002). Both the intention to get information and the purchase intention are positively affected by trust in vendor/website, or more specifically, by trust in vendor/website's ability. This might be because, in the C2C environment, the ability of the website is more important as the vendor or website just provides the platform for transactions, but not the products. A consumer would expect the transaction to be successful if she believes that the C2C website is capable of providing a safe environment and quality service, and that the merchant she transacts with has integrity and provides quality products. As expected, the intention to get information from a VC will induce the purchase intention.

Table 6
Correlation matrix and square roots of AVEs.

	FA	PS	SA	TP	ABI	INB	VAB	VIN	VBE	GII	PI
FA	0.8										
PS	0.33	0.71									
SA	0.18	0.53	0.74								
TP	0.15	0.31	0.31	0.73							
ABI	0.26	0.37	0.40	0.31	0.72						
INB	0.24	0.46	0.37	0.34	0.25	0.71					
VAB	0.16	0.25	0.26	0.30	0.55	0.22	0.8				
VIN	0.18	0.28	0.29	0.32	0.59	0.29	0.35	0.75			
VBE	0.18	0.27	0.27	0.22	0.58	0.28	0.33	0.37	0.74		
GII	0.12	0.18	0.18	0.17	0.41	0.16	0.37	0.30	0.33	0.84	
PI	0.09	0.14	0.15	0.16	0.32	0.13	0.48	0.23	0.19	0.45	0.85

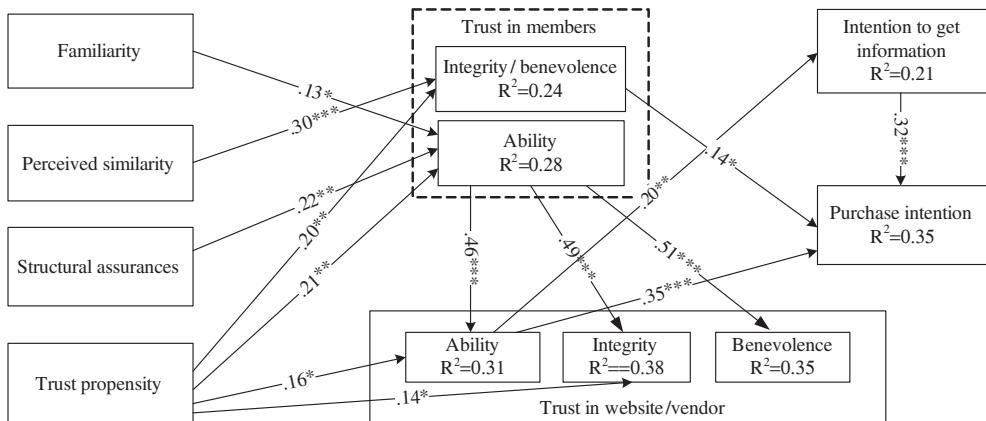


Fig. 2. Standardized LISREL solution (model with only significant paths). Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 7
Model fit indices and their acceptable ranges.

Fit indices	Values	Acceptable threshold
χ^2/df	942/535 = 1.76	<3
RMSEA	0.046	<0.08
NFI	0.93	>0.90
NNFI	0.96	>0.90
CFI	0.97	>0.90
GFI	0.88	>0.90
AGFI	0.85	>0.80
IFI	0.97	>0.90
SRMR	0.074	<0.08

5.2. Implications and limitations

Our research has the following theoretical contributions and practical implications.

On the theoretical side, our study empirically establishes the link between VCs and C2C websites and examines the impact of trust in the conversion from VC members to C2C buyers. Specifically, we focus on two kinds of trust: trust in members and trust in website/vendor. Furthermore, on the basis of previous studies, we examine the relationships between dimensions of two types of trust to find out which dimension plays a more important role in establishing trust in the C2C vendor/website and affecting members' purchase behavior. We also consider two important aspects of the consumer's purchase decision: get information and purchase. In previous studies, researchers have mainly focused their attention on the purchase phase. VCs may influence the information search phase as members obtain product-related information from each other and then decide what and how to buy.

Our research also has practical implications. First, trust is critical for the success of electronic commerce, and our research points out an effective way to build consumers' trust in a C2C website, especially when counterfeit goods and shoddy merchandise become a big threat to C2C development. Our research provides empirical evidence that C2C providers' efforts in building VCs are indeed important to the growth of their C2C websites, especially in establishing members' trust in them. Moreover, just as what we found, trust propensity has a greater effect on trust in members than trust in vendor/website, which might imply that people are more likely to trust a VC than a C2C transaction website. For C2C websites that do not currently support VCs, they should consider adding this function as it will encourage members interactions

and turn members into C2C buyers. For those that have VCs already, they should continue to enhance features on their VCs. Even though all major C2C providers in China offer VCs, they are not equally successful (Chen et al. 2007). Compared with Eachnet VC, Taobao VC is more successful in promoting C2C buyer and seller interactions. Our research directs C2C providers' attention to the importance of vibrant VCs to the success of their C2C websites. This is also good news to Baidu and Tencent, which already own large VC user bases. For these two companies, the critical issue is converting their VC members into C2C website customers. One way of achieving this is to add more functions and features linking their VCs to their C2C websites.

Our findings also provide suggestions for C2C websites on enhancing their VCs. For example, they should pay more attention to trust in members' ability as it plays a more important role in fostering trust in the vendor or website that further affects members' intention to get information from the VC. Therefore, only encouraging interactions among members are not enough. VCs should motivate more experienced users to share their experience and knowledge with others. This way, less experienced members can learn from the more experienced ones and form the belief that people in VCs are capable of providing useful information, which will be a more effective way to build trust in the vendor and website. We also notice that, among three dimensions of trust in the vendor or website, the ability dimension has a greater influence on members' purchase decision process. Thus for C2C providers, improving their reputation among VC members in terms of the providers' ability is more useful in encouraging the conversion from VC members to C2C buyers.

Second, our research reveals the importance of trust in building a successful VC. The VC provider will benefit from its efforts in providing structural assurances, encouraging member interactions, and providing topic- or interest-oriented forums in its online community. All these would be helpful to build trust in the VC. For example, as structural assurances facilitate trust, a VC should clearly specify the rules and norms on its website and educate members about them. When violations occur, the VC should act accordingly to enforce these rules. When members learn about the existence of such rules and the consequences of violating them, they are more likely to behave according to the norms on the VC, which will lead to a more orderly community and higher trust among members. A VC can also encourage member participation by offering rewards to popular posts or best answer to a question, which will help members become familiar with each other and then be more likely to trust each other. In addition, a VC should provide different forums oriented toward different topics, catego-

ries of products, or interests so that members of a forum are similar to each other. This similarity will make it easier for them to trust each other.

There are the following limitations to this study. First, although our sample was members of the Taobao Virtual Community, most of them were students and new members. Hence, they may not be representative of Taobao Virtual Community members. Second, compared with previous research, the variances explained in the two kinds of trust were relatively low (McKnight et al. 2002, Porter and Donthu 2008). For trust in members, we only consider factors based on the trust building mechanism. Other factors such as empathy, sense of community, and the flow experience may also influence trust in members. For trust in vendor/website, as our aim was to investigate the relationship between the two kinds of trust, we excluded other variables that might influence this trust. Examples are the reputation of the vendor, previous purchase experiences, and other institution-based mechanisms used to build trust (Pavlou and Gefen 2004). Future research can examine the impacts of these factors. Moreover, we only considered two dimensions of trust in members and integrated integrity and benevolence as one variable based on Ridings et al. (2002). Future research can separate them to examine different aspects of trust in more detail. Last, we only studied the effects of trust on the intention to get information and the purchase intention – two important aspects in the consumer purchase decision as intentions are closely related to the actual behaviors (Pavlou and Fygenson 2006). However, actual behaviors are different from intentions, and future research can examine how trust affects the actual behaviors.

5.3. Suggestions for future research

The focus of this study is more on buyers' behavior in Taobao Virtual Community, not the sellers. The trust of buyers and sellers may be different, and the outcomes may differ. Future research can investigate how VCs affect sellers' behaviors. In addition, we mainly focus on trust in members and do not consider many factors related to the website. Future research can examine such website related factors as familiarity with a store and perceived similarity between websites. To more closely examine the conversion from VC members to C2C customers, future research can also test our research model using a sample of VC members from Paipai or Youa.

A quite different type of C2C websites called Witkey websites emerged in recent years. Users on these websites sell and buy products just like those on other C2C websites. However, the products are intellectual ones, such as logo designs, article translation, and documents writing. Taskcn (<http://witkey.taskcn.com/>) is a typical Witkey website in China that has grown rapidly in the last few years. VCs for Witkey websites may be different from those of physical product C2C websites. How to encourage VC members to become Witkeyers is an interesting issue that deserves additional research. Future research can also explore the impact of such communities.

6. Conclusion

In this study, we examine trust building in VCs on C2C websites and how it affects a consumer's intentions to get information and purchase products. Our research results show that building trust in VC members is an effective way to establish trust in the VC's sponsor – the C2C website, and that these two kinds of trust would further affect the consumer's intentions to get information and purchase. Through examining the relationships between the dimensions of these two types of trust, we find that trust in mem-

bers' ability influences the three dimensions of trust in the vendor/website in terms of ability, integrity, and benevolence. For trust in website/vendor, the ability dimension plays an important role in affecting consumers' intentions to get information and purchase on C2C websites.

Further, our results suggest that trust in members' ability is positively affected by familiarity (knowledge-based), perceived similarity (characteristic-based), structural assurances (institution-based), and trust propensity (personality-based), while trust in members' integrity/benevolence is positively influenced by perceived similarity and trust propensity.

When a member trusts other members in the VC more, she would be more willing to get information from the VC for her purchase decision. To C2C website sponsors, providing communities for consumers to communicate and interact with each other would give them a chance to increase sales by influencing members' purchase behaviors.

Acknowledgements

This work was partially supported by a grant from the National Natural Science Foundation of China (No. 70731001) and a grant from the Program for New Century Excellent Talents by the Ministry of Education (No. NCET-08-0233).

Appendix. Scales and descriptive statistics

	Construct/items	Mean	Standard deviation	Cronbach's alpha
<i>Familiarity (FA)</i>				
FA1	I become familiar with the IDs of some members through reading posts, posting, or replying to messages in the Taobao Virtual Community	3.84	1.473	0.838
FA2	I become familiar with the interests and behavioral characteristics of some members such as their writing styles through reading, posting, or replying to messages in the Taobao Virtual Community	4.05	1.481	
FA3	I become familiar with other members through reading, posting, or replying to messages in the Taobao Virtual Community	3.76	1.452	
FA4	I communicated with some members in the Taobao Virtual Community frequently (delete)	3.51	1.559	

(continued on next page)

Appendix A (continued)

Construct/items		Mean	Standard deviation	Cronbach's alpha
<i>Perceived similarity (PS)</i>				
PS1	I feel members in the Taobao Virtual Community have common goals	4.26	1.406	0.775
<i>Structural assurances (SA)</i>				
SA1	I am at ease communicating with other members because Taobao establishes rules for the community	4.35	1.332	0.838
SA2	I am at ease communicating with other members because there are administrators and forum owners managing the Taobao Virtual Community	4.45	1.322	
SA3	I feel safe communicating with other members because Taobao Virtual Community provides Internet safety alerts	4.64	1.281	
SA4	I feel safe communicating with other members because I accessed Taobao Virtual Community through a well-known, reputable portal	4.48	1.340	
<i>Trust propensity (TP)</i>				
TP1	I generally have faith in humanity	4.90	1.310	0.757
TP2	I feel that people are generally reliable	4.73	1.274	
TP3	I generally trust other people unless they give me reason not to	4.70	1.442	

Appendix A (continued)

Construct/items		Mean	Standard deviation	Cronbach's alpha
<i>Trust in members' ability (ABI)</i>				
ABI1	I feel very confident about the skills that the other members in the Taobao Virtual Community have in relation to the topics we discuss	4.61	1.144	0.815
ABI2	The other participants on the Taobao Virtual Community have much knowledge about the subject we discuss	4.53	1.105	
ABI3	The other participants on the Taobao Virtual Community have specialized capabilities that can add to the conversation in this community	4.91	1.110	
ABI4	The other participants on the Taobao Virtual Community are well qualified in the topics we discuss	4.68	1.098	
<i>Trust in members' integrity and benevolence (INB)</i>				
INB1	The other participants in the Taobao Virtual Community would not knowingly do anything to disrupt the conversation	4.06	1.271	0.724
INB2	The participants in the Taobao Virtual Community are concerned about what is important to others	4.07	1.175	
INB3	The participants in the Taobao Virtual Community will do everything within their capacity to help others	4.50	1.175	
INB4	The other participants in the Taobao Virtual Community do not behave in a consistent manner (reverse coded; delete)	4.33	1.067	
<i>Trust in the website/vendor's ability (VAB)</i>				
				0.778

Appendix A (continued)

Construct/items	Mean	Standard deviation	Cronbach's alpha
VAB1 I believe that Taobao has the skills and expertise to meet most customer needs	5.00	1.185	
VAB2 I believe that Taobao has the skills and expertise to provide quality service to buyers and sellers	5.02	1.148	
<i>Trust in the website/vendor's integrity (VIN)</i>			0.801
VIN1 I believe that Taobao is fair in its conduct of transactions between sellers and buyers	4.92	1.173	
VIN2 I believe that Taobao is fair in its use of private user data collected during a transaction	4.86	1.171	
VIN3 I believe that Taobao is fair in its service policies for buyers and sellers	4.82	1.179	
<i>Trust in the website/vendor's benevolence (VBE)</i>			0.776
VBE1 I believe that Taobao is open and receptive to users' (buyers and sellers) needs	4.67	1.221	
VBE2 I believe that Taobao keeps its users' (buyers and sellers) interests in mind during most transactions	4.61	1.262	
VBE3 I believe that Taobao makes good-faith efforts to address most users' (buyers and sellers) concerns	4.99	1.129	
<i>Intention to get information (GII)</i>			0.811
GII1 I intend to come to the Taobao Virtual Community to get related information, when I want to purchase some products	5.14	1.298	
GII2 I intend to come to the Taobao Virtual Community to get related information when I need to know the characteristics of some products	5.13	1.310	

Appendix A (continued)

Construct/items	Mean	Standard deviation	Cronbach's alpha
GII3 I will consider coming to the Taobao Virtual Community to get related information when I need to know other people's experiences of using some products	5.12	1.248	
<i>Purchase intention (PI)</i>			0.903
PI1 Given the chance, I would consider purchasing products on Taobao in the future	5.72	1.102	
PI2 It is likely that I will actually purchase products on Taobao in the near future	5.75	1.116	
PI3 Given the opportunity, I intend to purchase products on Taobao	5.68	1.209	

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Source: *The Academy of Management Review*, Jul., 1995, Vol. 20, No. 3 (Jul., 1995), pp. 709-734

Published by: Academy of Management

Stable URL: <https://www.jstor.org/stable/258792>

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AN INTEGRATIVE MODEL OF ORGANIZATIONAL TRUST

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Scholars in various disciplines have considered the causes, nature, and effects of trust. Prior approaches to studying trust are considered, including characteristics of the trustor, the trustee, and the role of risk. A definition of trust and a model of its antecedents and outcomes are presented, which integrate research from multiple disciplines and differentiate trust from similar constructs. Several research propositions based on the model are presented.

The topic of trust is generating increased interest in organizational studies. Gambetta (1988) noted that "scholars tend to mention [trust] in passing, to allude to it as a fundamental ingredient or lubricant, an unavoidable dimension of social interaction, only to move on to deal with less intractable matters" (unnumbered foreword). The importance of trust has been cited in such areas as communication (Giffin, 1967), leadership (Atwater, 1988), management by objectives (Scott, D., 1980), negotiation (Bazerman, 1994), game theory (Milgrom & Roberts, 1992), performance appraisal (Cummings, 1983), labor-management relations (Taylor, 1989), and implementation of self-managed work teams (Lawler, 1992).

Although a great deal of interest in trust has been expressed by scholars, its study in organizations has remained problematic for several reasons: problems with the definition of trust itself; lack of clarity in the relationship between risk and trust; confusion between trust and its antecedents and outcomes; lack of specificity of trust referents leading to confusion in levels of analysis; and a failure to consider both the trusting party and the party to be trusted. The purpose of this article is to illuminate and resolve these problems in the presentation of a model of trust of one individual for another. Through this model we propose that this level of trust and the level of perceived risk in the situation will lead to risk taking in the relationship.

We would like to thank Edward Conlon, Robert Vecchio, and four anonymous reviewers for their helpful comments.

Need for Trust

Working together often involves interdependence, and people must therefore depend on others in various ways to accomplish their personal and organizational goals. Several theories have emerged that describe mechanisms for minimizing the risk inherent in working relationships. These theories are designed to regulate, to enforce, and/or to encourage compliance to avoid the consequences of broken trust. In order to avoid self-serving behaviors as well as potential litigation, many firms utilize control mechanisms and contracts, and they alter their decision-making processes, internal processes, reward systems, and structures (Jensen & Meckling, 1976; Meyer, 1983; Sitkin & Bies, 1994; Williamson, 1975). Legalistic remedies have been described as weak, impersonal substitutes for trust (Sitkin & Roth, 1993), which may bring organizational legitimacy, yet often are ineffective (Argyris, 1994; Donaldson & Davis, 1991; Granovetter, 1985; Sitkin & Roth, 1993).

Current trends in both workforce composition and the organization of the workplace in the United States suggest that the importance of trust is likely to increase during the coming years. One important trend in workforce composition is the increase in diversity. Jamieson and O'Mara (1991) projected that the minority share of the workforce will grow from 17 percent in the late 1980s to over 25 percent by the year 2000. Jackson and Alvarez (1992) pointed out that increases in workforce diversity necessitate that people with very different backgrounds come into contact and deal closely with one another. A diverse workforce is less able to rely on interpersonal similarity and common background and experience to contribute to mutual attraction and enhance the willingness to work together (Berscheid & Walster, 1978; Newcomb, 1956). In this context, the development of mutual trust provides one mechanism for enabling employees to work together more effectively.

Another trend related to changes in the organization of work also will lead to an increased interest in the study of trust. Lawler (1992) cited continuing changes in the workplace in the direction of more participative management styles and the implementation of work teams. A recent survey indicates that 27 percent of American companies are implementing self-directed work teams in some part of the organization (Wellins, Byham, & Wilson, 1991). The emergence of self-directed teams and a reliance on empowered workers greatly increase the importance of the concept of trust (Golembiewski & McConkie, 1975; Larson & LaFasto, 1989) as control mechanisms are reduced or removed and interaction increases.

The trends just cited suggest that the development of a model of trust in organizations is both timely and practical. In the use of self-directed teams, trust must take the place of supervision because direct observation of employees becomes impractical. Further, a clear understanding of trust and its causes can facilitate cohesion and collaboration between people by building trust through means other than interpersonal similar-

ity. In spite of the growing importance of trust, a number of institutions that measure trust have witnessed diminishing trust among employees (Farnham, 1989).

One of the difficulties that has hindered previous research on trust has been a lack of clear differentiation among factors that contribute to trust, trust itself, and outcomes of trust (Cook & Wall, 1980; Kee & Knox, 1970). Without this clear distinction, the difference between trust and similar constructs is blurred. For example, many researchers have agreed with Deutsch (1958) that risk, or having something invested, is requisite to trust. The need for trust only arises in a risky situation. Although numerous authors have recognized the importance of risk to understanding trust (Coleman, 1990; Giffin, 1967; Good, 1988; Lewis & Weigert, 1985; Luhmann, 1988; March & Shapira, 1987; Riker, 1974; Schlenker, Helm, & Tedeschi, 1973), no consensus on its relationship with trust exists. It is unclear whether risk is an antecedent to trust, is trust, or is an outcome of trust. This key issue of how risk fits with trust must be resolved, and it is dealt with later in this article. The model developed in this article complements the risk literature by clarifying the role of interpersonal trust in risk taking. A parsimonious model (James, Mulaik, & Brett, 1982; Runkel & McGrath, 1972) with a manageable number of factors should provide a solid foundation for the empirical study of trust for another party.

Each of the essential trust issues that have just been described will be explored as a model of dyadic trust is developed. Although there is a growing body of literature in social psychology that examines trust in dating and other such relationships (e.g., Larzelere & Huston, 1980), the nature and bases of such relationships may be different from those in organizations. Thus, the model developed here is designed to focus on trust in an organizational setting involving two specific parties: a trusting party (trustor) and a party to be trusted (trustee) (Driscoll, 1978; Scott, C. L., 1980). The model explicitly encompasses factors about both the trustor and the trustee, which previous models have neglected. This relationship-specific boundary condition of our approach is important, because a number of authors have dealt with trust for generalized others (e.g., Rotter, 1967) and trust as a social phenomenon (e.g., Lewis & Weigert, 1985). Even though such approaches help provide a general sense of the considerations involved in trust, they do not clarify the relationship between two specific individuals and the reasons why a trustor would trust a trustee. Further, the failure to clearly specify the trustor and the trustee encourages the tendency to change referents and even levels of analysis, which obfuscates the nature of the trust relationship.

In the following sections, the definition of trust developed from our research is presented, and it is differentiated from similar constructs. Next, characteristics of both the trustor and the trustee, which affect the amount of trust the trustor has for the trustee, are considered. Following that, the relationship of trust and risk is considered. Finally, the effects of context as well as the long-term development of trust are considered.

Definition of Trust

Johnson-George and Swap (1982: 1306) asserted that "willingness to take risks may be one of the few characteristics common to all trust situations." Kee and Knox (1970) argued that to appropriately study trust there must be some meaningful incentives at stake and that the trustor must be cognizant of the risk involved. The definition of trust proposed in this research is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party. This definition of trust is applicable to a relationship with another identifiable party who is perceived to act and react with volition toward the trustor. This definition parallels that of Gambetta (1988), with the critical addition of vulnerability. Being vulnerable (Boss, 1978; Zand, 1972) implies that there is something of importance to be lost. Making oneself vulnerable is taking risk. Trust is not taking risk *per se*, but rather it is a willingness to take risk. This distinction will be further explored in a later section.

Several terms have been used synonymously with trust, and this has obfuscated the nature of trust. Among these are cooperation, confidence, and predictability. The sections that follow differentiate trust from these constructs.

Cooperation

One conceptual difficulty with studying trust is that it has often been confused with cooperation (Bateson, 1988). For instance, Gambetta (1988: 217) asserted that trusting someone means "the probability that he will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him." The distinction of trust from cooperation is unclear.

Although trust can frequently lead to cooperative behavior, trust is not a necessary condition for cooperation to occur, because cooperation does not necessarily put a party at risk. An employee could cooperate with and, indeed, even appear to act like he or she trusts another employee who he or she does not trust. However, the reason for the cooperation may be due to a powerful manager who is clearly expected to punish the other employee for any act that damages the focal employee's interests. The focal employee may cooperate with and appear to trust the other employee, but his or her actions are due to a lack of perceived risk. Such means as control mechanisms and lack of available alternatives may lead a party to cooperate, even in the absence of trust. As Gambetta stated, "As the high incidence of paranoid behaviour among dictators suggests, coercion can be self-defeating, for while it may enforce 'cooperation' in specific acts, it also increases the probability of treacherous ones: betrayal, defection, and the classic stab in the back" (1988: 220).

Kee and Knox (1970) also concluded that there were a number of

reasons why individuals may be observed to act in cooperative or competitive fashions that are not reflective of the level of trust in the relationship. For example, a person may not be able to avoid a situation structured like the prisoner's dilemma. His or her behavior may appear to be trusting, but it is based on other motives or rationales.

Even though trust and cooperation have at times been treated as synonymous, it is important to distinguish between them. You can cooperate with someone who you don't really trust. If there are external control mechanisms that will punish the trustee for deceitful behavior, if the issue at hand doesn't involve vulnerability to the trustor over issues that matter, or if it's clear that the trustee's motives will lead him or her to behave in a way that coincides with the trustor's desires, then there can be cooperation without trust. In each of these cases, vulnerability is minimal or absent.

Confidence

The relationship between confidence and trust is amorphous in the literature on trust. For example, Deutsch (1960) considered the reasons why one person would trust another person to produce some beneficial events. The "individual must have confidence that the other individual has the ability and intention to produce it" (Deutsch, 1960: 125). Cook and Wall (1980: 39) defined trust as "the extent to which one is willing to ascribe good intentions to and have confidence in the words and actions of other people." A number of other authors have not clearly distinguished between the two (e.g., Coleman, 1990; Frost, Stimpson, & Maughan, 1978; Jones, James, & Bruni, 1975).

Luhmann (1988) proposed a distinction that helps to differentiate trust from confidence. He asserted that both concepts refer to expectations that may lead to disappointment. Luhmann argued that trust differs from confidence because it requires a previous engagement on a person's part, recognizing and accepting that risk exists. Although Luhmann suggested that both confidence and trust may become routine, the distinction "depends on perception and attribution. If you do not consider alternatives (every morning you leave the house without a weapon!), you are in a situation of confidence. If you choose one action in preference to others in spite of the possibility of being disappointed by the action of others, you define the situation as one of trust" (1988: 102).

Luhmann's differentiation between trust and confidence recognizes that in the former risk must be recognized and assumed, and such is not the case with confidence. The trustor's explicit recognition of risk within our model precludes the conceptual ambiguity present in the research just cited.

Predictability

There is clearly a relationship between predictability and trust, but, again, the association is ambiguous. Both prediction and trust are means

of uncertainty reduction (Lewis & Weigert, 1985). However, much of the literature tends to equate predictability with trust. For example, Gabarro (1978: 294) cited several definitions of trust, including "the extent to which one person can expect predictability in the other's behavior in terms of what is 'normally' expected of a person acting in good faith." Several other theorists have defined trust in ways that also appear to overlap substantially with predictability (Dasgupta, 1988; Gambetta, 1988; Good, 1988; Rotter, 1967).

To be meaningful, trust must go beyond predictability (Deutsch, 1958). To equate the two is to suggest that a party who can be expected to consistently ignore the needs of others and act in a self-interested fashion is therefore trusted, because the party is predictable. What is missing from such an approach is the willingness to take a risk in the relationship and to be vulnerable. One can believe such a trustee to be predictable in a situation in which the trustee influences resource distribution between the trustee and the trustor but also be unwilling to be vulnerable to that trustee.

Another party's predictability is insufficient to make a person willing to take a risk. If a person's superior always "shoots the messenger" when bad news is delivered, the superior is predictable. However, this predictability will not increase the likelihood that the individual will take a risk and deliver bad news. On the contrary, predictability can reduce the likelihood that the individual will trust and therefore take actions that allow vulnerability to the superior.

Predictability might best be thought of as influencing cooperation. If one expects that a party will predictably behave positively, one will be disposed to cooperate with the party. However, the reason for that predictability may be external to the party, such as strong control mechanisms (Friedland, 1990). Without those mechanisms, a person may be unwilling to be vulnerable to the party. Thus, predictability is insufficient to trust.

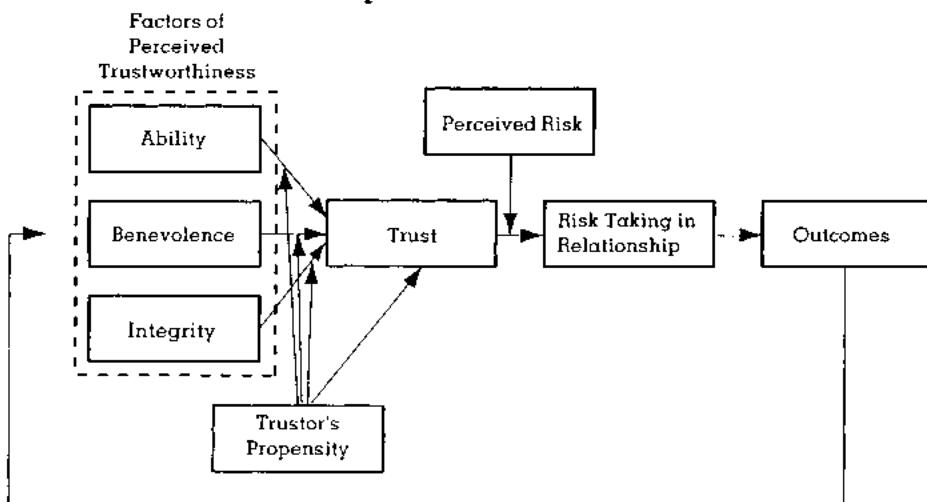
The previous section dealt with the nature of trust itself, differentiating it from similar constructs. The following sections of this paper deal first with factors concerning the trustor and then the trustee that lead to trust. These components of the model can be seen in Figure 1.

Characteristics of the Trustor

One factor that will affect the trust one party has for another involves traits of the trustor. Some parties are more likely to trust than are others. As discussed in this section, several authors have considered trust from the perspective of a person's general willingness to trust others.

Among the early trust theorists was Rotter (1967: 651), who defined interpersonal trust "as an expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied upon." Although his definition appears to suggest the author is speaking of trust for a specific referent, Rotter's widely used

FIGURE 1
Proposed Model of Trust



measure focuses on a generalized trust of others—something akin to a personality trait that a person would presumably carry from one situation to another. For example, typical items in his scale are "In dealing with strangers one is better off to be cautious until they have provided evidence that they are trustworthy" and "Parents usually can be relied upon to keep their promises."

Several other authors have discussed trust in similar ways. For example, Dasgupta's treatment of trust includes generalized expectations of others; for example, "Can I trust people to come to my rescue if I am about to drown?" (1988: 53; emphasis added). Similarly, Farris, Senner, and Butterfield (1973: 145) defined trust as "a personality trait of people interacting with peripheral environment of an organization." In this approach trust is viewed as a trait that leads to a generalized expectation about the trustworthiness of others. In the proposed model this trait is referred to as the propensity to trust.

Propensity to trust is proposed to be a stable within-party factor that will affect the likelihood the party will trust. People differ in their inherent propensity to trust. Propensity might be thought of as the general willingness to trust others. Propensity will influence how much trust one has for a trustee prior to data on that particular party being available. People with different developmental experiences, personality types, and cultural backgrounds vary in their propensity to trust (e.g., Hofstede, 1980). An example of an extreme case of this is what is commonly called blind trust. Some individuals can be observed to repeatedly trust in situations that most people would agree do not warrant trust. Conversely, others are unwilling to trust in most situations, regardless of circumstances that would support doing so.

Some evidence exists that this dispositional approach is worth pursuing. For example, using Rotter's (1967) measure, Conlon and Mayer (1994) found the willingness to trust others was significantly related to the behavior and performance of persons working in an agency simulation. Other researchers also have found this dispositional trust factor to be related to behaviors of interest in organizational research (e.g., Moore, Shaffer, Pollak, & Taylor-Lemcke, 1987; Sabatelli, Buck, & Dreyer, 1983). Propensity should contribute to the explanation of variance in trust if used as a part of a more complete set of variables.

Propensity to trust is similar to Sitkin and Pablo's (1992) definition of propensity in their model of the determinants of risk behavior. They define *risk propensity* as "the tendency of a decision maker either to take or avoid risks" (1992: 12). However, our approach differs in that propensity to trust others is viewed as a trait that is stable across situations, whereas according to Sitkin and Pablo's approach, risk propensity is more situation specific, affected both by personality characteristics (i.e., risk preference) and situational factors (i.e., inertia and outcome history).

*Proposition 1. The higher the trustor's propensity to trust,
the higher the trust for a trustee prior to availability of
information about the trustee.*

Even though an understanding of trust necessitates consideration of the trust propensity of the trustor, a given trustor has varied levels of trust for various trustees. Thus, propensity is by itself insufficient. To address this variance, in the next section we examine the characteristics of the trustee.

Characteristics of the Trustee: The Concept of Trustworthiness

One approach to understanding why a given party will have a greater or lesser amount of trust for another party is to consider attributes of the trustee. Ring and Van de Ven (1992) argued that because of the risk in transactions, managers must concern themselves with the trustworthiness of the other party. A number of authors have considered why a party will be judged as trustworthy.

Some of the earliest research on characteristics of the trustee was conducted by Hovland, Janis, and Kelley (1953) in the famous Yale studies on communication and attitude change. According to these researchers, credibility was affected by two factors: expertise and trustworthiness. Trustworthiness was assessed as the motivation (or lack thereof) to lie. For example, if the trustee had something to gain by lying, he or she would be seen as less trustworthy.

In more recent work, Good (1988) suggested that trust is based on expectations of how another person will behave, based on that person's current and previous implicit and explicit claims. Similarly, Lieberman (1981) stated that trust in fiduciary relationships is based on a belief in the professional's competence and integrity. Examination of the items in Johnson-George and Swap's (1982) measure of trust reveals that they reflect inferences about the trustee.

All of these authors have suggested that characteristics and actions of the trustee will lead that person to be more or less trusted. These characteristics are important if researchers are to understand why some parties are more trusted than others. In the remainder of this section, three characteristics of the trustee that determine trustworthiness are examined. Although they are not trust per se, these variables help build the foundation for the development of trust.

The Factors of Trustworthiness

Conditions that lead to trust have been considered repeatedly in the literature. Some authors identify a single trustee characteristic that is responsible for trust (e.g., Strickland, 1958), whereas other authors delineate as many as 10 characteristics (e.g., Butler, 1991). A review of factors that lead to trust is summarized in Table 1. Even though a number of factors have been proposed, three characteristics of a trustee appear often in the literature: ability, benevolence, and integrity. As a set, these three appear to explain a major portion of trustworthiness.¹ Each contributes a unique perceptual perspective from which to consider the trustee, while the set provides a solid and parsimonious foundation for the empirical study of trust for another party.

Ability

Ability is that group of skills, competencies, and characteristics that enable a party to have influence within some specific domain. The domain of the ability is specific because the trustee may be highly competent in some technical area, affording that person trust on tasks related to that area. However, the trustee may have little aptitude, training, or experience in another area, for instance, in interpersonal communication. Although such an individual may be trusted to do analytic tasks related to his or her technical area, the individual may not be trusted to initiate contact with an important customer. Thus, trust is domain specific (Zand, 1972).

A number of theorists have discussed similar constructs as affecting trust, using several synonyms. Cook and Wall (1980), Deutsch (1960), Jones, James, and Bruni (1975), and Sitkin and Roth (1993) all considered ability an essential element of trust. Others (e.g., Butler, 1991; Butler & Cantrell, 1984; Kee & Knox, 1970; Lieberman, 1981; Mishra, In press; Rosen & Jerdee, 1977) used the word competence to define a similar construct. In the Yale studies described previously, perceived expertise was identified as a critical characteristic of the trustee. Similarly, Giffin (1967) suggested

¹ It is interesting to note that Aristotle's *Rhetoric* suggests that a speaker's ethos (Greek root for ethics) is based on the listener's perception of three things: intelligence; character (reliability, honesty); and goodwill (favorable intentions toward the listener). These bases provide an interesting parallel with the factors of ability, integrity, and benevolence, respectively.

TABLE 1
Trust Antecedents

Authors	Antecedent Factors
Boyle & Bonacich (1970)	Past interactions, index of caution based on prisoners' dilemma outcomes
Butler (1991)	Availability, competence, consistency, discreetness, fairness, integrity, loyalty, openness, promise fulfillment, receptivity
Cook & Wall (1980)	Trustworthy intentions, ability
Dasgupta (1988)	Credible threat of punishment, credibility of promises
Deutsch (1960)	Ability, intention to produce
Farris, Senner, & Butterfield (1973)	Openness, ownership of feelings, experimentation with new behavior, group norms
Frost, Stimpson, & Maughan (1978)	Dependence on trustee, altruism
Gabarro (1978)	Openness, previous outcomes
Giffin (1967)	Expertness, reliability as information source, intentions, dynamism, personal attraction, reputation
Good (1988)	Ability, intention, trustees' claims about how (they) will behave
Hart, Capps, Cangemi, & Caillouet (1986)	Openness/congruity, shared values, autonomy/feedback
Hovland, Janis, & Kelley (1953)	Expertise, motivation to lie
Johnson-George & Swap (1982)	Reliability
Jones, James, & Bruni (1975)	Ability, behavior is relevant to the individual's needs and desires
Kee & Knox (1970)	Competence, motives
Larzelere & Huston (1980)	Benevolence, honesty
Lieberman (1981)	Competence, integrity
Mishra (In press)	Competence, openness, caring, reliability
Ring & Van de Ven (1992)	Moral integrity, goodwill
Rosen & Jerdee (1977)	Judgment or competence, group goals
Sitkin & Roth (1993)	Ability, value congruence
Solomon (1960)	Benevolence
Strickland (1958)	Benevolence

expertness as a factor that leads to trust. Finally, Gabarro (1978) identified nine bases of trust, including functional/specific competence, interpersonal competence, business sense, and judgment. All of these are similar to ability in the current conceptualization. Whereas such terms as expertise and competence connote a set of skills applicable to a single, fixed domain (e.g., Gabarro's interpersonal competence), ability highlights the task- and situation-specific nature of the construct in the current model.

Benevolence

Benevolence is the extent to which a trustee is believed to want to do good to the trustor, aside from an egocentric profit motive. Benevolence suggests that the trustee has some specific attachment to the trustor. An

example of this attachment is the relationship between a mentor (trustee) and a protégé (trustor). The mentor wants to help the protégé, even though the mentor is not required to be helpful, and there is no extrinsic reward for the mentor. Benevolence is the perception of a positive orientation of the trustee toward the trustor.

A number of researchers have included characteristics similar to benevolence as a basis for trust. Hovland and colleagues (1953) described trustworthiness in terms of the trustee's motivation to lie. This idea is clearly consistent with the view that perceived benevolence plays an important role in the assessment of trustworthiness, in that high benevolence in a relationship would be inversely related to motivation to lie. Several authors have used the term benevolence in their analyses of trust, focusing on the specific relationship with the trustor (Larzelere & Huston, 1980; Solomon, 1960; Strickland, 1958). Others have considered intentions or motives as important to trust (e.g., Cook & Wall, 1980; Deutsch, 1960; Giffin, 1967; Kee & Knox, 1970; Mishra, In press). Although these authors reflect a belief that the trustee's orientation toward the trustor is important, the terms *intentions* and *motives* can include wider implications than the orientation toward the trustor (e.g., the trustee's profit motives). Benevolence connotes a personal orientation that is integral to the proposed model. Also, in a similar vein, Frost, Stimpson, and Maughan (1978) suggested that altruism contributes to the level of trust. Butler and Cantrell (1984) identified loyalty among their determinants of dyadic trust. Jones, James, and Bruni (1975) suggested that confidence and trust in a leader are influenced in part by the extent to which the leader's behavior is relevant to the individual's needs and desires. Rosen and Jerdee (1977) considered the likelihood that the trustee would put organizational goals ahead of individual goals. Thus, all of these researchers used some construct similar to benevolence, as defined in our model.

Integrity

The relationship between integrity and trust involves the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable. McFall (1987) illustrated why both the adherence to and acceptability of the principles are important. She suggested that following some set of principles defines *personal integrity*. However, if that set of principles is not deemed acceptable by the trustor, the trustee would not be considered to have integrity for our purposes (McFall called this *moral integrity*). The issue of acceptability precludes the argument that a party who is committed solely to the principle of profit seeking at all costs would be judged high in integrity (unless this principle is acceptable to the trustor). Such issues as the consistency of the party's past actions, credible communications about the trustee from other parties, belief that the trustee has a strong sense of justice, and the extent to which the party's actions are congruent with his or her words all affect the degree to which the party is judged to have integrity. Even though a case could be

made that there are differentiable reasons why the integrity of a trustee could be perceived as higher or lower (e.g., lack of consistency is different from acceptability of principles), in the evaluation of trustworthiness it is the perceived level of integrity that is important rather than the reasons why the perception is formed.

Integrity or very similar constructs have been discussed as antecedent to trust by a number of theorists. Lieberman (1981) included integrity *per se* as an important trust factor. Sitkin and Roth's (1993: 368) approach utilizes a similar but more constrained construct of *value congruence*, which they defined as "the compatibility of an employee's beliefs and values with the organization's cultural values." Their approach compares the trustee's values with those of an organizational referent, rather than a judgment of the acceptability of the trustee's values to the trustor. Integrity and consistency were trust determinants in Butler and Cantrell's (1984) model. Likewise, Butler (1991) included consistency, integrity, and fairness as conditions of trust. Although a lack of consistency would cause one to question what values a trustee holds, being consistent is insufficient to integrity, as the trustee may consistently act in a self-serving manner. Gabarro (1978) suggested that three bases of trust were commonly mentioned by their interviewees, one of which was *character*. He contended that character includes integrity. Hart, Capps, Cangemi, and Caillouet's (1986) analysis of 24 survey items revealed three factors, one of which was openness/congruity (i.e., the integrity, fairness, and openness of management). Inclusion of integrity in the proposed model is well grounded in previous approaches to trust.

It is apparent from the previous discussion that the three factors of ability, benevolence, and integrity are common to much of the previous work on trust. Earlier models of trust antecedents either have not used the three factors together or have expanded into much larger sets of antecedents (e.g., Butler, 1991; Gabarro, 1978). These three factors appear to explain concisely the within-trustor variation in trust for others.

Proposition 2. Trust for a trustee will be a function of the trustee's perceived ability, benevolence, and integrity and of the trustor's propensity to trust.

Interrelationship of the Three Factors

Ability, benevolence, and integrity are important to trust, and each may vary independently of the others. This statement does not imply that the three are unrelated to one another, but only that they are separable.

Consider the case of an individual and would-be mentor. Ideally, the individual would want the mentor to be able to have the maximum positive impact on the protégé's career and to help and guide the protégé in any way possible. To what extent would the protégé trust the mentor? The mentor would need to be knowledgeable about the profession, have a thorough knowledge of the company, be interpersonally and politically

astute, and so on. All of these attributes would contribute to the protégé's perception that the mentor has the ability to be helpful. This perception, alone, would not assure that the mentor would be helpful; it would mean only that the possibility exists.

Previous positively viewed actions of the mentor in his or her relationships with others, compatibility of the mentor's statements and actions, and credible communications from others about honorable actions by the mentor would build the assessment of the mentor's integrity. However, even if the individual is deemed to have high integrity, he or she may or may not have the knowledge and capabilities to be a helpful mentor. Thus, integrity by itself will not make the individual a trusted mentor.

But what about the person whose integrity is well known and whose abilities are stellar? Would this potential mentor be trusted? Perhaps not—this individual may have no particular attachment to the focal employee. Would the focal employee trust this person enough to divulge sensitive information about mistakes or shortcomings? If the manager also were benevolent toward the employee, he or she may try to protect the employee from the possible ramifications of mistakes. A manager who is less benevolent to the focal employee may be more disposed to use the information in a way that helps the company most, even at the possible expense of the employee. However, benevolence by itself is insufficient to cause trust. A well-intentioned person who lacks ability may not know who in the organization should be made aware of what. Aside from not being helpful, the person could actually do significant harm to the employee's career. Thus, it is possible for a perceived lack of any of the three factors to undermine trust.

If ability, benevolence, and integrity were all perceived to be high, the trustee would be deemed quite trustworthy. However, trustworthiness should be thought of as a continuum, rather than the trustee being either trustworthy or not trustworthy. Each of the three factors can vary along a continuum. Although the simplest case of high trust presumes a high level of all three factors, there may be situations in which a meaningful amount of trust can develop with lesser degrees of the three. Consider the case in which a highly able manager does not demonstrate high integrity (e.g., in dealings with others) but forms an attachment to a particular employee. The manager repeatedly demonstrates strong benevolence toward the employee, providing resources even at others' expense. Will the employee trust the manager? On one hand, it can be argued that if the employee strongly believes in the benevolence of the manager, the employee has no reason to doubt how the manager will behave in the future. On the other hand, if the manager's integrity is questionable, can the employee help but wonder how long it will be until the manager betrays her or him as well? Whether or not the employee will trust the manager depends in part upon the employee's propensity to trust. In addition to propensity affecting trust when there are no data on characteristics of the

trustee, propensity can enhance the effect of these factors, thereby producing a moderating effect on trust. The point is that the employee may or may not trust the manager in such a scenario. Clearly, if all three factors were high, the employee would trust, but how low can some of the three factors be before the employee would not trust the manager? In what situations is each of the three factors most sensitive or critical? These questions clearly deserve investigation.

The proposed model can explain trust (based on propensity) before any relationship between two parties has developed. As a relationship begins to develop, the trustor may be able to obtain data on the trustee's integrity through third-party sources and observation, with little direct interaction. Because there is little information about the trustee's benevolence toward the trustor, we suggest that integrity will be important to the formation of trust early in the relationship. As the relationship develops, interactions with the trustee allow the trustor to gain insights about the trustee's benevolence, and the relative impact of benevolence on trust will grow. Thus, the development of the relationship is likely to alter the relative importance of the factors of trustworthiness.

Proposition 3. The effect of integrity on trust will be most salient early in the relationship prior to the development of meaningful benevolence data.

Proposition 4. The effect of perceived benevolence on trust will increase over time as the relationship between the parties develops.

Each of these three factors captures some unique elements of trustworthiness. Previously we suggested that as a set, ability, benevolence, and integrity appear to explain a major portion of trustworthiness while maintaining parsimony. Each element contributes a unique perceptual perspective from which the trustor considers the trustee. If a trustee is perceived as high on all three factors, it is argued here that the trustee will be perceived as quite trustworthy.

Even though there are many conceptualizations of which factors of trustworthiness are important, ability, benevolence, and integrity appear to encompass the major issues. Using three of the most current models available, Table 2 illustrates that factors of trustworthiness from earlier models are subsumed within the perceptions of these three factors. For example, Mishra's (In press) conceptualization includes competence, openness, caring, and reliability. Competence and ability are clearly similar, whereas caring parallels benevolence. A lack of trustee reliability as Mishra conceptualizes it would clearly damage the perception of integrity in the current model. Mishra's openness is measured through questions about both the trustee's general openness with others and openness with the trustor, which could be expected to be related to either integrity or benevolence, respectively. Likewise, if a trustor perceived that a trustee were low on any one of Butler's (1991) 10 factors of trustworthi-

TABLE 2
Apparent Overlap of Recent Models

Authors	No. of Factors				Similar Factors Included	Integrity
		Propensity	Ability	Beneficence		
Butler (1991)	10	No	Competence	Loyalty, openness, receptivity.		Consistency, discreetness, fairness, integrity.
Mishra (In press)	4	No	Competence	Availability		promise fulfillment
Sitkin & Roth (1993)	2	No	Ability	Caring, openness No		Reliability, openness Value congruence

ness, that perceived deficiency would also lower the perception of one of three factors in our current model. Specifically, if a trustor perceived a trustee to be deficient on any of Butler's loyalty, openness, receptivity, or availability factors, it would also lower the perception of the trustee's benevolence in the current model. Butler's factors of consistency, discreetness, fairness, integrity, and promise fulfillment are encompassed within the current conceptualization of integrity. If a trustor were concerned with a trustee's competence in Butler's model, those concerns would be reflected in the perception of ability in our model. Like the current model, Sitkin and Roth's (1993) model includes ability. Their definition of value congruence parallels the considerations encompassed in integrity. Thus, the factors of trustworthiness described in earlier, more complex models are accounted for in the current approach while gaining the advantage of parsimony (James, Mulaik, & Brett, 1982; Runkel & McGrath, 1972).

In the preceding sections, characteristics of a trustor and a trustee that lead to trust were examined. The distinction between a trustor's characteristics and trustee's characteristics is important. Perceptions of ability, benevolence, and integrity of another party leave a considerable amount of variance in trust unexplained, because they neglect between-trustor differences in propensity to trust. Likewise, understanding the propensity to trust does not include the trustworthiness of a given trustee. In sum, to understand the extent to which a person is willing to trust another person, both the trustor's propensity to trust and the trustor's perceptions of the trustee's ability, benevolence, and integrity must be discerned.

The above presentation dealt with characteristics of the trustor and trustee that lead to trust. What follows is a consideration of risk and its relationship with engaging in trusting actions.

Risk Taking in Relationship

It was argued previously that risk is an essential component of a model of trust. It is important for researchers to understand the role of risk. There is no risk taken in the willingness to be vulnerable (i.e., to trust), but risk is inherent in the *behavioral manifestation* of the willingness to be vulnerable. One does not need to risk anything in order to trust; however, one must take a risk in order to engage in trusting action. The fundamental difference between trust and trusting behaviors is between a "willingness" to assume risk and actually "assuming" risk. Trust is the willingness to assume risk; behavioral trust is the assuming of risk. This differentiation parallels Sitkin and Pablo's (1992) distinction in the risk-taking literature between the tendency to take risks and risk behavior. This critical differentiation highlights the importance of clearly distinguishing between trust and its outcomes.

Trust will lead to risk taking in a relationship, and the form of the risk taking depends on the situation. For example, a supervisor may take a risk by allowing an employee to handle an important account rather than

handling it personally. The supervisor risks repercussions if the employee mishandles the account. Likewise, an employee may trust a manager to compensate for exceptional contributions that are beyond the scope of the employee's job. If the employee allows performance on some aspects of his or her formal job description to suffer in order to attend to a project that is important to the supervisor, the employee is clearly taking a risk. If the supervisor fails to account for the work on the project, the employee's performance appraisal will suffer. In both examples, the level of trust will affect the amount of risk the trustor is willing to take in the relationship. In the former case, trust will affect the extent to which the supervisor will empower the employee; in the latter case, trust will affect the extent to which the employee will engage in organizational citizenship behavior. Even though the form of the risk taking depends on the situation, in both cases the amount of trust for the other party will affect how much risk a party will take.

Thus, the outcome of trust proposed in this article is risk taking in relationship (RTR). RTR differentiates the outcomes of trust from general risk-taking behaviors because it can occur only in the context of a specific, identifiable relationship with another party. Further, RTR suggests that trust will increase the likelihood that a trustor will not only form some affective link with a trustee, but also that the trustor will allow personal vulnerability. The separation of trust from RTR is illustrated in Figure 1 by the inclusion of a box representing each construct.

Trust is not involved in all risk-taking behavior. For example, when a farmer invests time and resources into planting crops, the farmer is taking a risk that sufficient rain will fall during the critical times of the growing season so that there will be a profitable crop to harvest. Although this behavior involves risk, it does not involve trust as defined in this theory, because there is no relationship with an identifiable "other party" to which the farmer would make himself or herself vulnerable. Even though proponents of a sociological approach might argue that this is an example of trust because there is a system that produces meteorological forecasts, it is important to remember that the meteorologists do not control the weather—they merely provide data about the likelihood of various weather scenarios. Perceptions of meteorologists' accuracy would affect risk perception (Sitkin & Pablo, 1992). Thus, the farmer does not trust the weather but takes a risk on what the weather will do (Deutsch, 1958).

Assessing the risk in a situation involves consideration of the context, such as weighing the likelihood of both positive and negative outcomes that might occur (Bierman, Bonini, & Hausman, 1969; Coleman, 1990). If a decision involves the possibility of a negative outcome coupled with a positive outcome, the aggregate level of risk is different than if only the possibility of the negative outcome exists. Thus, the stakes in the situation (i.e., both the possible gains and the potential losses) will affect the interpretation of the risk involved. In an integrative review of risk

behavior, Sitkin and Pablo (1992) identified a number of other factors that influence the perception of risk, such as familiarity of the domain of the problem, organizational control systems, and social influences.

It is important that we clarify what is meant by the perception of risk in this model, because it extends the risk literature in its meaning. In our model, the perception of risk involves the trustor's belief about likelihoods of gains or losses outside of considerations that involve the relationship with the particular trustee. Current approaches to perceived risk implicitly incorporate knowledge of the relationship with the trustee with non-relational reasons for assessments of risk, and, therefore, they do not clarify how trust for a given trustee is related to risk behavior. For example, Sitkin and Pablo (1992: 10) defined risk as "a characteristic of decisions that is defined here as the extent to which there is uncertainty about whether potentially significant and/or disappointing outcomes of decisions will be realized." In our model of trust, the decision to which Sitkin and Pablo refer is the RTR, wherein the trustor takes action. Two categories of factors influence the assessment of the likelihood of significant and/or disappointing outcomes: the relationship with the trustee (i.e., trust) and factors outside the relationship that make the decision significant and uncertain. In sum, to understand how trust actually affects a person's taking a risk, one must separate trust from other situational factors that necessitate trust (i.e., perceived risk in the current model).

We propose that the level of trust is compared to the level of perceived risk in a situation. If the level of trust surpasses the threshold of perceived risk, then the trustor will engage in the RTR. If the level of perceived risk is greater than the level of trust, the trustor will not engage in the RTR.

In sum, trust is a willingness to be vulnerable to another party, but there is no risk involved with holding such an attitude. Trust will increase the likelihood of RTR, which is the behavioral manifestation of trust. Whether or not a specific risk will be taken by the trustor is influenced both by the amount of trust for the trustee and by the perception of risk inherent in the behavior.

Proposition 5. RTR is a function of trust and the perceived risk of the trusting behavior (e.g., empowerment of a subordinate).

Early in this article it was argued the placement of risk in a model of trust was important, and this section clarifies that issue. Two other issues warrant exposition: the effects of context and the evolution of trust.

The Role of Context

The preceding discussion of risk-taking behavior makes a clear argument for the importance of the context in which the risk is to be taken. Even though the level of trust (as determined by ability, benevolence, integrity and propensity to trust) may be constant, the specific consequences of trust will be determined by contextual factors such as the

stakes involved, the balance of power in the relationship, the perception of the level of risk, and the alternatives available to the trustor.

Similarly, the assessment of the antecedents of trust (ability, benevolence, and integrity) are affected by the context. For example, in the previous discussion of ability we noted that ability was domain specific—high ability at one task does not necessarily imply high ability at another task. Furthermore, perceived ability will change as the dynamics of the situation in which the task is to be performed change. For example, a protégé may believe that the mentor is able to advance his or her career, but a change in top management's philosophy may change the situation. Although the mentor's skills are constant, the context in which those skills will be utilized has changed. The net result of the change in context (i.e., politics) has decreased the protégé's perception of the mentor's ability.

Perceived levels of benevolence also are influenced by context. For example, if an employee perceives that a new supervisor has attitudes and preferences similar to his or her own, the employee will perceive higher levels of benevolence from that supervisor (Berscheid & Walster, 1978; Newcomb, 1956). The context of the situation (i.e., perceived similarity) helps to determine the perceived level of benevolence that the supervisor has for the employee.

The context of a party's actions affects the perception of integrity as well. A middle manager may make a decision that appears to be inconsistent with earlier decisions. Knowing nothing else about the situation, employees may question the manager's integrity. However, if the employees learn that the manager's actions were in response to orders from those higher in the organization, the manager's integrity will no longer be questioned. The manager's actions are seen as unavoidable given the context, and they are not deemed to be his or her fault. Thus, the perception of integrity can be influenced by the context of the actions.

In sum, the trustor perception and interpretation of the context of the relationship will affect both the need for trust and the evaluation of trustworthiness. Changes in such factors as the political climate and the perceived volition of the trustee in the situation can cause a reevaluation of trustworthiness. A strong organizational control system could inhibit the development of trust, because a trustee's actions may be interpreted as responses to that control rather than signs of trustworthiness. A clear understanding of trust for a trustee necessitates understanding how the context affects perceptions of trustworthiness.

Long-Term Effects

Up to this point, in the proposed model we have described trust at a given point in time. A more complete understanding of trust would come from consideration of its evolution within a relationship (Boyle & Bonacich, 1970; Kee & Knox, 1970). The level of trust will evolve as the parties interact. Several factors that affect the process by which trust evolves have been explored in the literature and are discussed next.

Strickland's (1958) analysis of monitoring and employee locus of motivation provides an interesting insight into the evolution of trust. He suggested that low trust will lead to a greater amount of surveillance or monitoring of work progress. Kruglanski (1970: 215) suggested that a frequently monitored employee might interpret the supervisor's surveillance as illustrating distrust for the employee. The employee may react in retaliation by "double-crossing the supervisor whenever the opportunity arises. The supervisor's anticipation of such an effect might lead him to continue his surveillance of the subordinate."

A number of researchers have suggested that the emergence of trust can be demonstrated in game theory as a reputation evolves from patterns of previous behavior. For example, Solomon (1960) described effects of reputation on trust utilizing a prisoner's dilemma. He asserted that an individual who receives cooperation from another develops a liking for that individual, increasing the likelihood of the person's behaving in a trustworthy fashion. Boyle and Bonacich described the dynamic interplay between experiences and trust. They argued that "a Cooperative move by Opponent will increase Player's trust in him, while a Noncooperative move will decrease Player's trust" (1970: 130). Other researchers have used a repeated decision game to show how trust emerges in a transaction between two parties (e.g., Butler, 1983; Dasgupta, 1988; Davis, Helms, & Henkin, 1989; Milgrom & Roberts, 1992).

Our proposed model incorporates the dynamic nature of trust. This is represented in Figure 1 by the feedback loop from the "Outcomes" of RTR to the perceived characteristics of the trustee. When a trustor takes a risk in a trustee that leads to a positive outcome, the trustor's perceptions of the trustee are enhanced. Likewise, perceptions of the trustee will decline when trust leads to unfavorable conclusions. Boyle and Bonacich (1970) have suggested that the outcomes of engaging in a trusting behavior will affect trust directly. We propose that the outcome of the trusting behavior (favorable or unfavorable) will influence trust indirectly through the perceptions of ability, benevolence, and integrity at the next interaction. For example, a manager empowers an employee to deal with a task that is critical to the manager's performance. If the employee's performance of the task is very good, the manager's perception of the employee's trustworthiness will be enhanced. Conversely, if the employee performs poorly and damages the manager's reputation, the manager's perception of the employee's trustworthiness is diminished. The manager may attribute the employee's high or low performance to ability, benevolence, and/or integrity, depending upon the situation.

Proposition 6. Outcomes of trusting behaviors (i.e., RTR) will lead to updating of prior perceptions of the ability, benevolence, and integrity of the trustee.

Conclusions and Future Directions

This article raises a number of issues for the study of trust in organizations. Each is considered and dealt with in the development of a

model of dyadic trust in an organizational context. The model proposed in this article is the first that explicitly considers both characteristics of the trustee as well as the trustor. The model clearly differentiates trust from factors that contribute to it, and it also differentiates trust from its outcome of risk taking in the relationship. The current approach defines trust in a way that distinguishes trust from other similar constructs (cooperation, confidence, predictability), which often have been confused with trust in the literature. Likewise, the critical role of risk is clearly specified in this model. This article develops a versatile definition of trust and a parsimonious set of determinants.

The differentiations between factors that cause trust, trust itself, and outcomes of trust are critical to the validation of this model. All three must be measured in order to fully test the model. Measures of the perceptions of a trustee's ability, benevolence, and integrity must be developed that are consistent with the definitions provided. Behaviors that are characterized by vulnerability and the lack of ability to monitor or control can be assessed to operationalize RTR. RTR must be measured in terms of actual behavior, not willingness to engage in behavior. Such behaviors as monitoring are examples of a lack of risk taking in relationship. Dealing with these behaviors from a measurement perspective requires a reverse scoring of the measure of their occurrence. The extent of perceived risk involved in engaging in the trusting behavior should be assessed either directly (e.g., through survey items) or controlled for, such as structuring a simulation wherein the subjects have a limited number of possible responses that clearly vary in the amount of risk they involve. The most problematic component of the model from the standpoint of measurement is trust itself. Because trust is a willingness to be vulnerable, a measure that assesses that willingness is needed. Even though trust is conceptually easy to differentiate from perceived ability, benevolence, and integrity of the trustee, separating the willingness to be vulnerable from actually being vulnerable constitutes a finer distinction. To measure trust itself, a survey or other similar methodology that taps into the person's willingness to be vulnerable to the trustee is needed, because this is distinct from observable RTR.

The question "Do you trust them?" must be qualified: "trust them to do what?" The issue on which you trust them depends not only on the assessment of integrity and benevolence, but also on the ability to accomplish it. Thus, if a party is trusted on one task, will that increase the trust on another unrelated task, even in the absence of data on the party's ability on the new task? Consistent with the arguments of Sitkin and Roth (1993), this model suggests that assessments of ability may not generalize across dissimilar tasks or situations.

Several limitations of the proposed theory should be recognized. First, its focus is limited to trust of a specific trustor for a specific trustee. Thus, its contribution to understanding trust in a social system (e.g., Barber, 1983; Lewis & Weigert, 1985) is beyond the scope of this model. Second, trust as considered in this model is unidirectional: from a given

trustor to a given trustee. In its present form it is not designed to examine the development of mutual trust between two parties. Third, this model is focused on trust in an organizational relationship, and its propositions may not generalize to relationships in other contexts. Finally, the labels for the constructs in this model were selected from several options used earlier in the trust literature. To us, these labels most clearly reflected the constructs as defined in the proposed model; however, in some cases this necessitated that the definitions vary somewhat from some of the prior uses of the same terms.

In addition to model-specific hypotheses, a number of other avenues of research should be pursued. For example, the process by which trust develops needs further exploration. We propose that the need for trusting behavior often arises while there is still a lack of data regarding some of the three factors. For instance, an employee may not have had enough interaction with a given manager to be able to assess the manager's benevolence toward him or her. In order to gather such data, the employee first may have to be vulnerable (i.e., to trust the manager) to see how the manager deals with the vulnerability. In this instance, the employee may have to display a type of trust similar to blind faith. Depending on how the manager responds to the vulnerability, the employee will develop more or less trust.

A number of theorists have suggested that trust evolves over time based on a series of observations and interactions. A critical issue is the process by which trust evolves, given the framework of our model. Further research should investigate the relationship between trust and cooperation. Game theorists tend to equate cooperation and trust, suggesting that over time a pattern of cooperative behavior develops trust (Axelrod, 1984). To what extent does cooperation that can be attributed to external motivations develop trust? This idea also suggests the need to test the feedback loop in the proposed model.

There are many areas in organizational studies in which trust has been cited as playing a key role. Further development and operationalization of the model proposed in this article would benefit the study of organizations through an increased understanding of such topics as employee-organization linkages, negotiation, and the implementation of self-managed teams.

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Accelerated Hierarchical Density Clustering

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May 25, 2017

Abstract

We present an accelerated algorithm for hierarchical density based clustering. Our new algorithm improves upon HDBSCAN*, which itself provided a significant qualitative improvement over the popular DBSCAN algorithm. The accelerated HDBSCAN* algorithm provides comparable performance to DBSCAN, while supporting variable density clusters, and eliminating the need for the difficult to tune distance scale parameter ϵ . This makes accelerated HDBSCAN* the default choice for density based clustering.

1 Introduction

Clustering is the attempt to group data in a way that meets with human intuition. Unfortunately, our intuitive ideas of what makes a ‘cluster’ are poorly defined and highly context sensitive [26]. This results in a plethora of clustering algorithms each of which matches a slightly different intuitive notion of what a natural grouping is.

Despite the uncertainty underlying the clustering process it continues to be used in a multitude of scientific domains. The fundamental problem of finding groupings is pervasive and results, however poor, are still important and informative. It is used in diverse fields such as molecular dynamics [40], airplane flight path analysis [60], crystallography [52], and social analytics [29], among many others.

While clustering has many uses to many people, our particular focus is on clustering for the purpose of exploratory data analysis. By exploratory data analysis we mean the process of looking for “interesting patterns” in a data set, primarily with the goal of generating new hypotheses or research questions about the data set in question. This necessitates minimal parameter selection and few apriori assumptions about the data. In this use case, it is highly desirable that solutions have informative failure modes. Specifically, when data is poorly clustered or does not contain clusters, it is necessary to have some indication of this from the clustering algorithm itself.

Many traditional clustering algorithms are poorly suited to exploratory data analysis tasks. In particular, most clustering algorithms suffer from the prob-

lems of difficult parameter selection, insufficient robustness to noise in the data, and distributional assumptions about the clusters themselves.

Many algorithms require the selection of the number of clusters, either explicitly, or implicitly through proxy parameters. In the majority of use cases we have encountered, selecting the number of clusters is very difficult apriori. Methods to determine the number of clusters such as the elbow method and silhouette method are often subjective and can be hard to apply in practice. Ultimately these methods all hinge on the clustering quality measure chosen; these are diverse and often highly related with particular clustering algorithms [26].

Many practitioners fail to distinguish between partitioning and clustering to the point where the terms are now often used interchangeably. By clustering we specifically mean finding subsets of the data which group “naturally”, without necessarily assigning a cluster for all points. Partitioning, on the other hand, requires that every data point be associated with a particular cluster. In the presence of noise the partitioning approach can be problematic. Even without noise, if clear clusters are not present, partitioning will simply return a poor solution.

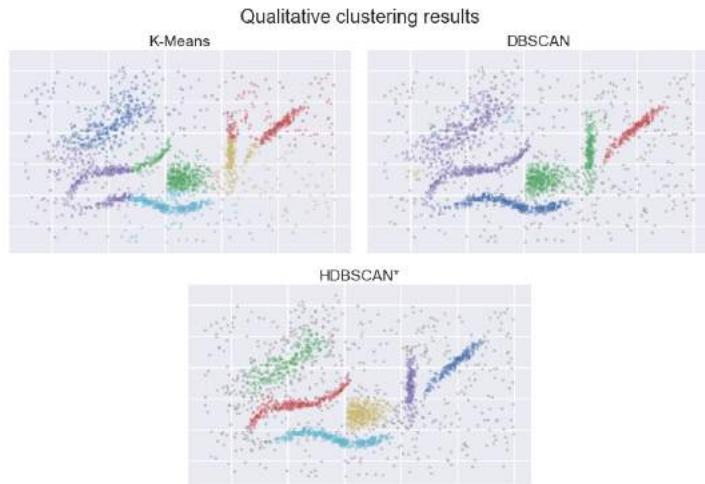


Figure 1: A qualitative comparison of some candidate clustering algorithms on synthetic data. Colors indicate cluster membership (grey denotes noise). We advocate density based clustering methods when performing exploratory data analysis as they require fewer assumptions about the data distribution, and can refuse to cluster points. Unclustered “noise” points for both DBSCAN and HDBSCAN* are depicted in gray. The above clustering results represent the result of a qualitative hand tuned search for optimal parameters. ¶

¹See https://github.com/lmcinnes/hdbscan_paper/blob/master/Qualitative%20clustering%20results.ipynb for code used to generate these plots

Distributional assumptions on the data are difficult to make in exploratory data analysis. As a result we examine density based clustering since it has few implicit assumptions about the distribution of clusters within the data. Among density based clustering techniques DBSCAN [19] is attractive in that it is efficient and is robust to the presence of noise within data. Its primary difficulties include parameter selection and the handling of variable density clusters. In [6] and [7] Campello, et al. propose the HDBSCAN* algorithm which addresses both of these problems, but its major difficulty is that it sacrifices performance to do so.

In Figure 1 we compare three candidate clustering algorithms: K-Means, DBSCAN, and HDBSCAN*. The archetypal clustering algorithm, K-Means, suffers from all three of the problems mentioned previously: requiring the selection of the number of clusters; partitioning the data, and hence assigning noise to clusters; and the implicit assumption that clusters have Gaussian distributions. In comparison, being a density based approach, DBSCAN only suffers from the difficulty of parameter selection. Finally HDBSCAN* resolves many of the difficulties in parameter selection by requiring only a small set of intuitive and fairly robust parameters.

Section 2 introduces the HDBSCAN* algorithm. We provide three different descriptions of the algorithm: the first description follows Chauduri et al. [11], [12] and Stuetzle et al. [53], [54], viewing the algorithm as a statistically motivated extension of Single Linkage clustering; the second description follows Campello et al. [6], [7], viewing the algorithm as a natural hierarchical extension of the popular DBSCAN algorithm; the third, novel, description is in terms of techniques from topological data analysis [8]. All three descriptions are valid, and collecting them here serves to bring these diverse fields together. Both the statistical and computational descriptions of HDBSCAN* have been published before (though little comparison has been drawn). We believe the topological description is a significant new contribution of this paper, and offers the opportunity to bring new and powerful mathematical tools to bear on the problem.

The major contribution of this paper is section 3, which describes a new algorithm for computing HDBSCAN* clustering results. This new algorithm, building on the work of March et al. [36] and Curtin et al. [14], [15], offers significant improvements in average case asymptotic performance.

In section 4 we compare the performance of our new HDBSCAN* algorithm against other clustering algorithms. In particular, we demonstrate the asymptotic performance improvement over the reference HDBSCAN* algorithm, and show our new algorithm provides HDBSCAN* with comparable asymptotic performance to DBSCAN, one of the fastest extant clustering algorithms.

2 HDBSCAN* Explained Three Ways

Algorithms like HDBSCAN* lie at the convergence of several lines of research from different fields. To highlight this convergence we will describe the HDB-

SCAN* algorithm from three different perspectives: from a statistically motivated point of view; with a computationally motivated mindset; and in a topologically motivated framework. Through this repetition we hope to both provide a sound introduction to how the algorithm works, and to place it in a richer context of ideas. We also hope that explanations that are less familiar will become easier to follow by analogy to explanations closer to the reader’s field of expertise. Finally, we hope to bring together disparate fields of research that are attacking the same problem and arriving at nearly the same solution, and unify their approaches.

2.1 Statistically Motivated HDBSCAN*

A statistically oriented view of density clustering begins with the assumption that there exists some unknown density function from which the observed data is drawn. From the density function f , defined on a metric space (\mathcal{X}, d) , one can construct a hierarchical cluster structure, where a cluster is a connected subset of an f -level set $\{x \in (\mathcal{X}, d) \mid f(x) \geq \lambda\}$. As $\lambda \geq 0$ varies these f -level sets nest in such a way as to construct an infinite tree, which is referred to as the *cluster tree* (see figure 2 for an example). Each cluster is a branch of this tree, extending over the range of λ values for which it is distinct. The goal of a clustering algorithm is to suitably approximate the cluster tree, converging to it in the limit of infinite observed data points.

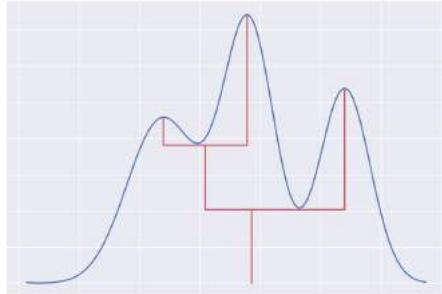


Figure 2: The cluster tree (red) induced by a density function (blue).

This idea dates back at least to Hartigan [24], and has become an increasingly popular way to frame the clustering problem; see [49], [50], [53], [54] and [57] for examples. Our description of HDBSCAN* in these terms follows Chaudhuri et al. [11], [12] and their description of Robust Single Linkage.

The motivation for the approach is based on Hartigan’s work on consistency results for single linkage clustering [24]. Hartigan’s results while impressive, only apply to one dimensional data. The commonly cited drawback of single linkage clustering is that it is not robust to noise and suffers from chaining effects (spurious points merging clusters prematurely) [38], [61]. Wishart proposed a heuristic algorithm as a potential solution to this in [61]. The Robust Single

Linkage algorithm [11], [12] extends Wishart’s basic approach, and provides suitable theoretical underpinnings.

The Robust Single Linkage algorithm assumes that the data set

$$X = \{X_1, X_2, \dots, X_N\}$$

is sampled from an unknown density f on some metric space (\mathcal{X}, d) . We then define $B(X_i, \varepsilon)$ to be the open ball of radius ε in (\mathcal{X}, d) . The algorithm takes two inputs, k and α . For each $X_i \in X$ define

$$r_k(X_i) = \inf\{\varepsilon \mid B(X_i, \varepsilon) \text{ contains } k \text{ points}\}.$$

For each $\varepsilon \geq 0$ define a graph G_ε with vertices $\{X_i \in X \mid r_k(X_i) \leq \varepsilon\}$ and an edge (X_i, X_j) if $d(X_i, X_j) \leq \alpha\varepsilon$. Define the clusters at level ε of the tree to be the connected components of G_ε .

In [11] and [12] Chaudhuri et al. provide a number of results on the consistency and convergence of this algorithm in Euclidean space (\mathbb{R}^d) for $k \sim d \log N$ with $\sqrt{2} \leq \alpha \leq 2$. Eldridge et al. [18] provide even stronger consistency results by introducing stricter notions of consistency. This provides a sound statistical basis for the approach.

A remaining issue with this algorithm is that the resulting cluster tree with N leaves is highly complex, making analysis difficult for large data set sizes. This is, of course, an issue faced by many hierarchical clustering algorithms. Several authors, including Stuetzle et al. [53], [54], and Chaudhuri et al. [12] have proposed approaches to pruning the cluster tree to simplify presentation and analysis. While Chaudhuri et al. provide consistency guarantees for their approach, we find the required parameters to be less intuitive, and harder to tune. We therefore will follow the “runt pruning” algorithm of Stuetzle [53].

Tree simplification begins with the introduction of a new parameter m , the minimum cluster size. Any branch of the cluster tree that represents a cluster of less than m points is pruned out of the tree, and we record the ε value of the split, defining it as the ε value when the points of the pruned branch left the parent branch. That is, for each branch C_i of the cluster tree there is an associated set of points $\{X_{i_1}, X_{i_2}, \dots, X_{i_t}\} \subseteq X$, and for each point X_{i_ℓ} in $\{X_{i_1}, X_{i_2}, \dots, X_{i_t}\}$ there exists a value ε_ℓ for which the point X_{i_ℓ} is deemed to have left the cluster (including because the cluster C_i split, or because it was removed).

The resulting pruned tree has many fewer branches, and hence fewer leaves. Furthermore, each remaining branch has a record of the points remaining in the branch at each ε value for which the branch exists. The result is a far simpler tree of clusters, amenable to further analysis, but still containing rich information about the actual cluster structures at a point-wise level.

Finally, it is often desirable to extract a flat clustering – selecting a set of non-overlapping clusters from the tree. For hierarchical cluster schemes this often takes the form of choosing a “cut level” (in our case a choice of ε) and using the clustering at that level of the tree. When we wish to consider variable

density clusters, the cut level varies through the tree, and thus we must choose a different approach to selecting a flat clustering.

Notionally our goal is to determine the clusters that persist over the largest ranges of distance scales. To do this we require a measure of the persistence of a cluster. To make this concrete we refer again to Hartigan [23], and also to Müller and Sawitzki [41], for the notion of excess of mass. Given a density function f , let C be a subset of the domain of f , and define the *excess of mass* of C at a level λ to be

$$E(C, \lambda) = \int_{C_\lambda} (f(x) - \lambda) dx,$$

where $C_\lambda = \{x \in C \mid f(x) \geq \lambda\}$. Given a cluster tree for f , we can define the excess of mass of a cluster C_i that exists at level λ_{C_i} of the cluster tree as follows: Let $\lambda_{\min}(C_i)$ be the minimal λ value for the branch associated to C_i in the cluster tree. Then define the excess of mass of C_i to be

$$E(C_i) = \int_{C_i} (f(x) - \lambda_{\min}(C_i)) dx.$$

Next we follow [6] in defining the *relative excess of mass* for a cluster C_i . First we define $\lambda_{\max}(C_i)$ to be the maximal lambda value for which C_i exists as a distinct cluster (i.e. before it splits into sub-clusters in the cluster tree). Then the relative excess of mass is

$$E_R(C_i) = \int_{C_i} (\min(f(x), \lambda_{\max}(C_i)) - \lambda_{\min}(C_i)) dx.$$

Alternatively, if $C_{i_1}, C_{i_2}, \dots, C_{i_k}$ are the children of C_i in the cluster tree then

$$E_R(C_i) = E(C_i) - \sum_{j=1}^k E(C_{i_j}).$$

That is, the relative excess of mass of a cluster is the total mass of the cluster *not including* the mass of any descendant clusters in the cluster tree. We see this demonstrated in figure 3 with the shaded areas indicating the excess of mass of the each for clusters from the cluster tree.

We can translate these notions to the empirical pruned tree described above. The pruned tree can be used to construct a discrete density function ranging over data points. In order to do this we require two things. Firstly, a density associated to each data point. This is simply the inverse of the ε value at which the point left the tree (this was the data we recorded in addition to pruning branches of the tree). Secondly, we need an ordering on the data points such that the cluster tree of the density function is isomorphic to the pruned tree. This is simply a matter of sorting the points via a depth first search of the pruned tree (making use of the per point ε values to order data points within a branch of the cluster tree). Explicitly we have an empirical density

$$\hat{f}(X_j) = \frac{1}{\varepsilon_{X_j}}$$

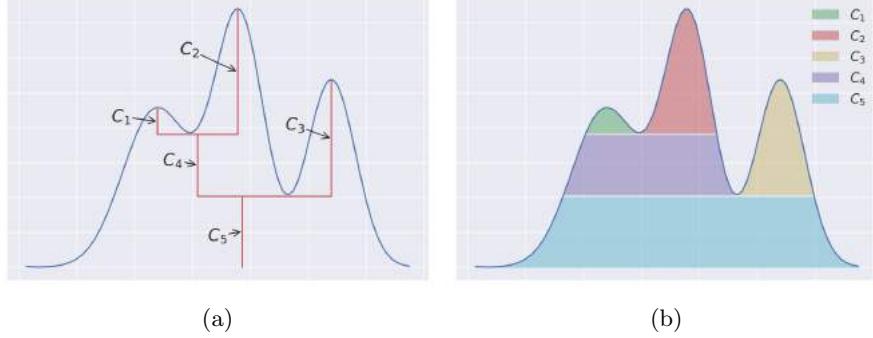


Figure 3: Relative excess of mass for the cluster tree from figure 2. In (a) we label the clusters, and (b) depicts the relative excess of mass as shaded areas, using different colours for each clusters relative excess of mass.

where ε_{X_j} is the ε value at which we recorded the point X_j leaving the tree. Further we have a cluster tree associated with \hat{f} isomorphic to the pruned tree and we can define $\lambda_{\min}(C_i)$ for any cluster C_i in the pruned tree accordingly.

This allows us to compute excess of mass for \hat{f} and any cluster C_i from the pruned tree as

$$E(C_i) = \sum_{X_j \in C_i} (\hat{f}(X_j) - \lambda_{\min}(C_i))$$

and consequently we have a persistence score provided by the relative excess of mass. That is, given cluster C_i having children $C_{i_1}, C_{i_2}, \dots, C_{i_k}$, we define the persistence score

$$\sigma(C_i) = E(C_i) - \sum_{j=1}^k E(C_{i_j}).$$

The optimal flat clustering can then be described as the solution to a constrained optimization problem. If the set of clusters is $\{C_1, C_2, \dots, C_n\}$ then we wish to select $I \subseteq \{1, 2, \dots, n\}$ to maximize

$$\sum_{i \in I} \sigma(C_i)$$

subject to the constraint that, for all $i, j \in I$ with $i \neq j$, we have

$$C_i \cap C_j = \emptyset.$$

That is, we wish to maximize the total persistence score over chosen clusters, subject to the constraint that clusters must not overlap. This constrained optimization problem is can be solved in a straightforward manner [7].

2.2 Computationally Motivated HDBSCAN*

HDBSCAN* can be thought of as a natural extension of the popular DBSCAN algorithm. We begin, following [6] and [7], by describing a modified version of DBSCAN, denoted DBSCAN*, that will make the relationship clearer. This algorithm is an adaptation of standard DBSCAN which removes the notion of border points. Removing border points provides clarity and improves consistency with the statistical interpretation of clustering in section 2.1. DBSCAN* takes two parameters, ε and k , where ε is a distance scale, and k is a density threshold expressed in terms of a minimum number of points. Extending to HDBSCAN* can be conceptually considered as searching over all ε values for DBSCAN* to find the clusters that persist for many values of ε . This selection of clusters, which persist over many distance scales, provides the benefits of not only eliminating the need to select the ε parameter but also of dealing with the problem of variable density clustering, something which classical DBSCAN struggles with.

We will describe DBSCAN* in the same terms used by Campello, et al. [6]. Again we will be working with a set of $X = \{X_1, X_2, \dots, X_N\}$ of data points in a metric space (\mathcal{X}, d) .

A point X_i is called a *core point* with respect to ε and k if its ε -neighbourhood contains at least k many points, i.e. if $|B(X_i, \varepsilon) \cap X| \geq k$. That is, the open ball of radius ε contains at least k many points from X .

Two core points X_i and X_j are *ε -reachable* with respect to ε and k if $X_i \in B(X_j, \varepsilon)$ and $X_j \in B(X_i, \varepsilon)$. That is, they are both core points with respect to k , and are both contained within each other's ε -neighbourhood. Two core points X_i and X_j are *density-connected* with respect to ε and k if they are directly or transitively ε -reachable.

A *cluster* C , with respect to ε and k , is a non-empty maximal subset of X such that every pair of points in C is density-connected. This definition of cluster results in the DBSCAN* algorithm.

To extend the algorithm to get HDBSCAN* we need to build a hierarchy of DBSCAN* clusterings for varying ε values. The key to doing this is to redefine how we measure distance between points in X . For a given fixed value k , we define a new distance metric derived from the metric d , called the *mutual reachability distance*, as follows. For any point X_i we define the *core-distance* of X_i , denoted $\kappa(X_i)$ to be the distance to the k^{th} nearest neighbor of X_i ; then, given points X_i and X_j we define

$$d_{\text{mreach}}(X_i, X_j) = \begin{cases} \max\{\kappa(X_i), \kappa(X_j), d(X_i, X_j)\} & X_i \neq X_j \\ 0 & X_i = X_j \end{cases}.$$

It is straightforward to show that this is indeed a metric on X . We can then apply standard Single Linkage Clustering [51] to the discrete metric space (X, d_{mreach}) to obtain a hierarchical clustering of X . The clusters at level ε of this hierarchical clustering are precisely the clusters obtained by DBSCAN* for the parameter choices k and ε ; in this sense we have derived a hierarchical DBSCAN* clustering.

The goal of a density based algorithm, such as DBSCAN, is to find areas of the greatest density. To do this we need to shift from the notion of distance to a notion of density. An efficient estimate of the local density at a point can be provided by the reciprocal of the distance to its k^{th} nearest neighbor. This is simply the inverse of the core-distance of that point. With this in mind we will work in terms of varying density instead of varying distance by constructing our cluster tree with respect to $\lambda = \frac{1}{\varepsilon}$ and consider the λ value at which cluster splits occur.

The next step in the algorithm is to produce a condensed tree that simplifies the hierarchy. For this we introduce a new parameter m which will denote the minimum cluster size that will be accepted. We process the tree from the root downward. At each cluster split we consider the child clusters. Any child cluster containing fewer than m points is considered a spurious split, and we denote those points as “falling out of the parent cluster” at the given λ value. If only one child cluster contains more than m points we consider it the continuation of the parent, persisting the parent cluster’s label/identity to it. If more than a single child cluster contains more than m points then we consider the split to be a “true” split. In this fashion we arrive at a tree with a much smaller number of clusters which “shrink” in size as they persist over increasing λ values of the tree. One can consider this a form of smoothing of the tree.

We can now define the stability of a cluster to be the sum of the range of λ values for points in a cluster. Explicitly, we define $\lambda_{\max,C_i}(X_j)$ to be the λ value at which the point X_j falls out of the cluster C_i (either as an individual point, or as a cluster split in the condensed tree). Similarly we define $\lambda_{\min,C_i}(X_j)$ as the minimum lambda value for which X_j is present in C_i . Then the stability of the cluster C_i is defined as

$$\sigma(C_i) = \sum_{X_j \in C_i} (\lambda_{\max,C_i}(X_j) - \lambda_{\min,C_i}(X_j)).$$

The optimal flat clustering can then be described as the solution to a constrained optimization problem. If the set of clusters is $\{C_1, C_2, \dots, C_n\}$ then we wish to select $I \subseteq \{1, 2, \dots, n\}$ to maximize

$$\sum_{i \in I} \sigma(C_i)$$

subject to the constraint that, for all $i, j \in I$ with $i \neq j$, we have

$$C_i \cap C_j = \emptyset$$

That is, we wish to maximize the total persistence score over chosen clusters, subject to the constraint that clusters must not overlap.

We should note that while this explanation is the most compact of the three, it is also the least formal, and most heuristically motivated.

2.3 Topologically Motivated HDBSCAN*

Topological data analysis [8], [59], [63] is a suite of techniques bringing the powerful tool of topology to bear on data analysis problems. Recently the techniques of topological data analysis have been brought to bear on clustering problems [9], [10], [13], [49], [50]. A number of insights can be gained by looking at HDBSCAN* through the lens of topological data analysis.

The primary technique employed in topological data analysis is persistent homology [17], [64]. Although our description of HDBSCAN* makes use of persistent homology techniques, the full details of that subject are beyond the scope of this paper. Please see [8] and [22] for a good introduction to the topic. We will also make use of the language of sheaves. Again, details are beyond the scope of this paper; see Ghrist [22], Mac Lane and Moerdijk [33] or Bredon [5] for an introduction to sheaves.

Persistent homology for analysis of “point cloud data” begins with the assumption we are presented with a set of data points X living in a metric space (\mathcal{X}, d) . One can then construct a simplicial complex from this data. The standard approaches to this are the Čech complex construction and the Vietoris-Rips complex construction. Both approaches make use of a scale parameter ε and open balls of radius ε centered at a point X_i , denoted $B(X_i, \varepsilon) = \{x \in \mathcal{X} \mid d(X_i, x) < \varepsilon\}$. The Čech complex C_ε is constructed by taking all elements of X as 0-dimensional simplices, and adding an n -dimensional simplex spanning $X_{i_1}, X_{i_2}, \dots, X_{i_n}$ if the intersection $B(X_{i_1}, \varepsilon) \cap B(X_{i_2}, \varepsilon) \cap \dots \cap B(X_{i_n}, \varepsilon)$ is non-empty. While the Čech complex has nice topological properties, it is often too computationally expensive to work with directly. The Vietoris-Rips complex V_ε is constructed by, again, taking all elements of X as 0-dimensional simplices, but adding an n -dimensional simplex spanning $X_{i_1}, X_{i_2}, \dots, X_{i_n}$ if all pairwise intersections $B(X_{i_j}, \varepsilon) \cap B(X_{i_k}, \varepsilon)$ for $1 \leq j \leq k \leq n$ are non-empty.

A family of simplicial complexes that have a natural “nested” structure, such as $\{V_\varepsilon\}_{\varepsilon \geq 0}$, are called filtered simplicial complexes. There is a natural homology theory on filtered simplicial complexes, called persistent homology [17] [64]. If we consider the 0-th homology, which computes groups with rank equal to the number of connected components of a topological space, we see that the persistent homology of the Vietoris-Rips complex associated to a point cloud provides a computation very similar to that of single-linkage clustering.

As in the case of Robust Single Linkage we seek to make such a computation more robust to noise. Ultimately this falls to the method of construction of a simplicial complex from the point cloud data, and the metric of the space in which it resides. The goal is to make use of information about density in this construction. Intuitively, for both Vietoris-Rips and Čech complexes, higher dimensional simplices occur in denser regions of the space. Thus, the natural approach is to start with the Vietoris-Rips complex V_ε and then remove all simplices that are not faces of simplices of dimension k . This gives a two parameter complex $W_{\varepsilon, k}$ where k provides a density threshold. Unfortunately this approach, much like the Čech complex, is too computationally expensive to construct for all but trivial cases. Other alternative, but similar, approaches

are proposed in [37] and [38], however we will follow Lesnick and Wright [31] for a computationally tractable density-sensitive simplicial complex construction.

We begin with some notation. Given a simplicial complex A , define the n -skeleton of A , denoted $sk_n(A)$, to be the sub-complex of A containing all simplices of A of dimension less than or equal to n . Thus the 1-skeleton of a complex can be viewed as a graph, and the 0-skeleton as a discrete set of points. We define the Lesnick complex $L_{\varepsilon,k}$ as follows. Let V_ε be the Vietoris-Rips complex associated to X and define a graph $G_{\varepsilon,k}$ to be the subgraph of the 1-skeleton $sk_1(V_\varepsilon)$ induced by the vertices with degree at least k . The Lesnick complex $L_{\varepsilon,k}$ of X is the maximal simplicial complex having 1-skeleton $G_{\varepsilon,k}$. For a fixed choice of k we now have a filtered simplicial complex based on the family of complexes $\{L_{\varepsilon,k}\}_{\varepsilon>0}$, and so we can apply standard persistent homology.

To extend this topological approach to the full HDBSCAN* algorithm however we will take a slightly different approach to that described above. We draw upon the same fundamental ideas and intuitions, but use the language of sheaves. Intuitively a sheaf is a set that “varies continuously” over a topological space; thus each open set of the topological space has a set of *sections* that lie above it. See [22] or [33] for further details.

Consider the set of non-negative reals $\mathbb{R}_{\geq 0} = \{x \in \mathbb{R} \mid x \geq 0\}$ with the following topology: for each non-negative real x define an open set $\hat{x} = \{y \in \mathbb{R}_{\geq 0} \mid y \geq x\}$ and take the topology formed by all such sets. Now define a sheaf \mathcal{F} over $\mathbb{R}_{\geq 0}$ by defining

$$\mathcal{F}(\hat{x}) = \{sk_0(C) : C \in \Pi_0(L_{x,k})\}, \quad (1)$$

where $\Pi_0(L_{x,k})$ is the set of connected components of the simplicial complex. That is, for an open set associated to the non-negative real x we associate the set of 0-skeletons of connected components of the Lesnick complex $L_{x,k}$ associated to X . Since Π_0 is a functor, the maps from the filtered complex $L_{x,k} \hookrightarrow L_{y,k}$ for $x \leq y$ naturally induce restriction maps $res_{x,y} : \mathcal{F}(\hat{x}) \rightarrow \mathcal{F}(\hat{y})$. Verification that this is a sheaf is straightforward given the nested nature of the topology.

The sheaf is the structure we will use to capture persistence information; it can be seen as similar to a tree of clusters. While the specific sheaf described here is equivalent to a tree, the sheaf formalism allows the description of similar structures that cannot be described by trees. We now wish to condense the sheaf with regard to a parameter m denoting the minimum cluster size. To do this we first consider the subsheaf \mathcal{G} defined by

$$\mathcal{G}(\hat{x}) = \{s \in \mathcal{F}(\hat{x}) \mid |s| \geq m\}. \quad (2)$$

This definition creates a simpler object by removing any sections that contain fewer than m data points. Next we need to identify clusters from the sheaf. Since clusters must persist over a range distance scales (the x in $L_{x,k}$) we must identify sections from different open sets. This can be viewed as the construction of an equivalence relation across the set of all sections in the sheaf

$$S = \bigcup_{x \in \mathbb{R}_{\geq 0}} \mathcal{G}(\hat{x}).$$

We define the equivalence relation as follows: given sections $s \in \mathcal{G}(\dot{x})$ and $s' \in \mathcal{G}(\dot{y})$ where (without loss of generality) $x \leq y$, we say s is equivalent to s' (denoted as $s \sim s'$) if and only if $\text{res}_{x,y}^{-1}(s') = \{s\}$ and for all z with $x \leq z \leq y$ we have $|\text{res}_{z,y}^{-1}(s')| = 1$. That is, we consider sections at different distance scales equivalent if the section at the smaller distance scale is the *only* section that restricts to the section at the larger distance scale, and this remains true for all intervening distance scales.

A cluster can then be identified with an equivalence class of sections under this equivalence relation. Such clusters necessarily overlap on the data points which they cover. If we wish to obtain a flat clustering we need to be able to score and compare clusters. We can score clusters in terms of their persistence over distance scales. Let $[s]$ be a cluster, and let $s_t \in S$ be the element of S in the equivalence class $[s]$ that lies in $\mathcal{G}(\dot{t})$, or the empty set if there is no representative of the equivalence class $[s]$ in $\mathcal{G}(\dot{t})$. Define a function $\hat{s}(t) = |s_t|$, and then define the persistence score σ of $[s]$ to be

$$\sigma([s]) = \int_0^\infty \frac{\hat{s}(t)}{t^2} dt. \quad (3)$$

The inclusion of the $\frac{1}{t^2}$ term provides the equivalent transformation to the shift from ε to $\lambda = \frac{1}{\varepsilon}$ and ensures that this definition of σ computes the same values as the definitions given in sections 2.1 and 2.2.

To compare clusters for overlap it is necessary to be able to talk about the data points ‘in’ a cluster. While the set of data points that make up a section is well defined, a cluster formed as an equivalence class of sections over different open sets has no natural assignment of data points to it. Instead we will define the points of a cluster $[s]$ to be the union of points in the sections within the equivalence class; thus we have a ‘points’ function p acting on clusters as

$$p([s]) = \bigcup_{t=0}^{\infty} s_t.$$

The optimal flat clustering can then be described as the solution to a constrained optimization problem. If the set of clusters is $\{[s_1], [s_2], \dots, [s_n]\}$ then we wish to select $I \subseteq \{1, 2, \dots, n\}$ to maximize

$$\sum_{i \in I} \sigma([s_i])$$

subject to the constraint that, for all $i, j \in I$ with $i \neq j$, we have

$$p([s_i]) \cap p([s_j]) = \emptyset$$

That is, we wish to maximize the total persistence score over chosen clusters, subject to the constraint that clusters must not overlap.

This is a complete description of the HDBSCAN* algorithm in topological terms.

One of the major advantages of viewing HDBSCAN* through this lens is that it allows for generalisations that were not previously possible to describe. For example one could consider a new algorithm computing persistence across both ϵ and k simultaneously via techniques of multidimensional persistent homology, and making use of the more general structure of sheaves instead of trees. Such an approach provides a concrete realization of the techniques initially described in [9]. This would provide a new clustering algorithm, *Persistent Density Clustering* [25], that is nearly parameter free.

3 Accelerating HDBSCAN*

As described in [6] and [7] the HDBSCAN* algorithm on N data points has $O(N^2)$ run-time. To be competitive with other high performance clustering algorithms a sub-quadratic run-time is required, with an $O(N \log N)$ run-time strongly preferred. The run-time analysis of HDBSCAN* in [7] identified three steps having $O(N^2)$ time complexity: the computation of core-distances (and mutual reachability distances); the computation of a minimum spanning tree (MST) used for single linkage computation; and the tree condensing. We propose to improve each of these steps, and in so doing, approach an average case complexity that grows approximately proportionally to $N \log N$.

One of the most common techniques for asymptotic performance improvement in the face of pairwise statistical problems (in our case pairwise distance computations) are space tree algorithms [47]. Indeed, these techniques are the basis for the impressive asymptotic performance of the DBSCAN and Mean Shift clustering algorithms, and are even used to accelerate some versions of K-Means. These techniques can also be applied to HDBSCAN* whenever the input data is provided as points in some metric space.

The computation of core-distances is a query for the k^{th} nearest neighbor of each point in the input data set. The use of space tree algorithms for efficient nearest neighbor computations is well established. In particular kd-trees [2] in euclidean space, and ball-trees [44] or cover trees [3] for generic metric spaces, provide fast asymptotic performance for nearest neighbor computation. Strict asymptotic run-time bounds for such algorithms are often complicated by properties of the data set. For example, cover tree nearest neighbor computation is dependent upon the expansion constant of the data, and the performance of kd-trees and ball-trees are similarly dependent upon the data distribution. However, an all points nearest neighbor query algorithm for cover trees with “linear” run-time complexity $O(c^{16}N)$, where c is the expansion constant for the cover tree, is presented by Ram et al. [47]. Claims of empirical run-time complexity of approximately $O(N \log N)$ for kd-trees and ball-trees are also common. While explicitly stating a run-time complexity for the core-distance computation is difficult, we feel confident in stating that, except for carefully constructed pathological examples, we can achieve sub-quadratic complexity.

With core-distance computation improved, the next challenge is the efficient computation of single linkage clustering using mutual reachability distance. In

[7], Campello et al. use Prim's algorithm [46] to compute a minimum spanning tree of the complete graph with edges weighted by the mutual reachability distance. Campello et al. then sort the edges, and use that data to construct the single linkage tree. Such an approach is similar to the SLINK algorithm [42], [51] which essentially uses a modified version of Prim's algorithm (that does not explicitly compute an MST). For the purposes of computing a MST, Prim's is among the fastest available algorithms, however it is targeted toward graphs where the number of edges is some small multiple of the number of vertices, rather than complete graphs with $O(|V|^2)$ edges. In particular, if we have extra information about the vertices of the graph, other algorithms such as Borůvka's algorithm [4] become more appealing. This is because if vertices are points in some metric space and edge weights are distances, Borůvka's algorithm resembles a series of repeated all points nearest neighbor queries.

In [36] March et al. make use of this observation and describe the Dual-Tree Borůvka algorithm for computing minimum spanning trees of points in a metric space. Given points X in (\mathcal{X}, d) , they provide an algorithm to compute a minimum spanning tree of the weighted complete graph with vertices X and edges (X_i, X_j) with weight $d(X_i, X_j)$, where $X_i, X_j \in X$. The algorithm makes explicit use of space trees to provide impressive asymptotic performance. In particular, if cover trees are used, March et al. prove a run-time complexity of $O(\max\{c^6, c_p^2, c_l^2\}c^{10}N \log N \alpha(N))$, where c , c_p , and c_l are data dependent constants and α is the inverse Ackermann function [1]. Here we provide a (minor) adaptation of the algorithm to compute a MST of the mutual reachability distances, resulting in a computation with sub-quadratic complexity.

In describing the algorithm we follow the approach of Curtin et al. in [15] where they provide a version of March's algorithm adapted to a generic space partitioning tree framework. We begin with the introduction of notation to allow for easier statements of required algorithms.

For our purposes, a *space tree* on a data set $X \subset (\mathcal{X}, d)$ is a rooted tree with the following properties:

- Each node holds a number of points (possibly zero), has a single parent and has some number of children (possibly zero);
- each $X_i \in X$ is contained in at least one node of the tree;
- each node of the tree has an associated convex subset of (\mathcal{X}, d) that contains all the points in the node, and the convex subsets associated with all of its children.

Notationally we will use a number of short form conventions to make discussions of points, children, descendants, and distances between nodes more convenient. Again, following Curtin et al. we will use the following notation:

- The set of child nodes of a node \mathcal{N}_i will be denoted $\mathcal{C}(\mathcal{N}_i)$ or simply \mathcal{C}_i if the context allows.
- The parent node of a node \mathcal{N}_i will be denoted $\mathcal{U}(\mathcal{N}_i)$.

- The set of points held in a node \mathcal{N}_i will be denoted $\mathcal{P}(\mathcal{N}_i)$ or simply \mathcal{P}_i if the context allows.
- The convex subset of (\mathcal{X}, d) associated to a node \mathcal{N}_i will be denoted $\mathcal{S}(\mathcal{N}_i)$ or simply \mathcal{S}_i if the context allows.
- The set of *descendant nodes* of a node \mathcal{N}_i , denoted by $\mathcal{D}^n(\mathcal{N}_i)$ or \mathcal{D}_i^n , is the set of nodes $\mathcal{C}(\mathcal{N}_i) \cup \mathcal{C}(\mathcal{C}(\mathcal{N}_i)) \cup \dots$.
- The set of *descendant points* of a node \mathcal{N}_i , denoted $\mathcal{D}^p(\mathcal{N}_i)$ or \mathcal{D}_i^p , is the set of points $\{p \mid p \in \mathcal{D}^n(\mathcal{N}_i) \cup \mathcal{P}(\mathcal{N}_i)\}$.
- The *minimum distance* between two nodes \mathcal{N}_i and \mathcal{N}_j , denoted $d_{\min}(\mathcal{N}_i, \mathcal{N}_j)$ is defined as $\min\{d(p_i, p_j) \mid p_i \in \mathcal{D}_i^p, p_j \in \mathcal{D}_j^p\}$.
- The *maximum child distance* of a node \mathcal{N}_i , denoted $\rho(\mathcal{N}_i)$ is maximum distance from the centroid of $\mathcal{S}(\mathcal{N}_i)$ to any point in \mathcal{N}_i .
- The *maximum descendant distance* of a node \mathcal{N}_i , denoted $\lambda(\mathcal{N}_i)$ is the maximum distance from the centroid of $\mathcal{S}(\mathcal{N}_i)$ to any *descendant point* of \mathcal{N}_i .

In general, the minimum distance between nodes can be bounded below statically without having to compute all the point to point distances. For example, in kd-trees we have $d_{\min}(\mathcal{N}_i, \mathcal{N}_j)$ bounded below by the minimum distance between \mathcal{S}_i and \mathcal{S}_j which can be computed at the time of tree construction without computing any point to point distances. Other types of space trees offer similar methods to bound node distances.

In [15] Curtin et al. provide a generic algorithm from which specific dual tree algorithms can be constructed. This provides a simple breakdown of a dual tree algorithm into core constituent parts, which the authors of this paper found particularly helpful in understanding March’s algorithm. We therefore work within the same general framework here.

Dual tree algorithms make use of two different space trees, a *query tree* \mathcal{T}_q and a *reference tree* \mathcal{T}_r . Curtin et al. breaks dual tree algorithms into three components. The first component is a *pruning dual tree traversal*. This is a method of traversing a query and reference tree pair, pruning branches along the way. At each stage of such a pruning traversal we apply two procedures: the first, called SCORE, determines whether a branch is to be pruned (and potentially prioritises child branches); the second, called BASECASE, performs some algorithm specific operation on the pair of nodes at that stage of the traversal.

A simple approach to a dual tree traversal is a depth first traversal with no prioritisation of child nodes to explore. Algorithm 1 describes such an approach. In practice, one may want a more finely tailored traversal algorithm, with concomitant complexity of description, but for our explanatory purposes, this simple traversal is sufficient.

Given a traversal algorithm, the specifics of March’s Dual Tree Boruvka algorithm now falls to the BASECASE and SCORE procedures. To explicate

Algorithm 1 Depth First Dual Tree Traversal

```
procedure DEPTHFIRSTTRAVERSAL( $\mathcal{N}_q, \mathcal{N}_r$ )
    if SCORE( $\mathcal{N}_q, \mathcal{N}_r$ ) =  $\infty$  then
        return
    for all  $p_q \in \mathcal{P}_q, p_r \in \mathcal{P}_r$  do
        BASECASE( $p_q, p_r$ )
    for all  $\mathcal{N}_{qc} \in \mathcal{C}_q, \mathcal{N}_{rc} \in \mathcal{C}_r$  do
        DEPTHFIRSTTRAVERSAL( $\mathcal{N}_{qc}, \mathcal{N}_{rc}$ )
```

these we begin by describing Borůvka's original algorithm, and then explain how we reconstruct it within a dual tree framework.

The general idea for Borůvka's algorithm (Algorithm 2) is to build a forest, adding minimum weight edges to connect trees in iterative rounds. Borůvka's algorithm starts with a weighted graph G , and initializes a forest T to have the vertices of G , and no edges. Each pass of Borůvka's algorithm finds minimum weight edges that span distinct connected components of T , and then adds those edges to T . As the algorithm proceeds, T has larger but fewer connected components. The algorithm terminates when the forest T is a single connected component, and thus a tree.

Algorithm 2 Classical Borůvka's algorithm

```
procedure MST( $G = (V, E)$ )
     $T \leftarrow (V, \emptyset)$             $\triangleright$  Initialize a graph  $T$  with vertices from  $G$  and no edges
    while  $T$  has more than one connected component do
        for all components  $C$  of  $T$  do
             $S \leftarrow \emptyset$ 
            for all vertices  $v$  in  $C$  do
                 $D \leftarrow \{a \in E \mid a \text{ meets } v \text{ and is not wholly contained in } C\}$ 
                 $e \leftarrow \text{minimum weight edge in } D$ 
                 $S \leftarrow S \cup \{e\}$ 
             $e \leftarrow \text{minimum weight edge in } S$ 
            Add  $e$  to the graph  $T$ 
```

To convert Borůvka's algorithm to a dual tree algorithm employing the spatial nature of the data, we make use of the space trees to find the nearest neighbors in a different component of the current forest for each point in the dataset. We then compile this information together to update the forest, and then reapply the nearest neighbor search.

Notationally we are building a forest F with connected components F_i . At initialization F has no edges, and there are N connected components. At each pass of the algorithm we will add edges to F and update the list of connected components accordingly.

To keep track of state during processing, a number of associative arrays are

required. First we require a mapping from points to the connected component of F in which they currently reside. We denote this \mathcal{F} and define $\mathcal{F}(p)$ to be the component F_i which contains the point p . During the tree traversal we keep track of the nearest candidate point for each component with an associative array \mathcal{N} such that $\mathcal{N}(F_i)$ is the candidate point (not in component F_i) nearest to component F_i found so far. To keep track of which point in the component F_i is closest to the candidate point we use an associative array \mathcal{P} such that $\mathcal{P}(F_i)$ is the point in component F_i nearest to $\mathcal{N}(F_i)$. Finally we keep track of the distance to a nearest neighbor for each component through an associative array \mathcal{D} such that $\mathcal{D}(F_i)$ is the distance between $\mathcal{N}(F_i)$ and $\mathcal{P}(F_i)$.

To perform passes of the algorithm we need to use a modified nearest neighbor approach that looks for the nearest neighbor in a different component. Since we are searching for the “nearest neighbors” of the reference points each time, the query tree and reference tree are the same. After such an all-points nearest neighbor style tree search we can collate the results found for \mathcal{N} , \mathcal{P} and \mathcal{D} and use that to update the forest, and the associative array \mathcal{F} . This allows us to reset \mathcal{N} , \mathcal{P} and \mathcal{D} and make another pass with the same nearest neighbor style search. Each pass reduces the number of connected components in F until we have a minimal spanning tree.

With this in mind, the **BASECASE** (algorithm 3) needs to find points in different components that have a shorter distance separating them than the current value stored for the component under consideration. If such a pair is found we update \mathcal{N} , \mathcal{P} and \mathcal{D} accordingly.

Algorithm 3 Boruvka’s algorithm base case

```

procedure BASECASE( $p_q, p_r$ )
  if  $p_q = p_r$  then
    return
  if  $\mathcal{F}(p_q) \neq \mathcal{F}(p_r)$  and  $d(p_q, p_r) < \mathcal{D}(\mathcal{F}(p_q))$  then
     $\mathcal{D}(\mathcal{F}(p_q)) \leftarrow d(p_q, p_r)$ 
     $\mathcal{N}(\mathcal{F}(p_q)) \leftarrow p_r$ 
     $\mathcal{P}(\mathcal{F}(p_q)) \leftarrow p_q$ 
```

The benefit of the tree based approach is that we are able to prune branches from our tree search which we know will not yield useful results. Since our queries are closely related to nearest neighbor queries we can make use of similar bounding approaches. The simplest such bound will prune the node pair $(\mathcal{N}_q, \mathcal{N}_r)$ if and only if the minimal distance between the nodes $d_{\min}(\mathcal{N}_q, \mathcal{N}_r)$ is greater than the maximum of the nearest neighbor distances found so far for any point in \mathcal{D}_q^p . That is, if the closest any point in the query node (or its descendants) can be to any point in the reference node (or its descendants) is greater than all the current query node nearest neighbors found, clearly we do not need to descend any further.

In practice, with care and use of the triangle inequality, better bounds can be derived. We refer the reader to [15] for the derivation, but note that we can

define a bound

$$\begin{aligned}
B(\mathcal{N}_q) = \min \Big\{ & \max_{p \in \mathcal{P}_q} D_p, \max_{\mathcal{N}_c \in \mathcal{C}_q} B(\mathcal{N}_c), \\
& \min_{p \in \mathcal{P}_q} (D_p + \rho(\mathcal{N}_q) + \lambda(\mathcal{N}_q)), \\
& \min_{\mathcal{N}_c \in \mathcal{C}_q} \left(B(\mathcal{N}_c) + 2(\lambda(\mathcal{N}_q) - \lambda(\mathcal{N}_c)) \right), \\
& B(\mathcal{U}(\mathcal{N}_q)) \Big\},
\end{aligned}$$

where D_p is the distance to the nearest neighbor of p found so far. Given this bound, if $d_{\min}(\mathcal{N}_q, \mathcal{N}_r) \geq B(\mathcal{N}_q)$ then we can safely prune the pair $(\mathcal{N}_q, \mathcal{N}_r)$. In practice pruning will be done based on the pre-computed lower bound estimate for $d_{\min}(\mathcal{N}_q, \mathcal{N}_r)$. Furthermore, as the bound is expressed recursively, we can cache previous computations and calculate $B(\mathcal{N}_q)$ efficiently.

We can improve our pruning further by using component membership to prune: if all the descendant points in the query and reference nodes are in the same component then we do not need to descend and check any of those points. Again, this is a computation that can be done recursively and cached. With that in mind we can define a SCORE function (Algorithm 4) that prunes away unnecessary branches, resulting in far fewer distance computations being required.

Algorithm 4 Boruvka's algorithm scoring

```

procedure SCORE( $\mathcal{N}_q, \mathcal{N}_r$ )
  if  $d_{\min}(\mathcal{N}_q, \mathcal{N}_r) < B(\mathcal{N}_q)$  then
    if  $\forall (p_q \in \mathcal{D}_q^p, p_r \in \mathcal{D}_r^p) : \mathcal{F}(p_q) = \mathcal{F}(p_r)$  then
      return  $\infty$ 
    return  $d_{\min}(\mathcal{N}_q, \mathcal{N}_r)$ 
  return  $\infty$ 

```

Combining all these pieces together provides us with an algorithm to compute a minimum spanning tree of the distance weighted complete graph of points in a metric space. In practice, we wish to compute a MST using mutual reachability distance, and want to compute as few distances as possible. We can do this by using precomputed core-distances as a filter on the pairs of points passed to BASECASE, and only compute distances (and mutual reachability distances) for a subset of points. Furthermore, by prioritising the order in which we perform our dual tree traversal we can construct tighter bounds B sooner, and thus perform more tree pruning, resulting in even fewer distances being computed.

We can express this in a more detailed tree traversal algorithm. The traversal algorithm is assumed to have access to the associative arrays \mathcal{F} and \mathcal{D} . We also introduce a new associative array \mathcal{C} such that $\mathcal{C}(p)$ is the core-distance (i.e. distance to the k^{th} nearest neighbor) for the point p . We can then expand out the loop over pairs of algorithm 1 into a pair of nested for loops over points in

the query node, and points in the reference node. This allows us to check if the core-distance of a point exceeds the current best distance for the component the point lies in. If the core-distance is larger then the mutual reachability distance is necessarily also larger, and hence this point can be eliminated from consideration.

Algorithm 5 Tailored dual tree traversal

```

procedure DUALTRETRAVERSAL( $\mathcal{N}_q, \mathcal{N}_r$ )
    if SCORE( $\mathcal{N}_q, \mathcal{N}_r$ ) =  $\infty$  then
        return
    for all  $p_q \in \mathcal{P}_q$  do
        if  $C(p_q) < D(F(p_q))$  then
            for all  $p_r \in \mathcal{P}_r$  do
                if  $C(p_r) < D(F(p_q))$  then
                    BASECASE( $p_q, p_r$ )
     $L \leftarrow \text{SORT}([\{\mathcal{N}_{qc}, \mathcal{N}_{rc} \mid \mathcal{N}_{qc} \in \mathcal{C}_q, \mathcal{N}_{qr} \in \mathcal{C}_r\}], d_{\min}(\cdot, \cdot))$ 
    for  $(\mathcal{N}_{qc}, \mathcal{N}_{qr})$  in  $L$  do
        DUALTRETRAVERSAL( $\mathcal{N}_{qc}, \mathcal{N}_{rc}$ )

```

We can also prioritise the tree descent based on, for example, the distance between nodes, descending to nodes that are closer together first such that bounds get updated earlier. Algorithm 5 gives an example of such a tailored algorithm that takes advantage of core-distances and prioritises descent down the tree. In practice the exact traversal and descent strategy can be more carefully tuned according to the exact space tree used.

It only remains to adapt the BASECASE procedure presented in Algorithm 3 to use core-distances to compute d_{mreach} and use it instead of d (as seen in Algorithm 6) and we have a Dual Tree Boruvka algorithm adapted to perform HDBSCAN*. Such an algorithm allows us to compute a minimum spanning tree of the mutual reachability distance weighted complete graph without having to compute all pairwise distances. This results in an asymptotically sub-quadratic MST computation. While the data dependent nature of complexity analysis for tree based algorithms makes it difficult to place an explicit bound on the run-time complexity, analyses such as March et al. [36] suggest we can certainly approach $O(N \log N)$ asymptotic performance for many data sets.

One notable feature of mutual reachability distance is that it can result in many equal distances. We can exploit this fact within our modified Dual Tree Boruvka algorithm. After a tree traversal the algorithm updates the forest F and then resets the bounds B . Since there are many equal distances we can run the tree search again with the same bounds B and find new potential edges to add to F . Such a run is extremely efficient as it has very tight bounds and thus rapidly prunes branches. We can repeat these runs until no new edges are found, and only then reset the values for B , forcing the algorithm to make fast progress in the face of ties, and near ties. Unfortunately this breaks the guarantee that the algorithm will also find a minimal spanning tree. However, in

Algorithm 6 HDBSCAN* tailored Boruvka's algorithm base case

```
procedure BASECASE( $p_q, p_r$ )
    if  $p_q = p_r$  then
        return
    if  $F(p_q) \neq F(p_r)$  then
        dist = max{ $d(p_q, p_r), C(p_q), C(p_r)$ }
        if dist <  $D(F(p_q))$  then
             $\mathcal{D}(F(p_q)) \leftarrow$  dist
             $\mathcal{N}(F(p_q)) \leftarrow p_r$ 
             $\mathcal{P}(F(p_q)) \leftarrow p_q$ 
```

practice the result is a close approximation of a minimal spanning tree. We trade off a small loss in accuracy for a significantly faster algorithm. Furthermore, the minor differences in MST get smoothed out in tree condensing and flat cluster extraction process, resulting in very small deviations in final cluster results. This trade-off of performance for accuracy is particularly relevant for higher dimensional data sets when using kd-trees or ball-trees.

Given a minimal spanning tree it is possible to generate a single linkage cluster tree. This proceeds in two stages. The first stage is to sort the edges of the MST by weight (in this case, the mutual reachability distance between the pair of points the edge spans). Such an operation can be performed in $O(N \log N)$ run-time. In the second stage we process the edges in order using a union-find data structure [56]. This allows us to build the single linkage tree, providing the cluster merges and weights at which they occur, by progressively merging points and clusters by increasing weight. Since an MST has $O(N)$ edges we can complete this in $O(N\alpha(N))$ (using union-rank and path compression in our union-find algorithm).

The next step is to process the single linkage tree into a condensed tree. We can do this in a single pass working from the root in a breadth first traversal, building an associative array mapping single linkage cluster identifiers to new condensed tree cluster identifiers. At each node we need only check on the sizes of the child nodes, update the associative array accordingly, and record any data points falling out of the cluster. Since the single linkage tree has $N \log N$ nodes, the condensed tree processing can be completed in $O(N \log N)$ run-time.

In summary, the overall asymptotic run-time performance of the algorithm is bounded by the core-distance and minimum spanning tree computation stages, both of which now have sub-quadratic performance, and can be expected to approach $O(N \log N)$ performance for many data sets. This represents a significant improvement in potential scaling performance for HDBSCAN* clustering.

To test these algorithmic improvements we have implemented our accelerated HDBSCAN* algorithm in Python [39]. Our Python implementation builds from, and conforms to, the scikit-learn [45] software, making use of the kd-tree and ball tree data structures provided. Making use of scikit-learn has enabled our implementation to support a wide variety of distance metrics, as well as the

ability to fall back to fast $O(N^2)$ algorithms when provided with a (sparse) distance matrix rather than vector space data. In the following section we will make use of our accelerated HDBSCAN* implementation to compare scaling of run-time performance with data set size with classic HDBSCAN*, and with other popular clustering algorithms.

4 Performance Comparisons

In this section we will analyse the performance of our accelerated HDBSCAN*. For the purpose of this paper we will not be considering the quality of clustering results as that has been adequately covered in [6] and [7]. Instead we will demonstrate the computational competitiveness of our accelerated HDBSCAN* against other existing high performance clustering algorithms. We are mindful of the difficulties of run-time analyses [30]. We therefore focus on scaling trends with data set size (and dimension), and speak to the comparability of algorithms rather than making claims of strict superiority.

All our run-time benchmarking was performed on a Macbook Pro with a 3.1 GHz Intel Core i7 processor and 8GB of RAM. Furthermore the benchmarking was performed in Jupyter notebooks which we have made available at https://github.com/lmcinnes/hdbscan_paper. We encourage others to verify and extend these benchmarks.

4.1 Comparisons with HDBSCAN* reference implementation

As a baseline we compare the performance of our Python HDBSCAN* implementation against the reference implementation in Java from the original authors. Given two very different implementations in different languages our focus is on demonstrating that overall scalability and asymptotic performance can be improved through the spatial indexing acceleration techniques described.

We compare the performance on data sets of varying size for both 2-dimensional and 50-dimensional data. The results can be seen in Figure 4. The left hand column demonstrates raw performance times for both 2-dimensional and 50-dimensional data, while the right hand column provides a log-log plot that makes clear the different asymptotic performance of the algorithms. The accelerated Python version shows significantly improved performance, both in absolute terms, and asymptotically (having significantly lower linear slope in the log-log plot), clearly demonstrating sub $O(N^2)$ performance. Furthermore, in both the 2-dimensional and 50-dimensional cases, the accelerated Python version demonstrates roughly two orders of magnitude better absolute run-time performance on data set sizes of 200,000 points.

²See https://github.com/lmcinnes/hdbscan_paper/blob/master/Performance%20data%20generation.ipynb for the code used to generate this plot

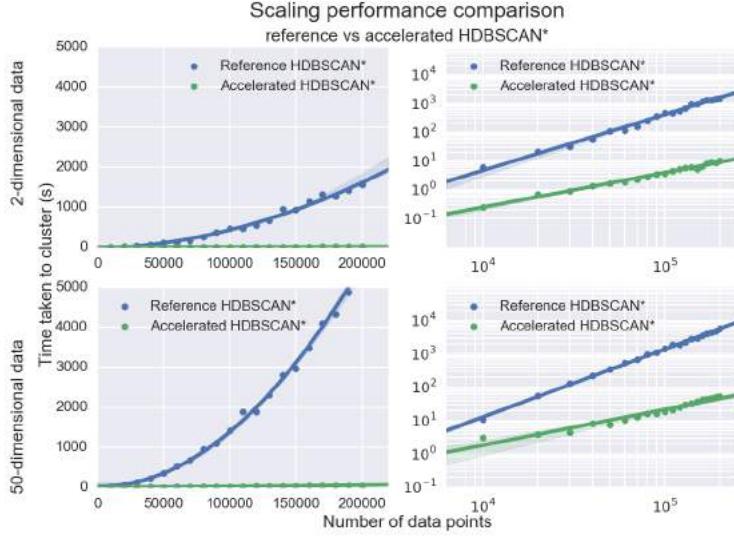


Figure 4: We compare the reference implementation in Java with the accelerated version implemented in Python. ²

4.2 Comparisons among clustering algorithms

In order to gain an overview of the performance landscape of clustering algorithms in general, we compare a number of the more popular clustering algorithms found in scikit-learn³ [45] [48]. Since we recognise that implementation can have a significant effect on run-time performance, our goal here is merely to provide a sample of the performance space rather than direct comparisons to specific algorithms. We chose scikit-learn as it provides a number of techniques that all rest on a common implementation foundation (including our scikit-learn compatible HDBSCAN* implementation).

For the initial comparison we consider the following algorithms as implemented in scikit-learn: Affinity Propagation [20], Birch [62], Complete Linkage [16], DBSCAN [19], KMeans [34], Mean Shift [21], Spectral Clustering [43], and Ward Clustering [58]. We compare these with our HDBSCAN* implementation.

Since this is a broad comparison of overall performance characteristics, each algorithm will be initialized with default scikit-learn parameters. In the next section, we do a more detailed comparison; carefully considering the impact of clustering algorithm parameters on performance.

As demonstrated in Figure 5, there are three classes of implementation. The first is Affinity Propagation, Spectral Clustering, and Mean Shift, which all had

³Benchmarking was performed using scikit-learn v0.18.1.

⁴See https://github.com/1mcinnes/hdbscan_paper/blob/master/Performance%20comparisons%20among%20clustering%20algorithms.ipynb for the code used to generate this plot

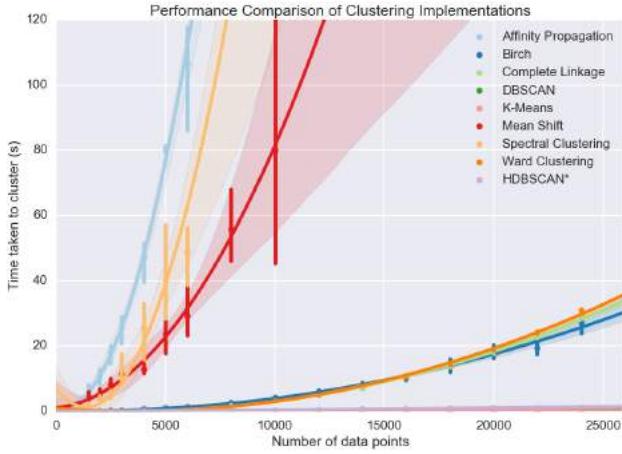


Figure 5: Comparison of scaling performance for scikit-learn implementations of a number of different clustering algorithms. Vertical bars present the range of run-times obtained over several runs at a given data set size.⁴

poor performance beyond a few thousand data points. Some of this is undoubtedly implementation specific (particularly in the case of Spectral Clustering and Mean Shift). The next class of implementations are Ward, Complete Linkage and Birch, which performed better, but still scaled poorly for larger data set sizes. Finally, there was the group of DBSCAN, K-Means and HDBSCAN*, which are difficult to tell apart from one another in Figure 5.

If we consider a log-log plot of the same data (Figure 6) in order to better see and understand the asymptotic scaling, we see algorithms ranging from K-Means impressive approximately $O(N)$ performance, through to the traditional $O(N^2)$ algorithms. DBSCAN and HDBSCAN* demonstrate similar asymptotics to each other, and are the closest in performance to K-Means. Also worth noting is that Mean Shift, while having poorer performance in general, has similar asymptotic performance to DBSCAN and HDBSCAN*.

K-Means, while being the fastest and most scalable algorithm (Figures 5 and 6) explicitly fails to meet our desiderata. Although K-Means has only a single parameter, the selection of that parameter is difficult. K-Means also has implicit apriori assumptions about the data distribution – specifically that clusters are Gaussian. Finally, K-Means is explicitly a partitioning algorithm and does not cope well with noise or outliers.

This leaves DBSCAN as the main competitor to our accelerated HDBSCAN*. We therefore seek a more detailed comparison of performance between

⁵See https://github.com/lmcinnes/hdbscan_paper/blob/master/Performance%20comparisons%20among%20clustering%20algorithms.ipynb for the code used to generate this plot

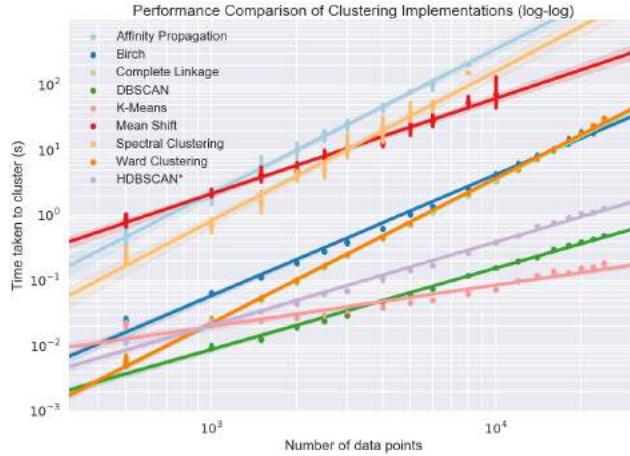


Figure 6: Comparison of scaling performance for scikit-learn implementations of a number of different clustering algorithms plotted on a log-log scale to demonstrate asymptotic performance more clearly.^b

DBSCAN and HDBSCAN*, specifically considering how parameter selection can affect performance.

4.3 Comparisons with DBSCAN

The difficulty with DBSCAN run-time comparisons using default parameters is that very small values of ε will return few or no core points. This results in a very fast run with virtually all the data being relegated to background noise. Conversely, for large values of ε DBSCAN will have very poor performance. Our desire is to not misrepresent DBSCAN’s run-times for real world use cases. To circumvent this problem we will perform a search over the parameter space of DBSCAN in order to find the parameters which best match our HDBSCAN* results on a particular data set. This is reasonable because, as described in section 2.2, HDBSCAN* can be viewed as a natural extension to DBSCAN. Once suitable parameters have been discovered we will benchmark the run-time of DBSCAN using those specific parameters against our HDBSCAN* run-time. Of course, in practice a user may not, apriori, know the optimal parameter values for DBSCAN; that issue is not addressed in this experiment.

As is the case for all tree based algorithms, run-time and run-time complexity are data dependent. As indicated in [30] this raises significant difficulties when benchmarking algorithms or implementations. Our interest is in demonstrating the comparability of the scaling performance of these algorithms. Under the assumption that both algorithms are tree based, they should have similar performance changes under different data distributions. As such, we will examine

the run-time behaviour of both algorithms with respect to a fairly simple data set. One could extend this experimental framework to more complex data sets including those containing background noise.

For this simple scaling experiment our data will consist of mixtures of Gaussian distributions laid down within a fixed diameter hypercube. We use variable numbers of constant variance Gaussian balls for simplicity and to not unfairly penalize DBSCAN. DBSCAN, as has been previously mentioned, does not support variable density clusters and thus could not match the output of HDBSCAN* in such cases. We vary dimension, number of clusters and number of data points to determine their effect on run-time.

Although we are building a generative model on which to compare the performance of DBSCAN and HDBSCAN*, it should be noted that we are comparing the clustering results of the algorithms directly against each other and not against the underlying generative model. This is intentional, since for any given instantiation of our generative model the generative model is not necessarily the most likely model (see [26]). We avoid this issue entirely by ignoring the generative model used to create the data for these experiments.

For the purposes of this experiment we chose to use scikit-learn’s implementation of DBSCAN⁶. We did this for two reasons. First, scikit-learn’s DBSCAN implementation is among the fastest of available DBSCAN implementations (see [30] for DBSCAN implementation comparisons). Second, our Python HDBSCAN* implementation was built using scikit-learn⁷. This means that both the DBSCAN and HDBSCAN* implementations will be using the same underlying library implementations and, in particular, the same implementation of kd-trees which account for a significant part of any performance gains. A common implementation base aids in extension of results from implementations to algorithms.

In order to find the DBSCAN parameters of best fit to our HDBSCAN* clustering, we make use of the Gaussian process optimization framework within scikit-optimize [35]. We treat the background noise identified by both DBSCAN and HDBSCAN* as a single extra “cluster” which yields a partition, allowing us to use the adjusted Rand-index, as proposed by [27], to compute a similarity between the partitionings generated by each algorithm. We then perform Gaussian process optimization to find the ε and k for DBSCAN which optimize this partition similarity score. Due to the expense of this parameter search this optimization was distributed across multiple nodes of a large memory cluster⁸.

The run-time comparison can be found in Figure 7. Each individual figure provides a log-log plot of run-time against data set size, with individual figures for each combination of data set dimension, and number of clusters.

⁶Benchmarks were run using scikit-learn v0.18.1

⁷Our HDBSCAN* implementation has a similar level of genericity to DBSCAN, supporting the same distance metrics etc.

⁸A more detailed supplemental notebook can be found at https://github.com/lmcinnes/hdbscan_paper/blob/master/Benchmark_vs_DBSCAN.ipynb

⁹The results of this optimization can be found at https://github.com/lmcinnes/hdbscan_paper/blob/master/optimizationResults.csv. Due to the fact that we only care about relative timings between dbscan and hdbscan* we omit the exact specifications of this cluster

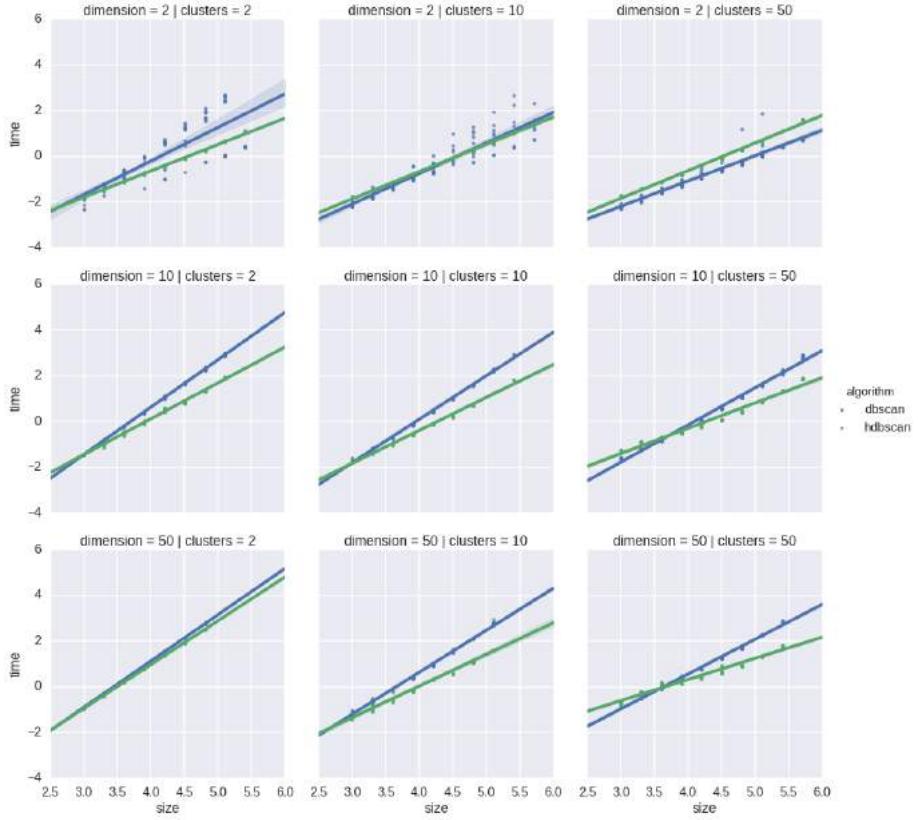


Figure 7: Comparison of scaling performance for scikit-learn’s implementation of DBSCAN and our accelerated HDBSCAN*. Axes are on a \log_{10} scale. Each individual plot provides a log-log plot of run-time against data set size, with individual plots for each combination of data set dimension and number of clusters. For each parameter combination ten random data sets were generated in order to assess the variation from data distribution. The plot shows that accelerated HDBSCAN* and DBSCAN exhibit comparable performance. §

It is worth noting that, particularly in the two dimensional case, due to crowding, the generative model can result in overlapped Gaussians and as a result HDBSCAN* produces a variable density clustering different from the constant density generative model. DBSCAN can have difficulty reproducing such a clustering. This leaves some open questions about the complete accuracy of the 2-dimensional run-times. However, the optimization process still often chose reasonable epsilon parameters so we feel that it is still representative of the broad expected performance for DBSCAN.

Figure 7 clearly indicates that our accelerated algorithm has comparable asymptotic performance to DBSCAN. Furthermore, our implementation has

comparable absolute performance. This is a significant achievement considering that HDBSCAN* can be thought of as computing DBSCAN for all values of ε . In fact, a single HDBSCAN* run allows a user to easily extract the DBSCAN clustering for any given ε . More importantly, parameter selection and variable density clusters are DBSCANS challenges; our accelerated HDBSCAN* algorithm has overcome both of these challenges without sacrificing performance.

5 Future work

A number of avenues for significant future work exist. First there are several ways that our current Python implementation could be improved. The effects of approximate nearest neighbor search via spill trees [32], bounding adjustments [14], or RP-trees with local neighborhood exploration [55], both on core-distance computation, and within March’s algorithm remains unexplored. Approximate nearest neighbor computations may offer significant performance improvements for a small trade-off in the accuracy of results. Secondly, since there is no cover tree implementation for scikit-learn, our Python implementation does not support cover trees. Cover trees offer better scaling with ambient dimension (cover trees scale according to the expansion constant of the data, related to its intrinsic dimension), and support arbitrary distance metrics. A high performance cover tree implementation may provide significant benefits for our Python implementation of HDBSCAN*.

A significant weakness of our accelerated HDBSCAN* algorithm as described is that it is inherently serial. The inability to parallelise the algorithm is an obstacle for its use on large distributed data sets. We believe that partitioning the space via spill trees [32], and building MSTs on the partitioned data in parallel, then using the techniques of Karger, Klein and Tarjan [28] to reconcile the overlapping trees may result in such a parallel algorithm. This is a topic of continued research.

Finally, the topological presentation of HDBSCAN* in section 2.3 provides the opportunity to use multi-dimensional persistent homology to eliminate the parameter k . In such an approach no condensed tree interpretation is possible; instead the relevant structure is a sheaf over a partially ordered set (with the supremum topology). The resulting algorithm, *Persistent Density Clustering*, is the subject of a forthcoming paper [25].

6 Conclusions

The HDBSCAN* clustering algorithm lies at the confluence of several threads of research from diverse fields. As a density based algorithm with a small number of intuitive parameters and few assumptions about data distribution, it is ideally suited to exploratory data analysis. In this paper we have described an accelerated HDBSCAN* algorithm that can provide comparable performance to the popular DBSCAN clustering algorithm. Since it has more intuitive pa-

rameters and can find variable density clusters, HDBSCAN* is clearly superior to DBSCAN from a qualitative clustering perspective. As the improvements of our accelerated HDBSCAN* make its computational scalability comparable in performance to DBSCAN, HDBSCAN* should be the default choice for clustering.

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UMAP: Uniform Manifold Approximation and Projection for Dimension Reduction

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September 21, 2020

Abstract

UMAP (Uniform Manifold Approximation and Projection) is a novel manifold learning technique for dimension reduction. UMAP is constructed from a theoretical framework based in Riemannian geometry and algebraic topology. The result is a practical scalable algorithm that is applicable to real world data. The UMAP algorithm is competitive with t-SNE for visualization quality, and arguably preserves more of the global structure with superior run time performance. Furthermore, UMAP has no computational restrictions on embedding dimension, making it viable as a general purpose dimension reduction technique for machine learning.

1 Introduction

Dimension reduction plays an important role in data science, being a fundamental technique in both visualisation and as pre-processing for machine

learning. Dimension reduction techniques are being applied in a broadening range of fields and on ever increasing sizes of datasets. It is thus desirable to have an algorithm that is both scalable to massive data and able to cope with the diversity of data available. Dimension reduction algorithms tend to fall into two categories; those that seek to preserve the pairwise distance structure amongst all the data samples and those that favor the preservation of local distances over global distance. Algorithms such as PCA [27], MDS [30], and Sammon mapping [50] fall into the former category while t-SNE [59, 58], Isomap [56], LargeVis [54], Laplacian eigenmaps [6, 7] and diffusion maps [16] all fall into the latter category.

In this paper we introduce a novel manifold learning technique for dimension reduction. We provide a sound mathematical theory grounding the technique and a practical scalable algorithm that applies to real world data. UMAP (Uniform Manifold Approximation and Projection) builds upon mathematical foundations related to the work of Belkin and Niyogi on Laplacian eigenmaps. We seek to address the issue of uniform data distributions on manifolds through a combination of Riemannian geometry and the work of David Spivak [52] in category theoretic approaches to geometric realization of fuzzy simplicial sets. t-SNE is the current state-of-the-art for dimension reduction for visualization. Our algorithm is competitive with t-SNE for visualization quality and arguably preserves more of the global structure with superior run time performance. Furthermore the algorithm is able to scale to significantly larger data set sizes than are feasible for t-SNE. Finally, UMAP has no computational restrictions on embedding dimension, making it viable as a general purpose dimension reduction technique for machine learning.

Based upon preliminary releases of a software implementation, UMAP has already found widespread use in the fields of bioinformatics [5, 12, 17, 46, 2, 45, 15], materials science [34, 23], and machine learning [14, 20, 21, 24, 19, 47] among others.

This paper is laid out as follows. In Section 2 we describe the theory underlying the algorithm. Section 2 is necessary to understand both the theory underlying why UMAP works and the motivation for the choices that were made in developing the algorithm. A reader without a background (or interest) in topological data analysis, category theory or the theoretical underpinnings of UMAP should skip over this section and proceed directly to Section 3.

That being said, we feel that strong theory and mathematically justified algorithmic decisions are of particular importance in the field of unsupervised learning. This is, at least partially, due to plethora of proposed objec-

tive functions within the area. We attempt to highlight in this paper that UMAPs design decisions were all grounded in a solid theoretic foundation and not derived through experimentation with any particular task focused objective function. Though all neighbourhood based manifold learning algorithms must share certain fundamental components we believe it to be advantageous for these components to be selected through well grounded theoretical decisions. One of the primary contributions of this paper is to reframe the problem of manifold learning and dimension reduction in a different mathematical language allowing practitioners to apply a new field of mathematics to the problems.

In Section 3 we provide a more computational description of UMAP. Section 3 should provide readers less familiar with topological data analysis with a better foundation for understanding the theory described in Section 2. Appendix C contrasts UMAP against the more familiar algorithms t-SNE and LargeVis, describing all these algorithms in similar language. This section should assist readers already familiar with those techniques to quickly gain an understanding of the UMAP algorithm though they will grant little insight into its theoretical underpinnings.

In Section 4 we discuss implementation details of the UMAP algorithm. This includes a more detailed algorithmic description, and discussion of the hyper-parameters involved and their practical effects.

In Section 5 we provide practical results on real world datasets as well as scaling experiments to demonstrate the algorithm’s performance in real world scenarios as compared with other dimension reduction algorithms.

In Section 6 we discuss relative weaknesses of the algorithm, and applications for which UMAP may not be the best choice.

Finally, in Section 7 we detail a number of potential extensions of UMAP that are made possible by its construction upon solid mathematical foundations. These avenues for further development include semi-supervised learning, metric learning and heterogeneous data embedding.

2 Theoretical Foundations for UMAP

The theoretical foundations for UMAP are largely based in manifold theory and topological data analysis. Much of the theory is most easily explained in the language of topology and category theory. Readers may consult [39], [49] and [40] for background. Readers more interested in practical computational aspects of the algorithm, and not necessarily the theoretical motivation for the computations involved, may wish to skip this section.

Readers more familiar with traditional machine learning may find the relationships between UMAP, t-SNE and Largeviz located in Appendix C enlightening. Unfortunately, this purely computational view fails to shed any light upon the reasoning that underlies the algorithmic decisions made in UMAP. Without strong theoretical foundations the only arguments which can be made about algorithms amount to empirical measures, for which there are no clear universal choices for unsupervised problems.

At a high level, UMAP uses local manifold approximations and patches together their local fuzzy simplicial set representations to construct a topological representation of the high dimensional data. Given some low dimensional representation of the data, a similar process can be used to construct an equivalent topological representation. UMAP then optimizes the layout of the data representation in the low dimensional space, to minimize the cross-entropy between the two topological representations.

The construction of fuzzy topological representations can be broken down into two problems: approximating a manifold on which the data is assumed to lie; and constructing a fuzzy simplicial set representation of the approximated manifold. In explaining the algorithm we will first discuss the method of approximating the manifold for the source data. Next we will discuss how to construct a fuzzy simplicial set structure from the manifold approximation. Finally, we will discuss the construction of the fuzzy simplicial set associated to a low dimensional representation (where the manifold is simply \mathbb{R}^d), and how to optimize the representation with respect to our objective function.

2.1 Uniform distribution of data on a manifold and geodesic approximation

The first step of our algorithm is to approximate the manifold we assume the data (approximately) lies on. The manifold may be known apriori (as simply \mathbb{R}^n) or may need to be inferred from the data. Suppose the manifold is not known in advance and we wish to approximate geodesic distance on it. Let the input data be $X = \{X_1, \dots, X_N\}$. As in the work of Belkin and Niyogi on Laplacian eigenmaps [6, 7], for theoretical reasons it is beneficial to assume the data is uniformly distributed on the manifold, and even if that assumption is not made (e.g [26]) results are only valid in the limit of infinite data. In practice, finite real world data is rarely so nicely behaved. However, if we assume that the manifold has a Riemannian metric not inherited from the ambient space, we can find a metric such that the data is approximately uniformly distributed with regard to that metric.

Formally, let \mathcal{M} be the manifold we assume the data to lie on, and let g be the Riemannian metric on \mathcal{M} . Thus, for each point $p \in \mathcal{M}$ we have g_p , an inner product on the tangent space $T_p\mathcal{M}$.

Lemma 1. *Let (\mathcal{M}, g) be a Riemannian manifold in an ambient \mathbb{R}^n , and let $p \in M$ be a point. If g is locally constant about p in an open neighbourhood U such that g is a constant diagonal matrix in ambient coordinates, then in a ball $B \subseteq U$ centered at p with volume $\frac{\pi^{n/2}}{\Gamma(n/2+1)}$ with respect to g , the geodesic distance from p to any point $q \in B$ is $\frac{1}{r}d_{\mathbb{R}^n}(p, q)$, where r is the radius of the ball in the ambient space and $d_{\mathbb{R}^n}$ is the existing metric on the ambient space.*

See Appendix A of the supplementary materials for a proof of Lemma 1.

If we assume the data to be uniformly distributed on \mathcal{M} (with respect to g) then, away from any boundaries, any ball of fixed volume should contain approximately the same number of points of X regardless of where on the manifold it is centered. Given finite data and small enough local neighborhoods this crude approximation should be accurate enough even for data samples near manifold boundaries. Now, conversely, a ball centered at X_i that contains exactly the k -nearest-neighbors of X_i should have approximately fixed volume regardless of the choice of $X_i \in X$. Under Lemma 1 it follows that we can approximate geodesic distance from X_i to its neighbors by normalising distances with respect to the distance to the k^{th} nearest neighbor of X_i .

In essence, by creating a custom distance for each X_i , we can ensure the validity of the assumption of uniform distribution on the manifold. The cost is that we now have an independent notion of distance for each and every X_i , and these notions of distance may not be compatible. We have a family of discrete metric spaces (one for each X_i) that we wish to merge into a consistent global structure. This can be done in a natural way by converting the metric spaces into fuzzy simplicial sets.

2.2 Fuzzy topological representation

We will use functors between the relevant categories to convert from metric spaces to fuzzy topological representations. This will provide a means to merge the incompatible local views of the data. The topological structure of choice is that of simplicial sets. For more details on simplicial sets we refer the reader to [25], [40], [48], or [22]. Our approach draws heavily upon the work of Michael Barr [3] and David Spivak in [52], and many of the definitions and theorems below are drawn or adapted from those

sources. We assume familiarity with the basics of category theory. For an introduction to category theory readers may consult [39] or [49].

To start we will review the definitions for simplicial sets. Simplicial sets provide a combinatorial approach to the study of topological spaces. They are related to the simpler notion of simplicial complexes – which construct topological spaces by gluing together simple building blocks called simplices – but are more general. Simplicial sets are most easily defined purely abstractly in the language of category theory.

Definition 1. *The category Δ has as objects the finite order sets $[n] = \{1, \dots, n\}$, with morphisms given by (non-strictly) order-preserving maps.*

Following standard category theoretic notation, Δ^{op} denotes the category with the same objects as Δ and morphisms given by the morphisms of Δ with the direction (domain and codomain) reversed.

Definition 2. *A simplicial set is a functor from Δ^{op} to \mathbf{Sets} , the category of sets; that is, a contravariant functor from Δ to \mathbf{Sets} .*

Given a simplicial set $X : \Delta^{\text{op}} \rightarrow \mathbf{Sets}$, it is common to denote the set $X([n])$ as X_n and refer to the elements of the set as the n -simplices of X . The simplest possible examples of simplicial sets are the *standard simplices* Δ^n , defined as the representable functors $\text{hom}_{\Delta}(\cdot, [n])$. It follows from the Yoneda lemma that there is a natural correspondence between n -simplices of X and morphisms $\Delta^n \rightarrow X$ in the category of simplicial sets, and it is often helpful to think in these terms. Thus for each $x \in X_n$ we have a corresponding morphism $x : \Delta^n \rightarrow X$. By the density theorem and employing a minor abuse of notation we then have

$$\underset{x \in X_n}{\text{colim}} \Delta^n \cong X$$

There is a standard covariant functor $|\cdot| : \Delta \rightarrow \mathbf{Top}$ mapping from the category Δ to the category of topological spaces that sends $[n]$ to the standard n -simplex $|\Delta^n| \subset \mathbb{R}^{n+1}$ defined as

$$|\Delta^n| \triangleq \left\{ (t_0, \dots, t_n) \in \mathbb{R}^{n+1} \mid \sum_{i=0}^n t_i = 1, t_i \geq 0 \right\}$$

with the standard subspace topology. If $X : \Delta^{\text{op}} \rightarrow \mathbf{Sets}$ is a simplicial set then we can construct the realization of X (denoted $|X|$) as the colimit

$$|X| = \underset{x \in X_n}{\text{colim}} |\Delta^n|$$

and thus associate a topological space with a given simplicial set. Conversely given a topological space Y we can construct an associated simplicial set $S(Y)$, called the singular set of Y , by defining

$$S(Y) : [n] \mapsto \text{hom}_{\mathbf{Top}}(|\Delta^n|, Y).$$

It is a standard result of classical homotopy theory that the realization functor and singular set functors form an adjunction, and provide the standard means of translating between topological spaces and simplicial sets. Our goal will be to adapt these powerful classical results to the case of finite metric spaces.

We draw significant inspiration from Spivak, specifically [52], where he extends the classical theory of singular sets and topological realization to fuzzy singular sets and metric realization. To develop this theory here we will first outline a categorical presentation of fuzzy sets, due to [3], that will make extending classical simplicial sets to fuzzy simplicial sets most natural.

Classically a fuzzy set [65] is defined in terms of a carrier set A and a map $\mu : A \rightarrow [0, 1]$ called the membership function. One is to interpret the value $\mu(x)$ for $x \in A$ to be the *membership strength* of x to the set A . Thus membership of a set is no longer a bi-valent true or false property as in classical set theory, but a fuzzy property taking values in the unit interval. We wish to formalize this in terms of category theory.

Let I be the unit interval $(0, 1] \subseteq \mathbb{R}$ with topology given by intervals of the form $[0, a)$ for $a \in (0, 1]$. The category of open sets (with morphisms given by inclusions) can be imbued with a Grothendieck topology in the natural way for any poset category.

Definition 3. *A presheaf \mathcal{P} on I is a functor from I^{op} to \mathbf{Sets} . A fuzzy set is a presheaf on I such that all maps $\mathcal{P}(a \leq b)$ are injections.*

Presheaves on I form a category with morphisms given by natural transformations. We can thus form a category of fuzzy sets by simply restricting to the sub-category of presheaves that are fuzzy sets. We note that such presheaves are trivially sheaves under the Grothendieck topology on I . As one might expect, limits (including products) of such sheaves are well defined, but care must be taken to define colimits (and coproducts) of sheaves. To link to the classical approach to fuzzy sets one can think of a section $\mathcal{P}([0, a))$ as the set of all elements with membership strength at least a . We can now define the category of fuzzy sets.

Definition 4. *The category \mathbf{Fuzz} of fuzzy sets is the full subcategory of sheaves on I spanned by fuzzy sets.*

With this categorical presentation in hand, defining fuzzy simplicial sets is simply a matter of considering presheaves of Δ valued in the category of fuzzy sets rather than the category of sets.

Definition 5. *The category of fuzzy simplicial sets $s\mathbf{Fuzz}$ is the category with objects given by functors from Δ^{op} to \mathbf{Fuzz} , and morphisms given by natural transformations.*

Alternatively, a fuzzy simplicial set can be viewed as a sheaf over $\Delta \times I$, where Δ is given the trivial topology and $\Delta \times I$ has the product topology. We will use $\Delta_{<a}^n$ to denote the sheaf given by the representable functor of the object $([n], [0, a))$. The importance of this fuzzy (sheafified) version of simplicial sets is their relationship to metric spaces. We begin by considering the larger category of extended-pseudo-metric spaces.

Definition 6. *An extended-pseudo-metric space (X, d) is a set X and a map $d : X \times X \rightarrow \mathbb{R}_{\geq 0} \cup \{\infty\}$ such that*

1. $d(x, y) \geq 0$, and $x = y$ implies $d(x, y) = 0$;
2. $d(x, y) = d(y, x)$; and
3. $d(x, z) \leq d(x, y) + d(y, z)$ or $d(x, z) = \infty$.

The category of extended-pseudo-metric spaces \mathbf{EPMet} has as objects extended-pseudo-metric spaces and non-expansive maps as morphisms. We denote the subcategory of finite extended-pseudo-metric spaces $\mathbf{FinEPMet}$.

The choice of non-expansive maps in Definition 6 is due to Spivak, but we note that it closely mirrors the work of Carlsson and Memoli in [13] on topological methods for clustering as applied to finite metric spaces. This choice is significant since pure isometries are too strict and do not provide large enough Hom-sets.

In [52] Spivak constructs a pair of adjoint functors, \mathbf{Real} and \mathbf{Sing} between the categories $s\mathbf{Fuzz}$ and \mathbf{EPMet} . These functors are the natural extension of the classical realization and singular set functors from algebraic topology. The functor \mathbf{Real} is defined in terms of standard fuzzy simplices $\Delta_{<a}^n$ as

$$\mathbf{Real}(\Delta_{<a}^n) \triangleq \left\{ (t_0, \dots, t_n) \in \mathbb{R}^{n+1} \mid \sum_{i=0}^n t_i = -\log(a), t_i \geq 0 \right\}$$

similarly to the classical realization functor $|\cdot|$. The metric on $\mathbf{Real}(\Delta_{<a}^n)$ is simply inherited from \mathbb{R}^{n+1} . A morphism $\Delta_{<a}^n \rightarrow \Delta_{<b}^m$ exists only if

$a \leq b$, and is determined by a Δ morphism $\sigma : [n] \rightarrow [m]$. The action of Real on such a morphism is given by the map

$$(x_0, x_1, \dots, x_n) \mapsto \frac{\log(b)}{\log(a)} \left(\sum_{i_0 \in \sigma^{-1}(0)} x_{i_0}, \sum_{i_0 \in \sigma^{-1}(1)} x_{i_0}, \dots, \sum_{i_0 \in \sigma^{-1}(m)} x_{i_0} \right).$$

Such a map is clearly non-expansive since $0 \leq a \leq b \leq 1$ implies that $\log(b)/\log(a) \leq 1$.

We then extend this to a general simplicial set X via colimits, defining

$$\text{Real}(X) \triangleq \underset{\Delta_{<a}^n \rightarrow X}{\text{colim}} \text{Real}(\Delta_{<a}^n).$$

Since the functor Real preserves colimits, it follows that there exists a right adjoint functor. Again, analogously to the classical case, we find the right adjoint, denoted Sing , is defined for an extended pseudo metric space Y in terms of its action on the category $\Delta \times I$:

$$\text{Sing}(Y) : ([n], [0, a)) \mapsto \text{hom}_{\text{EPMet}}(\text{Real}(\Delta_{<a}^n), Y).$$

For our case we are only interested in finite metric spaces. To correspond with this we consider the subcategory of bounded fuzzy simplicial sets **Fin-sFuzz**. We therefore use the analogous adjoint pair **FinReal** and **FinSing**. Formally we define the finite fuzzy realization functor as follows:

Definition 7. Define the functor $\text{FinReal} : \text{Fin-sFuzz} \rightarrow \text{FinEPMet}$ by setting

$$\text{FinReal}(\Delta_{<a}^n) \triangleq (\{x_1, x_2, \dots, x_n\}, d_a),$$

where

$$d_a(x_i, x_j) = \begin{cases} -\log(a) & \text{if } i \neq j, \\ 0 & \text{otherwise} \end{cases}.$$

and then defining

$$\text{FinReal}(X) \triangleq \underset{\Delta_{<a}^n \rightarrow X}{\text{colim}} \text{FinReal}(\Delta_{<a}^n).$$

Similar to Spivak's construction, the action of FinReal on a map $\Delta_{<a}^n \rightarrow \Delta_{<b}^m$, where $a \leq b$ defined by $\sigma : \Delta^n \rightarrow \Delta^m$, is given by

$$(\{x_1, x_2, \dots, x_n\}, d_a) \mapsto (\{x_{\sigma(1)}, x_{\sigma(2)}, \dots, x_{\sigma(n)}\}, d_b),$$

which is a non-expansive map since $a \leq b$ implies $d_a \geq d_b$.

Since FinReal preserves colimits it admits a right adjoint, the fuzzy singular set functor FinSing . We can then define the (finite) fuzzy singular set functor in terms of the action of its image on $\Delta \times I$, analogously to Sing .

Definition 8. Define the functor $\text{FinSing} : \text{FinEPMet} \rightarrow \text{Fin-sFuzz}$ by

$$\text{FinSing}(Y) : ([n], [0, a)) \mapsto \text{hom}_{\text{FinEPMet}}(\text{FinReal}(\Delta_{<a}^n), Y).$$

We then have the following theorem.

Theorem 1. The functors $\text{FinReal} : \text{Fin-sFuzz} \rightarrow \text{FinEPMet}$ and $\text{FinSing} : \text{FinEPMet} \rightarrow \text{Fin-sFuzz}$ form an adjunction with FinReal the left adjoint and FinSing the right adjoint.

The proof of this is by construction. Appendix B provides a full proof of the theorem.

With the necessary theoretical background in place, the means to handle the family of incompatible metric spaces described above becomes clear. Each metric space in the family can be translated into a fuzzy simplicial set via the fuzzy singular set functor, distilling the topological information while still retaining metric information in the fuzzy structure. Ironing out the incompatibilities of the resulting family of fuzzy simplicial sets can be done by simply taking a (fuzzy) union across the entire family. The result is a single fuzzy simplicial set which captures the relevant topological and underlying metric structure of the manifold \mathcal{M} .

It should be noted, however, that the fuzzy singular set functor applies to extended-pseudo-metric spaces, which are a relaxation of traditional metric spaces. The results of Lemma 1 only provide accurate approximations of geodesic distance local to X_i for distances measured from X_i – the geodesic distances between other pairs of points within the neighborhood of X_i are not well defined. In deference to this lack of information we define distances between X_j and X_k in the extended-pseudo metric space local to X_i (where $i \neq j$ and $i \neq k$) to be infinite (local neighborhoods of X_j and X_k will provide suitable approximations).

For real data it is safe to assume that the manifold \mathcal{M} is locally connected. In practice this can be realized by measuring distance in the extended-pseudo-metric space local to X_i as geodesic distance *beyond* the nearest neighbor of X_i . Since this sets the distance to the nearest neighbor to be equal to 0 this is only possible in the more relaxed setting of extended-pseudo-metric spaces. It ensures, however, that each 0-simplex is the face of some 1-simplex with fuzzy membership strength 1, meaning that the resulting topological structure derived from the manifold is locally connected. We note that this has a similar practical effect to the truncated similarity approach of Lee and Verleysen [33], but derives naturally from the assumption of local connectivity of the manifold.

Combining all of the above we can define the fuzzy topological representation of a dataset.

Definition 9. Let $X = \{X_1, \dots, X_N\}$ be a dataset in \mathbb{R}^n . Let $\{(X, d_i)\}_{i=1\dots N}$ be a family of extended-pseudo-metric spaces with common carrier set X such that

$$d_i(X_j, X_k) = \begin{cases} d_{\mathcal{M}}(X_j, X_k) - \rho & \text{if } i = j \text{ or } i = k, \\ \infty & \text{otherwise,} \end{cases}$$

where ρ is the distance to the nearest neighbor of X_i and $d_{\mathcal{M}}$ is geodesic distance on the manifold \mathcal{M} , either known apriori, or approximated as per Lemma 1.

The fuzzy topological representation of X is

$$\bigcup_{i=1}^n \text{FinSing}((X, d_i)).$$

The (fuzzy set) union provides the means to merge together the different metric spaces. This provides a single fuzzy simplicial set as the global representation of the manifold formed by patching together the many local representations.

Given the ability to construct such topological structures, either from a known manifold, or by learning the metric structure of the manifold, we can perform dimension reduction by simply finding low dimensional representations that closely match the topological structure of the source data. We now consider the task of finding such a low dimensional representation.

2.3 Optimizing a low dimensional representation

Let $Y = \{Y_1, \dots, Y_N\} \subseteq \mathbb{R}^d$ be a low dimensional ($d \ll n$) representation of X such that Y_i represents the source data point X_i . In contrast to the source data where we want to estimate a manifold on which the data is uniformly distributed, a target manifold for Y is chosen apriori (usually this will simply be \mathbb{R}^d itself, but other choices such as d -spheres or d -tori are certainly possible). Therefore we know the manifold and manifold metric apriori, and can compute the fuzzy topological representation directly. Of note, we still want to incorporate the distance to the nearest neighbor as per the local connectedness requirement. This can be achieved by supplying a parameter that defines the expected distance between nearest neighbors in the embedded space.

Given fuzzy simplicial set representations of X and Y , a means of comparison is required. If we consider only the 1-skeleton of the fuzzy simplicial sets we can describe each as a fuzzy graph, or, more specifically, a fuzzy set of edges. To compare two fuzzy sets we will make use of fuzzy set cross entropy. For these purposes we will revert to classical fuzzy set notation. That is, a fuzzy set is given by a reference set A and a membership strength function $\mu : A \rightarrow [0, 1]$. Comparable fuzzy sets have the same reference set. Given a sheaf representation \mathcal{P} we can translate to classical fuzzy sets by setting $A = \bigcup_{a \in (0,1]} \mathcal{P}([0, a))$ and $\mu(x) = \sup\{a \in (0, 1] \mid x \in \mathcal{P}([0, a))\}$.

Definition 10. *The cross entropy C of two fuzzy sets (A, μ) and (A, ν) is defined as*

$$C((A, \mu), (A, \nu)) \triangleq \sum_{a \in A} \left(\mu(a) \log \left(\frac{\mu(a)}{\nu(a)} \right) + (1 - \mu(a)) \log \left(\frac{1 - \mu(a)}{1 - \nu(a)} \right) \right).$$

Similar to t-SNE we can optimize the embedding Y with respect to fuzzy set cross entropy C by using stochastic gradient descent. However, this requires a differentiable fuzzy singular set functor. If the expected minimum distance between points is zero the fuzzy singular set functor is differentiable for these purposes, however for any non-zero value we need to make a differentiable approximation (chosen from a suitable family of differentiable functions).

This completes the algorithm: by using manifold approximation and patching together local fuzzy simplicial set representations we construct a topological representation of the high dimensional data. We then optimize the layout of data in a low dimensional space to minimize the error between the two topological representations.

We note that in this case we restricted attention to comparisons of the 1-skeleton of the fuzzy simplicial sets. One can extend this to ℓ -skeleta by defining a cost function C_ℓ as

$$C_\ell(X, Y) = \sum_{i=1}^{\ell} \lambda_i C(X_i, Y_i),$$

where X_i denotes the fuzzy set of i -simplices of X and the λ_i are suitably chosen real valued weights. While such an approach will capture the overall topological structure more accurately, it comes at non-negligible computational cost due to the increasingly large numbers of higher dimensional simplices. For this reason current implementations restrict to the 1-skeleton at this time.

3 A Computational View of UMAP

To understand what computations the UMAP algorithm is actually making from a practical point of view, a less theoretical and more computational description may be helpful for the reader. This description of the algorithm lacks the motivation for a number of the choices made. For that motivation please see Section 2.

The theoretical description of the algorithm works in terms of fuzzy simplicial sets. Computationally this is only tractable for the one skeleton which can ultimately be described as a weighted graph. This means that, from a practical computational perspective, UMAP can ultimately be described in terms of, construction of, and operations on, weighted graphs. In particular this situates UMAP in the class of k-neighbour based graph learning algorithms such as Laplacian Eigenmaps, Isomap and t-SNE.

As with other k-neighbour graph based algorithms, UMAP can be described in two phases. In the first phase a particular weighted k-neighbour graph is constructed. In the second phase a low dimensional layout of this graph is computed. The differences between all algorithms in this class amount to specific details in how the graph is constructed and how the layout is computed. The theoretical basis for UMAP as described in Section 2 provides novel approaches to both of these phases, and provides clear motivation for the choices involved.

Finally, since t-SNE is not usually described as a graph based algorithm, a direct comparison of UMAP with t-SNE, using the similarity/probability notation commonly used to express the equations of t-SNE, is given in the Appendix C.

In section 2 we made a few basic assumptions about our data. From these assumptions we made use of category theory to derive the UMAP algorithms. That said, all these derivations assume these axioms to be true.

1. There exists a manifold on which the data would be uniformly distributed.
2. The underlying manifold of interest is locally connected.
3. Preserving the topological structure of this manifold is the primary goal.

The topological theory of Section 2 is driven by these axioms, particularly the interest in modelling and preserving topological structure. In particular Section 2.1 highlights the underlying motivation, in terms of topological theory, of representing a manifold as a k-neighbour graph.

As highlighted in Appendix C any algorithm that attempts to use a mathematical structure akin to a k-neighbour graph to approximate a manifold must follow a similar basic structure.

- Graph Construction
 1. Construct a weighted k-neighbour graph
 2. Apply some transform on the edges to ambient local distance.
 3. Deal with the inherent asymmetry of the k-neighbour graph.
- Graph Layout
 1. Define an objective function that preserves desired characteristics of this k-neighbour graph.
 2. Find a low dimensional representation which optimizes this objective function.

Many dimension reduction algorithms can be broken down into these steps because they are fundamental to a particular class of solutions. Choices for each step must be either chosen through task oriented experimentation or by selecting a set of believable axioms and building strong theoretical arguments from these. Our belief is that basing our decisions on a strong foundational theory will allow for a more extensible and generalizable algorithm in the long run.

We theoretically justify using the choice of using a k-neighbour graph to represent a manifold in Section 2.1. The choices for our kernel transform an symmetrization function can be found in Section 2.2. Finally, the justifications underlying our choices for our graph layout are outlined in Section 2.3.

3.1 Graph Construction

The first phase of UMAP can be thought of as the construction of a weighted k-neighbour graph. Let $X = \{x_1, \dots, x_N\}$ be the input dataset, with a metric (or dissimilarity measure) $d : X \times X \rightarrow \mathbb{R}_{\geq 0}$. Given an input hyper-parameter k , for each x_i we compute the set $\{x_{i_1}, \dots, x_{i_k}\}$ of the k nearest neighbors of x_i under the metric d . This computation can be performed via any nearest neighbour or approximate nearest neighbour search algorithm. For the purposes of our UMAP implementation we prefer to use the nearest neighbor descent algorithm of [18].

For each x_i we will define ρ_i and σ_i . Let

$$\rho_i = \min\{d(x_i, x_{i_j}) \mid 1 \leq j \leq k, d(x_i, x_{i_j}) > 0\},$$

and set σ_i to be the value such that

$$\sum_{j=1}^k \exp\left(\frac{-\max(0, d(x_i, x_{i_j}) - \rho_i)}{\sigma_i}\right) = \log_2(k).$$

The selection of ρ_i derives from the local-connectivity constraint described in Section 2.2. In particular it ensures that x_i connects to at least one other data point with an edge of weight 1; this is equivalent to the resulting fuzzy simplicial set being locally connected at x_i . In practical terms this significantly improves the representation on very high dimensional data where other algorithms such as t-SNE begin to suffer from the curse of dimensionality.

The selection of σ_i corresponds to (a smoothed) normalisation factor, defining the Riemannian metric local to the point x_i as described in Section 2.1.

We can now define a weighted directed graph $\bar{G} = (V, E, w)$. The vertices V of \bar{G} are simply the set X . We can then form the set of directed edges $E = \{(x_i, x_{i_j}) \mid 1 \leq j \leq k, 1 \leq i \leq N\}$, and define the weight function w by setting

$$w((x_i, x_{i_j})) = \exp\left(\frac{-\max(0, d(x_i, x_{i_j}) - \rho_i)}{\sigma_i}\right).$$

For a given point x_i there exists an induced graph of x_i and outgoing edges incident on x_i . This graph is the 1-skeleton of the fuzzy simplicial set associated to the metric space local to x_i where the local metric is defined in terms of ρ_i and σ_i . The weight associated to the edge is the membership strength of the corresponding 1-simplex within the fuzzy simplicial set, and is derived from the adjunction of Theorem 1 using the right adjoint (nearest inverse) of the geometric realization of a fuzzy simplicial set. Intuitively one can think of the weight of an edge as akin to the probability that the given edge exists. Section 2 demonstrates why this construction faithfully captures the topology of the data. Given this set of local graphs (represented here as a single directed graph) we now require a method to combine them into a unified topological representation. We note that while patching together incompatible finite metric spaces is challenging, by using Theorem 1 to convert to a fuzzy simplicial set representation, the combining operation becomes natural.

Let A be the weighted adjacency matrix of \bar{G} , and consider the symmetric matrix

$$B = A + A^\top - A \circ A^\top,$$

where \circ is the Hadamard (or pointwise) product. This formula derives from the use of the probabilistic t-conorm used in unioning the fuzzy simplicial sets. If one interprets the value of A_{ij} as the probability that the directed edge from x_i to x_j exists, then B_{ij} is the probability that at least one of the two directed edges (from x_i to x_j and from x_j to x_i) exists. The UMAP graph G is then an undirected weighted graph whose adjacency matrix is given by B . Section 2 explains this construction in topological terms, providing the justification for why this construction provides an appropriate fuzzy topological representation of the data – that is, this construction captures the underlying geometric structure of the data in a faithful way.

3.2 Graph Layout

In practice UMAP uses a force directed graph layout algorithm in low dimensional space. A force directed graph layout utilizes of a set of attractive forces applied along edges and a set of repulsive forces applied among vertices. Any force directed layout algorithm requires a description of both the attractive and repulsive forces. The algorithm proceeds by iteratively applying attractive and repulsive forces at each edge or vertex. This amounts to a non-convex optimization problem. Convergence to a local minima is guaranteed by slowly decreasing the attractive and repulsive forces in a similar fashion to that used in simulated annealing.

In UMAP the attractive force between two vertices i and j at coordinates \mathbf{y}_i and \mathbf{y}_j respectively, is determined by:

$$\frac{-2ab\|\mathbf{y}_i - \mathbf{y}_j\|_2^{2(b-1)}}{1 + \|\mathbf{y}_i - \mathbf{y}_j\|_2^2} w((x_i, x_j)) (\mathbf{y}_i - \mathbf{y}_j)$$

where a and b are hyper-parameters.

Repulsive forces are computed via sampling due to computational constraints. Thus, whenever an attractive force is applied to an edge, one of that edge's vertices is repulsed by a sampling of other vertices. The repulsive force is given by

$$\frac{2b}{(\epsilon + \|\mathbf{y}_i - \mathbf{y}_j\|_2^2)(1 + a\|\mathbf{y}_i - \mathbf{y}_j\|_2^{2b})} (1 - w((x_i, x_j))) (\mathbf{y}_i - \mathbf{y}_j).$$

ϵ is a small number to prevent division by zero (0.001 in the current implementation).

The algorithm can be initialized randomly but in practice, since the symmetric Laplacian of the graph G is a discrete approximation of the Laplace-Beltrami operator of the manifold, we can use a spectral layout to initialize the embedding. This provides both faster convergence and greater stability within the algorithm.

The forces described above are derived from gradients optimising the edge-wise cross-entropy between the weighted graph G , and an equivalent weighted graph H constructed from the points $\{\mathbf{y}_i\}_{i=1..N}$. That is, we are seeking to position points y_i such that the weighted graph induced by those points most closely approximates the graph G , where we measure the difference between weighted graphs by the total cross entropy over all the edge existence probabilities. Since the weighted graph G captures the topology of the source data, the equivalent weighted graph H constructed from the points $\{\mathbf{y}_i\}_{i=1..N}$ matches the topology as closely as the optimization allows, and thus provides a good low dimensional representation of the overall topology of the data.

4 Implementation and Hyper-parameters

Having completed a theoretical description of the approach, we now turn our attention to the practical realization of this theory. We begin by providing a more detailed description of the algorithm as implemented, and then discuss a few implementation specific details. We conclude this section with a discussion of the hyper-parameters for the algorithm and their practical effects.

4.1 Algorithm description

In overview the UMAP algorithm is relatively straightforward (see Algorithm 1). When performing a fuzzy union over local fuzzy simplicial sets we have found it most effective to work with the probabilistic t-conorm (as one would expect if treating membership strengths as a probability that the simplex exists). The individual functions for constructing the local fuzzy simplicial sets, determining the spectral embedding, and optimizing the embedding with regard to fuzzy set cross entropy, are described in more detail below.

The inputs to Algorithm 1 are: X , the dataset to have its dimension reduced; n , the neighborhood size to use for local metric approximation; d , the dimension of the target reduced space; min-dist, an algorithmic pa-

Algorithm 1 UMAP algorithm

```
function UMAP( $X, n, d, \text{min-dist}, \text{n-epochs}$ )  
  
    # Construct the relevant weighted graph  
    for all  $x \in X$  do  
        fs-set[ $x$ ]  $\leftarrow$  LOCALFUZZYSIMPLICIALSET( $X, x, n$ )  
        top-rep  $\leftarrow \bigcup_{x \in X} \text{fs-set}[x]$       # We recommend the probabilistic  $t$ -conorm  
  
    # Perform optimization of the graph layout  
     $Y \leftarrow \text{SPECTRALEMBEDDING}(\text{top-rep}, d)$   
     $Y \leftarrow \text{OPTIMIZEEMBEDDING}(\text{top-rep}, Y, \text{min-dist}, \text{n-epochs})$   
    return  $Y$ 
```

parameter controlling the layout; and n-epochs, controlling the amount of optimization work to perform.

Algorithm 2 describes the construction of local fuzzy simplicial sets. To represent fuzzy simplicial sets we work with the fuzzy set images of [0] and [1] (i.e. the 1-skeleton), which we denote as fs-set_0 and fs-set_1 . One can work with higher order simplices as well, but the current implementation does not. We can construct the fuzzy simplicial set local to a given point x by finding the n nearest neighbors, generating the appropriate normalised distance on the manifold, and then converting the finite metric space to a simplicial set via the functor FinSing , which translates into exponential of the negative distance in this case.

Rather than directly using the distance to the n^{th} nearest neighbor as the normalization, we use a smoothed version of knn-distance that fixes the cardinality of the fuzzy set of 1-simplices to a fixed value. We selected $\log_2(n)$ for this purpose based on empirical experiments. This is described briefly in Algorithm 3.

Spectral embedding is performed by considering the 1-skeleton of the global fuzzy topological representation as a weighted graph and using standard spectral methods on the symmetric normalized Laplacian. This process is described in Algorithm 4.

The final major component of UMAP is the optimization of the embedding through minimization of the fuzzy set cross entropy. Recall that

Algorithm 2 Constructing a local fuzzy simplicial set

```
function LOCALFUZZYSIMPLICIALSET( $X, x, n$ )
    knn, knn-dists  $\leftarrow$  APPROXNEARESTNEIGHBORS( $X, x, n$ )
     $\rho \leftarrow$  knn-dists[1]                                # Distance to nearest neighbor
     $\sigma \leftarrow$  SMOOTHKNNDIST(knn-dists,  $n, \rho$ )      # Smooth approximator to
    knn-distance
    fs-set0  $\leftarrow X$ 
    fs-set1  $\leftarrow \{([x, y], 0) \mid y \in X\}$ 
    for all  $y \in \text{knn}$  do
         $d_{x,y} \leftarrow \max\{0, \text{dist}(x, y) - \rho\}/\sigma$ 
        fs-set1  $\leftarrow$  fs-set1  $\cup ([x, y], \exp(-d_{x,y}))$ 
    return fs-set
```

Algorithm 3 Compute the normalizing factor for distances σ

```
function SMOOTHKNNDIST(knn-dists,  $n, \rho$ )
    Binary search for  $\sigma$  such that  $\sum_{i=1}^n \exp(-(knn\text{-dists}_i - \rho)/\sigma) = \log_2(n)$ 
    return  $\sigma$ 
```

Algorithm 4 Spectral embedding for initialization

```
function SPECTRALEMBEDDING(top-rep,  $d$ )
     $A \leftarrow$  1-skeleton of top-rep expressed as a weighted adjacency matrix
     $D \leftarrow$  degree matrix for the graph  $A$ 
     $L \leftarrow D^{1/2}(D - A)D^{1/2}$ 
    evec  $\leftarrow$  Eigenvectors of  $L$  (sorted)
     $Y \leftarrow$  evec[1.. $d + 1$ ]                                # 0-base indexing assumed
    return  $Y$ 
```

fuzzy set cross entropy, with respect given membership functions μ and ν , is given by

$$\begin{aligned}
C((A, \mu), (A, \nu)) &= \sum_{a \in A} \mu(a) \log \left(\frac{\mu(a)}{\nu(a)} \right) + (1 - \mu(a)) \log \left(\frac{1 - \mu(a)}{1 - \nu(a)} \right) \\
&= \sum_{a \in A} (\mu(a) \log(\mu(a)) + (1 - \mu(a)) \log(1 - \mu(a))) \\
&\quad - \sum_{a \in A} (\mu(a) \log(\nu(a)) + (1 - \mu(a)) \log(1 - \nu(a))).
\end{aligned} \tag{1}$$

The first sum depends only on μ which takes fixed values during the optimization, thus the minimization of cross entropy depends only on the second sum, so we seek to minimize

$$-\sum_{a \in A} (\mu(a) \log(\nu(a)) + (1 - \mu(a)) \log(1 - \nu(a))).$$

Following both [54] and [41], we take a sampling based approach to the optimization. We sample 1-simplices with probability $\mu(a)$ and update according to the value of $\nu(a)$, which handles the term $\mu(a) \log(\nu(a))$. The term $(1 - \mu(a)) \log(1 - \nu(a))$ requires negative sampling – rather than computing this over all potential simplices we randomly sample potential 1-simplices and assume them to be a negative example (i.e. with membership strength 0) and update according to the value of $1 - \nu(a)$. In contrast to [54] the above formulation provides a vertex sampling distribution of

$$P(x_i) = \frac{\sum_{\{a \in A | d_0(a) = x_i\}} 1 - \mu(a)}{\sum_{\{b \in A | d_0(b) \neq x_i\}} 1 - \mu(b)}$$

for negative samples, which can be reasonably approximated by a uniform distribution for sufficiently large data sets.

It therefore only remains to find a differentiable approximation to $\nu(a)$ for a given 1-simplex a so that gradient descent can be applied for optimization. This is done as follows:

Definition 11. Define $\Phi : \mathbb{R}^d \times \mathbb{R}^d \rightarrow [0, 1]$, a smooth approximation of the membership strength of a 1-simplex between two points in \mathbb{R}^d , as

$$\Phi(\mathbf{x}, \mathbf{y}) = \left(1 + a(\|\mathbf{x} - \mathbf{y}\|_2^2)^b \right)^{-1},$$

where a and b are chosen by non-linear least squares fitting against the curve
 $\Psi : \mathbb{R}^d \times \mathbb{R}^d \rightarrow [0, 1]$ where

$$\Psi(\mathbf{x}, \mathbf{y}) = \begin{cases} 1 & \text{if } \|\mathbf{x} - \mathbf{y}\|_2 \leq \text{min-dist} \\ \exp(-(\|\mathbf{x} - \mathbf{y}\|_2 - \text{min-dist})) & \text{otherwise} \end{cases}.$$

The optimization process is now executed by stochastic gradient descent as given by Algorithm 5.

Algorithm 5 Optimizing the embedding

```

function OPTIMIZEEMBEDDING(top-rep,  $Y$ , min-dist, n-epochs)
     $\alpha \leftarrow 1.0$ 
    Fit  $\Phi$  from  $\Psi$  defined by min-dist
    for  $e \leftarrow 1, \dots, \text{n-epochs}$  do
        for all  $([a, b], p) \in \text{top-rep}_1$  do
            if RANDOM()  $\leq p$  then          # Sample simplex with probability p
                 $y_a \leftarrow y_a + \alpha \cdot \nabla(\log(\Phi))(y_a, y_b)$ 
                for  $i \leftarrow 1, \dots, \text{n-neg-samples}$  do
                     $c \leftarrow \text{random sample from } Y$ 
                     $y_a \leftarrow y_a + \alpha \cdot \nabla(\log(1 - \Phi))(y_a, y_c)$ 
         $\alpha \leftarrow 1.0 - e/\text{n-epochs}$ 
    return  $Y$ 

```

This completes the UMAP algorithm.

4.2 Implementation

Practical implementation of this algorithm requires (approximate) k -nearest-neighbor calculation and efficient optimization via stochastic gradient descent.

Efficient approximate k -nearest-neighbor computation can be achieved via the Nearest-Neighbor-Descent algorithm of [18]. The error intrinsic in a dimension reduction technique means that such approximation is more than adequate for these purposes. While no theoretical complexity bounds

have been established for Nearest-Neighbor-Descent the authors of the original paper report an empirical complexity of $O(N^{1.14})$. A further benefit of Nearest-Neighbor-Descent is its generality; it works with any valid dissimilarity measure, and is efficient even for high dimensional data.

In optimizing the embedding under the provided objective function, we follow work of [54]; making use of probabilistic edge sampling and negative sampling [41]. This provides a very efficient approximate stochastic gradient descent algorithm since there is no normalization requirement. Furthermore, since the normalized Laplacian of the fuzzy graph representation of the input data is a discrete approximation of the Laplace-Betrami operator of the manifold [?, see]]belkin2002laplacian, belkin2003laplacian, we can provide a suitable initialization for stochastic gradient descent by using the eigenvectors of the normalized Laplacian. The amount of optimization work required will scale with the number of edges in the fuzzy graph (assuming a fixed negative sampling rate), resulting in a complexity of $O(kN)$.

Combining these techniques results in highly efficient embeddings, which we will discuss in Section 5. The overall complexity is bounded by the approximate nearest neighbor search complexity and, as mentioned above, is empirically approximately $O(N^{1.14})$. A reference implementation can be found at <https://github.com/lmcinnes/umap>, and an R implementation can be found at <https://github.com/jlmelville/uwot>.

For simplicity these experiments were carried out on a single core version of our algorithm. It should be noted that at the time of this publication that both Nearest-Neighbour-Descent and SGD have been parallelized and thus the python reference implementation can be significantly accelerated. Our intention in this paper was to introduce the underlying theory behind our UMAP algorithm and we felt that parallel vs single core discussions would distract from our intent.

4.3 Hyper-parameters

As described in Algorithm 1, the UMAP algorithm takes four hyper-parameters:

1. n , the number of neighbors to consider when approximating the local metric;
2. d , the target embedding dimension;
3. min-dist, the desired separation between close points in the embedding space; and

4. n-epochs, the number of training epochs to use when optimizing the low dimensional representation.

The effects of the parameters d and n-epochs are largely self-evident, and will not be discussed in further detail here. In contrast the effects of the number of neighbors n and of min-dist are less clear.

One can interpret the number of neighbors n as the local scale at which to approximate the manifold as roughly flat, with the manifold estimation averaging over the n neighbors. Manifold features that occur at a smaller scale than within the n nearest-neighbors of points will be lost, while large scale manifold features that cannot be seen by patching together locally flat charts at the scale of n nearest-neighbors may not be well detected. Thus n represents some degree of trade-off between fine grained and large scale manifold features — smaller values will ensure detailed manifold structure is accurately captured (at a loss of the “big picture” view of the manifold), while larger values will capture large scale manifold structures, but at a loss of fine detail structure which will get averaged out in the local approximations. With smaller n values the manifold tends to be broken into many small connected components (care needs to be taken with the spectral embedding for initialization in such cases).

In contrast min-dist is a hyperparameter directly affecting the output, as it controls the fuzzy simplicial set construction from the low dimensional representation. It acts in lieu of the distance to the nearest neighbor used to ensure local connectivity. In essence this determines how closely points can be packed together in the low dimensional representation. Low values on min-dist will result in potentially densely packed regions, but will likely more faithfully represent the manifold structure. Increasing the value of min-dist will force the embedding to spread points out more, assisting visualization (and avoiding potential overplotting issues). We view min-dist as an essentially aesthetic parameter, governing the appearance of the embedding, and thus is more important when using UMAP for visualization.

In Figure 1 we provide examples of the effects of varying the hyperparameters for a toy dataset. The data is uniform random samples from a 3-dimensional color-cube, allowing for easy visualization of the original 3-dimensional coordinates in the embedding space by using the corresponding RGB colour. Since the data fills a 3-dimensional cube there is no local manifold structure, and hence for such data we expect larger n values to be more useful. Low values will interpret the noise from random sampling as fine scale manifold structure, producing potentially spurious structure¹.

¹See the discussion of the constellation effect in Section 6

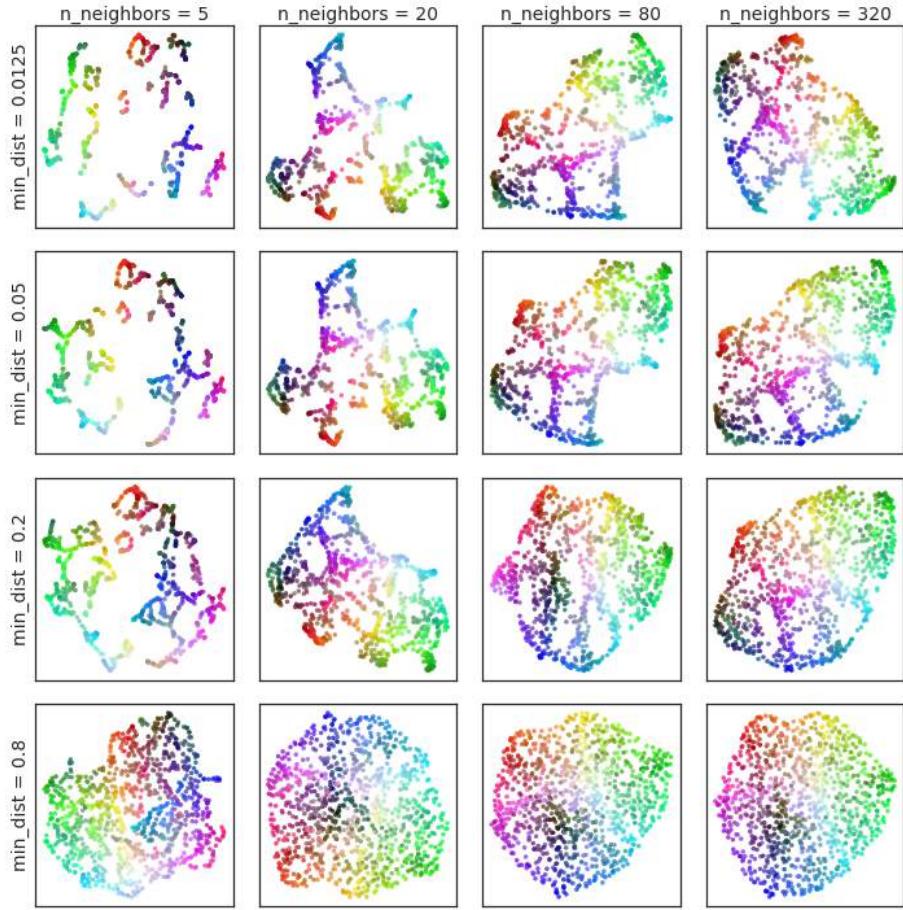


Figure 1: Variation of UMAP hyperparameters n and min-dist result in different embeddings. The data is uniform random samples from a 3-dimensional color-cube, allowing for easy visualization of the original 3-dimensional coordinates in the embedding space by using the corresponding RGB colour. Low values of n spuriously interpret structure from the random sampling noise – see Section 6 for further discussion of this phenomena.

In Figure 2 we provides examples of the same hyperparamter choices as Figure 1, but for the PenDigits dataset². In this case we expect small to medium n values to be most effective, since there is significant cluster structure naturally present in the data. The min-dist parameter expands out tightly clustered groups, allowing more of the internal structure of densely packed clusters to be seen.

Finally, in Figure 3 we provide an equivalent example of hyperparameter choices for the MNIST dataset³. Again, since this dataset is expected to have significant cluster structure we expect medium sized values of n to be most effective. We note that large values of min-dist result in the distinct clusters being compressed together, making the distinctions between the clusters less clear.

5 Practical Efficacy

While the strong mathematical foundations of UMAP were the motivation for its development, the algorithm must ultimately be judged by its practical efficacy. In this section we examine the fidelity and performance of low dimensional embeddings of multiple diverse real world data sets under UMAP. The following datasets were considered:

Pen digits [1 10] is a set of 1797 grayscale images of digits entered using a digitiser tablet. Each image is an 8x8 image which we treat as a single 64 dimensional vector, assumed to be in Euclidean vector space.

COIL 20 [43] is a set of 1440 greyscale images consisting of 20 objects under 72 different rotations spanning 360 degrees. Each image is a 128x128 image which we treat as a single 16384 dimensional vector for the purposes of computing distance between images.

COIL 100 [44] is a set of 7200 colour images consisting of 100 objects under 72 different rotations spanning 360 degrees. Each image consists of 3 128x128 intensity matrices (one for each color channel). We treat this as a single 49152 dimensional vector for the purposes of computing distance between images.

Mouse scRNA-seq [11] is profiled gene expression data for 20,921 cells from an adult mouse. Each sample consists of a vector of 26,774 measurements.

Statlog (Shuttle) [35] is a NASA dataset consisting of various data associated to the positions of radiators in the space shuttle, including a timestamp.

²See Section 5 for a description of the PenDigits dataset

³See section 5 for details on the MNIST dataset

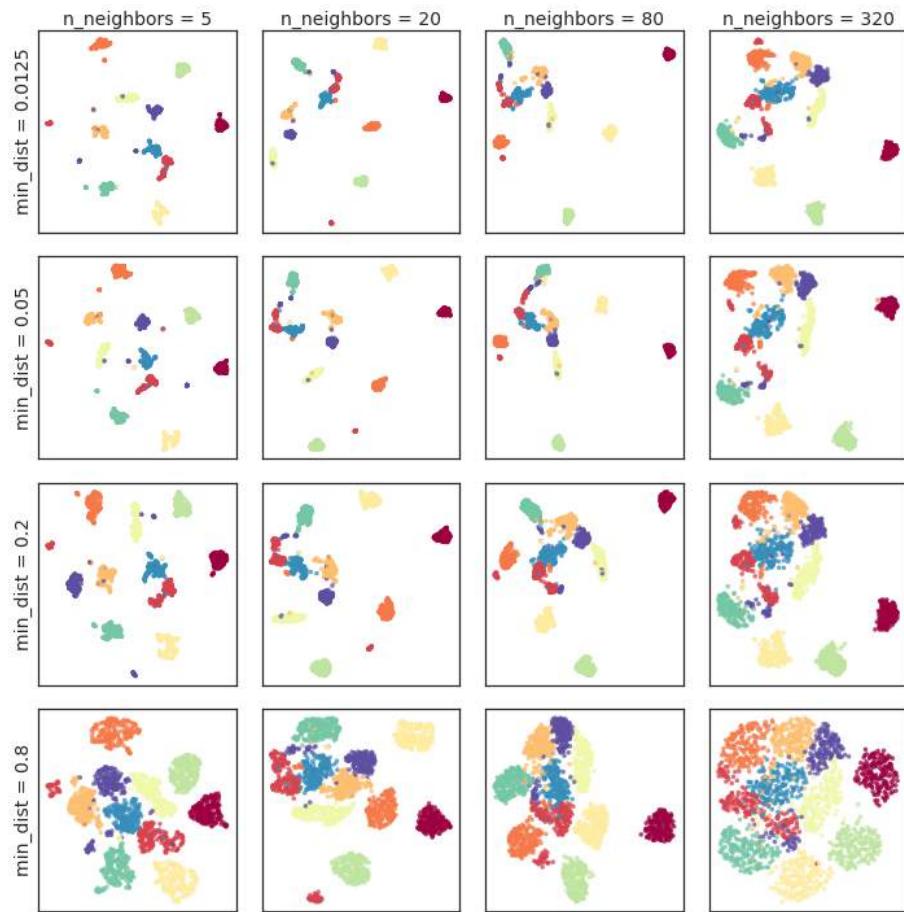


Figure 2: Variation of UMAP hyperparameters n and min-dist result in different embeddings. The data is the PenDigits dataset, where each point is an 8x8 grayscale image of a hand-written digit.

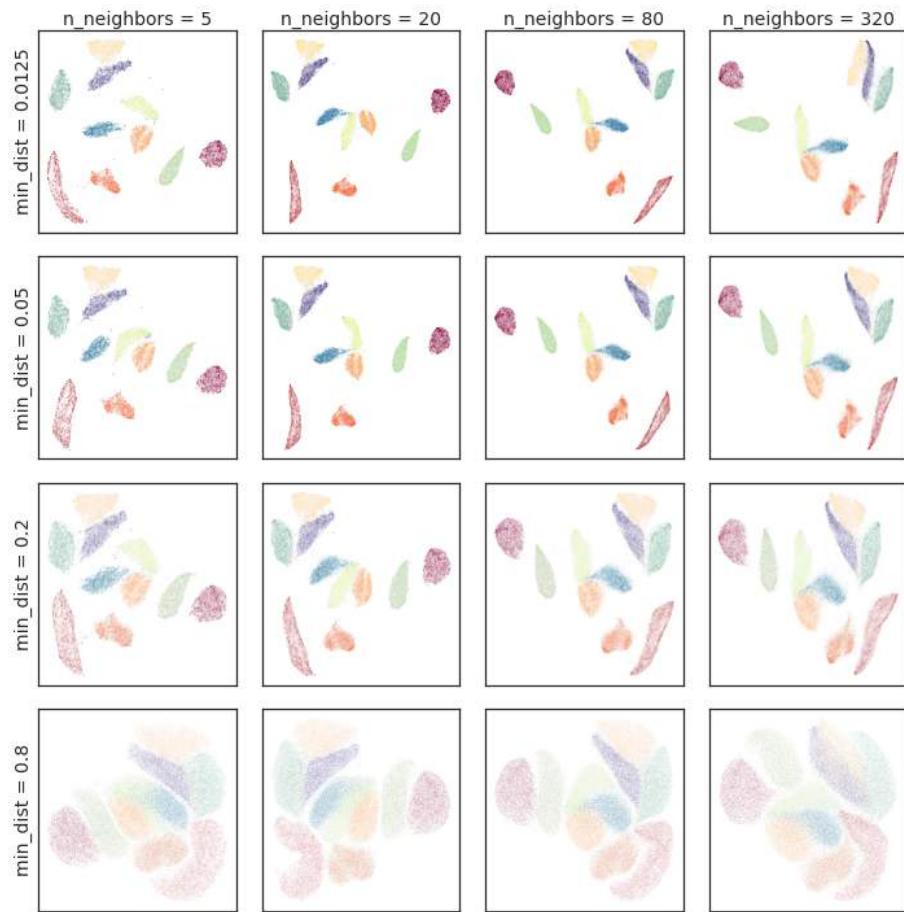


Figure 3: Variation of UMAP hyperparameters n and min-dist result in different embeddings. The data is the MNIST dataset, where each point is an 28x28 grayscale image of a hand-written digit.

The dataset has 58000 points in a 9 dimensional feature space.

MNIST [32] is a dataset of 28x28 pixel grayscale images of handwritten digits. There are 10 digit classes (0 through 9) and 70000 total images. This is treated as 70000 different 784 dimensional vectors.

F-MNIST [63] or Fashion MNIST is a dataset of 28x28 pixel grayscale images of fashion items (clothing, footwear and bags). There are 10 classes and 70000 total images. As with MNIST this is treated as 70000 different 784 dimensional vectors.

Flow cytometry [51, 9] is a dataset of flow cytometry measurements of CDT4 cells comprised of 1,000,000 samples, each with 17 measurements.

GoogleNews word vectors [41] is a dataset of 3 million words and phrases derived from a sample of Google News documents and embedded into a 300 dimensional space via word2vec.

For all the datasets except GoogleNews we use Euclidean distance between vectors. For GoogleNews, as per [41], we use cosine distance (or angular distance in t-SNE which does support non-metric distances, in contrast to UMAP).

5.1 Qualitative Comparison of Multiple Algorithms

We compare a number of algorithms—UMAP, t-SNE [60, 58], LargeVis [54], Laplacian Eigenmaps [7], and Principal Component Analysis [27]—on the COIL20 [43], MNIST [32], Fashion-MNIST [63], and GoogleNews [41] datasets. The Isomap algorithm was also tested, but failed to complete in any reasonable time for any of the datasets larger than COIL20.

The Multicore t-SNE package [57] was used for t-SNE. The reference implementation [53] was used for LargeVis. The scikit-learn [10] implementations were used for Laplacian Eigenmaps and PCA. Where possible we attempted to tune parameters for each algorithm to give good embeddings.

Historically t-SNE and LargeVis have offered a dramatic improvement in finding and preserving local structure in the data. This can be seen qualitatively by comparing their embeddings to those generated by Laplacian Eigenmaps and PCA in Figure 4. We claim that the quality of embeddings produced by UMAP is comparable to t-SNE when reducing to two or three dimensions. For example, Figure 4 shows both UMAP and t-SNE embeddings of the COIL20, MNIST, Fashion MNIST, and Google News datasets. While the precise embeddings are different, UMAP distinguishes the same structures as t-SNE and LargeVis.

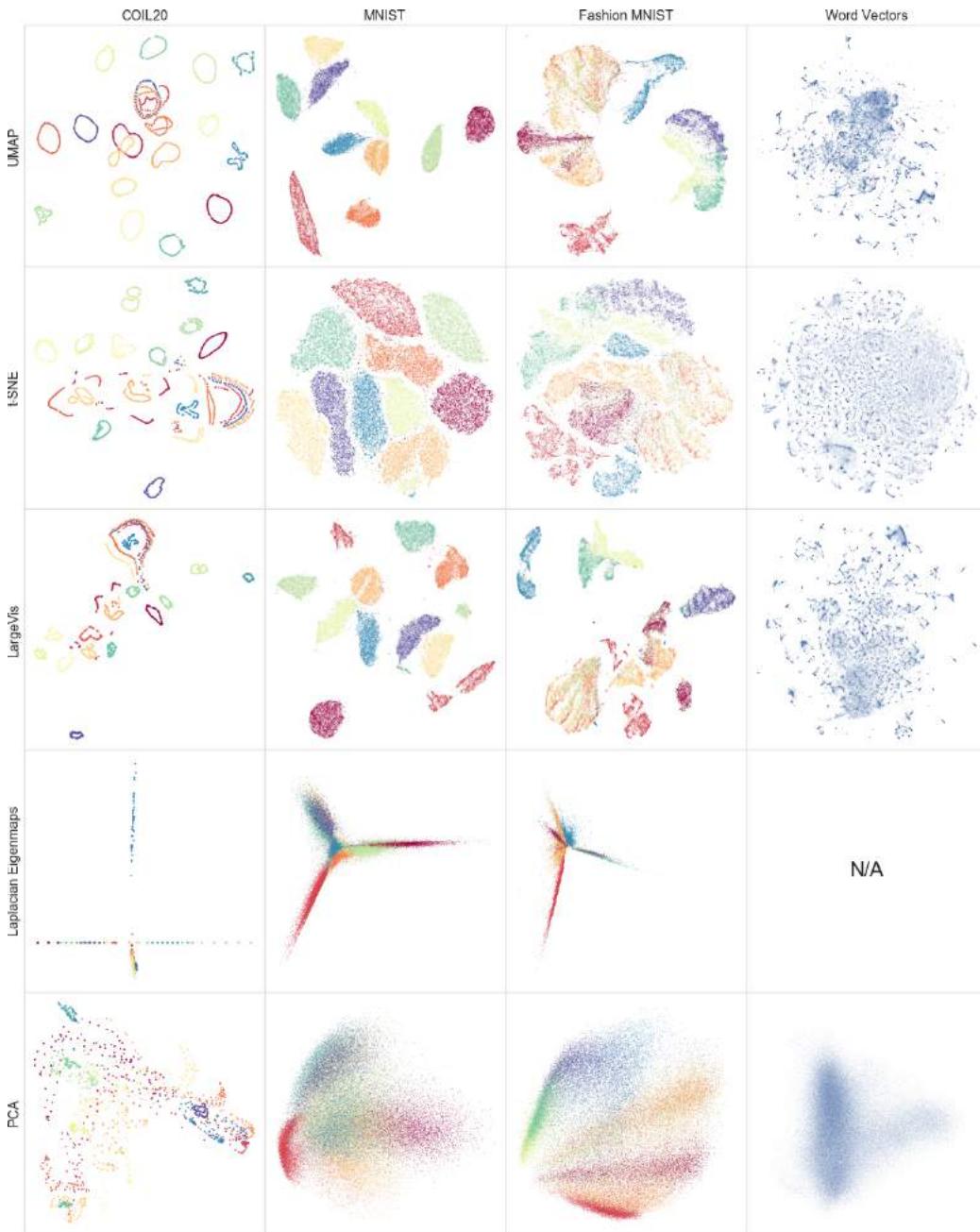


Figure 4: A comparison of several dimension reduction algorithms. We note that UMAP successfully reflects much of the large scale global structure that is well represented by Laplacian Eigenmaps and PCA (particularly for MNIST and Fashion-MNIST), while also preserving the local fine structure similar to t-SNE and LargeVis.

It can be argued that UMAP has captured more of the global and topological structure of the datasets than t-SNE [4] [62]. More of the loops in the COIL20 dataset are kept intact, including the intertwined loops. Similarly the global relationships among different digits in the MNIST digits dataset are more clearly captured with 1 (red) and 0 (dark red) at far corners of the embedding space, and 4,7,9 (yellow, sea-green, and violet) and 3,5,8 (orange, chartreuse, and blue) separated as distinct clumps of similar digits. In the Fashion MNIST dataset the distinction between clothing (dark red, yellow, orange, vermillion) and footwear (chartreuse, sea-green, and violet) is made more clear. Finally, while both t-SNE and UMAP capture groups of similar word vectors, the UMAP embedding arguably evidences a clearer global structure among the various word clusters.

5.2 Quantitative Comparison of Multiple Algorithms

We compare UMAP, t-SNE, LargeVis, Laplacian Eigenmaps and PCA embeddings with respect to the performance of a k -nearest neighbor classifier trained on the embedding space for a variety of datasets. The k -nearest neighbor classifier accuracy provides a clear quantitative measure of how well the embedding has preserved the important local structure of the dataset. By varying the hyper-parameter k used in the training we can also consider how structure preservation varies under transition from purely local to non-local, to more global structure. The embeddings used for training the k NN classifier are for those datasets that come with defined training labels: PenDigits, COIL-20, Shuttle, MNIST, and Fashion-MNIST.

We divide the datasets into two classes: smaller datasets (PenDigits and COIL-20), for which a smaller range of k values makes sense, and larger datasets, for which much larger values of k are reasonable. For each of the small datasets a stratified 10-fold cross-validation was used to derive a set of 10 accuracy scores for each embedding. For the Shuttle dataset a 10-fold cross-validation was used due to constraints imposed by class sizes and the stratified sampling. For MNIST and Fashion-MNIST a 20-fold cross validation was used, producing 20 accuracy scores.

In Table 1 we present the average accuracy across the 10-folds for the PenDigits and COIL-20 datasets. UMAP performs at least as well as t-SNE and LargeVis (given the confidence bounds on the accuracy) for k in the range 10 to 40, but for larger k values of 80 and 160 UMAP has significantly higher accuracy on COIL-20, and shows evidence of higher accuracy on PenDigits. Figure 5 provides swarm plots of the accuracy results across the COIL-20 and PenDigits datasets.

In Table 2 we present the average cross validation accuracy for the Shuttle, MNIST and Fashion-MNIST datasets. UMAP performs at least as well as t-SNE and LargeVis (given the confidence bounds on the accuracy) for k in the range 100 to 400 on the Shuttle and MNIST datasets (but notably underperforms on the Fashion-MNIST dataset), but for larger k values of 800 and 3200 UMAP has significantly higher accuracy on the Shuttle dataset, and shows evidence of higher accuracy on MNIST. For k values of 1600 and 3200 UMAP establishes comparable performance on Fashion-MNIST. Figure 6 provides swarm plots of the accuracy results across the Shuttle and MNIST and Fashion-MNIST datasets.

	k	t-SNE	UMAP	LargeVis	Eigenmaps	PCA
COIL-20	10	0.934 (± 0.115)	0.921 (± 0.075)	0.888 (± 0.092)	0.629 (± 0.153)	0.667 (± 0.179)
	20	0.901 (± 0.133)	0.907 (± 0.064)	0.870 (± 0.125)	0.605 (± 0.185)	0.663 (± 0.196)
	40	0.857 (± 0.125)	0.904 (± 0.056)	0.833 (± 0.106)	0.578 (± 0.159)	0.620 (± 0.230)
	80	0.789 (± 0.118)	0.899 (± 0.058)	0.803 (± 0.100)	0.565 (± 0.119)	0.531 (± 0.294)
	160	0.609 (± 0.067)	0.803 (± 0.138)	0.616 (± 0.066)	0.446 (± 0.110)	0.375 (± 0.111)
PenDigits	10	0.977 (± 0.033)	0.973 (± 0.044)	0.966 (± 0.053)	0.778 (± 0.113)	0.622 (± 0.092)
	20	0.973 (± 0.033)	0.976 (± 0.035)	0.973 (± 0.044)	0.778 (± 0.116)	0.633 (± 0.082)
	40	0.956 (± 0.064)	0.954 (± 0.060)	0.959 (± 0.066)	0.778 (± 0.112)	0.636 (± 0.078)
	80	0.948 (± 0.060)	0.951 (± 0.072)	0.949 (± 0.072)	0.767 (± 0.111)	0.643 (± 0.085)
	160	0.949 (± 0.065)	0.951 (± 0.085)	0.921 (± 0.085)	0.747 (± 0.108)	0.629 (± 0.107)

Table 1: k NN Classifier accuracy for varying values of k over the embedding spaces of COIL-20 and PenDigits datasets. Average accuracy scores are given over a 10-fold cross-validation for each of PCA, Laplacian Eigenmaps, LargeVis, t-SNE and UMAP.

As evidenced by this comparison UMAP provides largely comparable performance in embedding quality to t-SNE and LargeVis at local scales, but performs markedly better than t-SNE or LargeVis at non-local scales. This bears out the visual qualitative assessment provided in Subsection 5.1.

5.3 Embedding Stability

Since UMAP makes use of both stochastic approximate nearest neighbor search, and stochastic gradient descent with negative sampling for optimization, the resulting embedding is necessarily different from run to run, and under sub-sampling of the data. This is potentially a concern for a

	k	t-SNE	UMAP	LargeVis	Eigenmaps	PCA
Shuttle	100	0.994 (± 0.002)	0.993 (± 0.002)	0.992 (± 0.003)	0.962 (± 0.004)	0.833 (± 0.013)
	200	0.992 (± 0.002)	0.990 (± 0.002)	0.987 (± 0.003)	0.957 (± 0.006)	0.821 (± 0.007)
	400	0.990 (± 0.002)	0.988 (± 0.002)	0.976 (± 0.003)	0.949 (± 0.006)	0.815 (± 0.007)
	800	0.969 (± 0.005)	0.988 (± 0.002)	0.957 (± 0.004)	0.942 (± 0.006)	0.804 (± 0.003)
	1600	0.927 (± 0.005)	0.981 (± 0.002)	0.904 (± 0.007)	0.918 (± 0.006)	0.792 (± 0.003)
	3200	0.828 (± 0.004)	0.957 (± 0.005)	0.850 (± 0.008)	0.895 (± 0.006)	0.786 (± 0.001)
MNIST	100	0.967 (± 0.015)	0.967 (± 0.014)	0.962 (± 0.015)	0.668 (± 0.016)	0.462 (± 0.023)
	200	0.966 (± 0.015)	0.967 (± 0.014)	0.962 (± 0.015)	0.667 (± 0.016)	0.467 (± 0.023)
	400	0.964 (± 0.015)	0.967 (± 0.014)	0.961 (± 0.015)	0.664 (± 0.016)	0.468 (± 0.024)
	800	0.963 (± 0.016)	0.967 (± 0.014)	0.961 (± 0.015)	0.660 (± 0.017)	0.468 (± 0.023)
	1600	0.959 (± 0.016)	0.966 (± 0.014)	0.947 (± 0.015)	0.651 (± 0.014)	0.467 (± 0.0233)
	3200	0.946 (± 0.017)	0.964 (± 0.014)	0.920 (± 0.017)	0.639 (± 0.017)	0.459 (± 0.022)
Fashion-MNIST	100	0.818 (± 0.012)	0.790 (± 0.013)	0.808 (± 0.014)	0.631 (± 0.010)	0.564 (± 0.018)
	200	0.810 (± 0.013)	0.785 (± 0.014)	0.805 (± 0.013)	0.624 (± 0.013)	0.565 (± 0.016)
	400	0.801 (± 0.013)	0.780 (± 0.013)	0.796 (± 0.013)	0.612 (± 0.011)	0.564 (± 0.017)
	800	0.784 (± 0.011)	0.767 (± 0.014)	0.771 (± 0.014)	0.600 (± 0.012)	0.560 (± 0.017)
	1600	0.754 (± 0.011)	0.747 (± 0.013)	0.742 (± 0.013)	0.580 (± 0.014)	0.550 (± 0.017)
	3200	0.727 (± 0.011)	0.730 (± 0.011)	0.726 (± 0.012)	0.542 (± 0.014)	0.533 (± 0.017)

Table 2: k NN Classifier accuracy for varying values of k over the embedding spaces of Shuttle, MNIST and Fashion-MNIST datasets. Average accuracy scores are given over a 10-fold or 20-fold cross-validation for each of PCA, Laplacian Eigenmaps, LargeVis, t-SNE and UMAP.

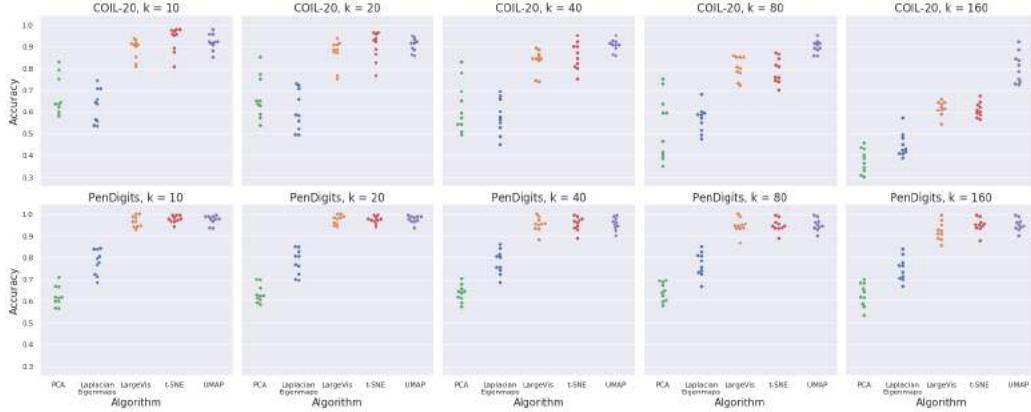


Figure 5: k NN Classifier accuracy for varying values of k over the embedding spaces of COIL-20 and PenDigits datasets. Accuracy scores are given for each fold of a 10-fold cross-validation for each of PCA, Laplacian Eigenmaps, LargeVis, t-SNE and UMAP. We note that UMAP produces competitive accuracy scores to t-SNE and LargeVis for most cases, and outperforms both t-SNE and LargeVis for larger k values on COIL-20.

variety of uses cases, so establishing some measure of how stable UMAP embeddings are, particularly under sub-sampling, is of interest. In this subsection we compare the stability under subsampling of UMAP, LargeVis and t-SNE (the three stochastic dimension reduction techniques considered).

To measure the stability of an embedding we make use of the normalized Procrustes distance to measure the distance between two potentially comparable distributions. Given two datasets $X = \{x_1, \dots, x_N\}$ and $Y = \{y_1, \dots, y_N\}$ such that x_i corresponds to y_i , we can define the Procrustes distance between the datasets $d_P(X, Y)$ in the following manner. Determine $Y' = \{y'_1, \dots, y'_N\}$ the optimal translation, uniform scaling, and rotation of Y that minimizes the squared error $\sum_{i=1}^N (x_i - y'_i)^2$, and define

$$d_P(X, Y) = \sqrt{\sum_{i=1}^N (x_i - y'_i)^2}.$$

Since any measure that makes use of distances in the embedding space is potentially sensitive to the extent or scale of the embedding, we normalize the data before computing the Procrustes distance by dividing by the average norm of the embedded dataset. In Figure 7 we visualize the results of using Procrustes alignment of embedding of sub-samples for both

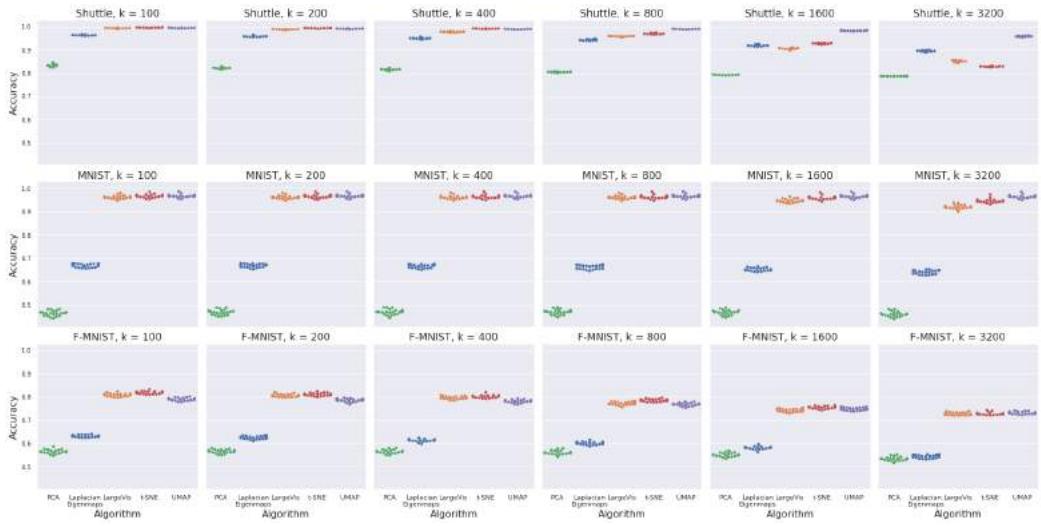


Figure 6: k NN Classifier accuracy for varying values of k over the embedding spaces of Shuttle, MNIST and Fashion-MNIST datasets. Accuracy scores are given for each fold of a 10-fold cross-validation for Shuttle, and 20-fold cross-validation for MNIST and Fashion-MNIST, for each of PCA, Laplacian Eigenmaps, LargeVis, t-SNE and UMAP. UMAP performs better than the other algorithms for large k , particularly on the Shuttle dataset. For Fashion-MNIST UMAP provides slightly poorer accuracy than t-SNE and LargeVis at small scales, but is competitive at larger k values.

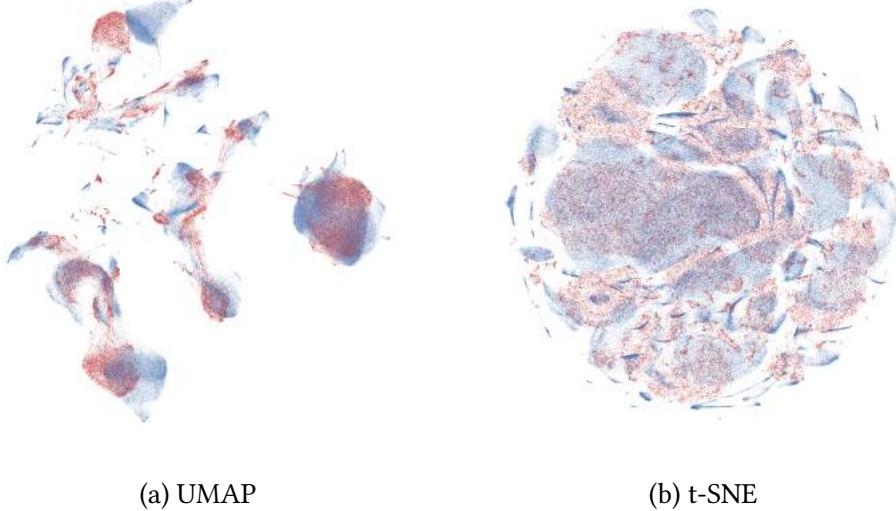


Figure 7: Procrustes based alignment of a 10% subsample (red) against the full dataset (blue) for the flow cytometry dataset for both UMAP and t-SNE.

UMAP and t-SNE, demonstrating how Procrustes distance can measure the stability of the overall structure of the embedding.

Given a measure of distance between different embeddings we can examine stability under sub-sampling by considering the normalized Procrustes distance between the embedding of a sub-sample, and the corresponding sub-sample of an embedding of the full dataset. As the size of the sub-sample increases the average distance per point between the sub-sampled embeddings should decrease, potentially toward some asymptote of maximal agreement under repeated runs. Ideally this asymptotic value would be zero error, but for stochastic embeddings such as UMAP and t-SNE this is not achievable.

We performed an empirical comparison of algorithms with respect to stability using the Flow Cytometry dataset due its large size, interesting structure, and low ambient dimensionality (aiding runtime performance for t-SNE). We note that for a dataset this large we found it necessary to increase the default `n_iter` value for t-SNE from 1000 to 1500 to ensure better convergence. While this had an impact on the runtime, it significantly improved the Procrustes distance results by providing more stable and consistent embeddings. Figure 8 provides a comparison between UMAP and t-SNE, demonstrating that UMAP has significantly more stable results than

t-SNE. In particular, after sub-sampling on 5% of the million data points, the per point error for UMAP was already below any value achieved by t-SNE.

5.4 Computational Performance Comparisons

Benchmarks against the real world datasets were performed on a Macbook Pro with a 3.1 GHz Intel Core i7 and 8GB of RAM for Table 3 and on a server with Intel Xeon E5-2697v4 processors and 512GB of RAM for the large scale benchmarking in Subsections 5.4.1, 5.4.2, and 5.4.3.

For t-SNE we chose MulticoreTSNE [57], which we believe to be the fastest extant implementation of Barnes-Hut t-SNE at this time, even when run in single core mode. It should be noted that MulticoreTSNE is a heavily optimized implementation written in C++ based on Van der Maaten’s bhtsne [58] code.

As a fast alternative approach to t-SNE we also consider the FIt-SNE algorithm [37]. We used the reference implementation [36], which, like MulticoreTNSE is an optimized C++ implementation. We also note that FIt-SNE makes use of multiple cores.

LargeVis [54] was benchmarked using the reference implementation [53]. It was run with default parameters including use of 8 threads on the 4-core machine. The only exceptions were small datasets where we explicitly set the `-samples` parameter to `n_samples/100` as per the recommended values in the documentation of the reference implementation.

The Isomap [55] and Laplacian Eigenmaps [7] implementations in scikit-learn [10] were used. We suspect the Laplacian eigenmaps implementation may not be well optimized for large datasets but did not find a better performing implementation that provided comparable quality results. Isomap failed to complete for the Shuttle, Fashion-MNIST, MNIST and Google-News datasets, while Laplacian Eigenmaps failed to run for the Google-News dataset.

To allow a broader range of algorithms to run some of the datasets where subsampled or had their dimension reduced by PCA. The Flow Cytometry dataset was benchmarked on a 10% sample and the GoogleNews was subsampled down to 200,000 data points. Finally, the Mouse scRNA dataset was reduced to 1,000 dimensions via PCA.

Timing were performed for the COIL20 [43], COIL100 [44], Shuttle [35], MNIST [32], Fashion-MNIST [63], and GoogleNews [41] datasets. Results can be seen in Table 3. UMAP consistently performs faster than any of the other algorithms aside from on the very small Pendigits dataset, where Laplacian Eigenmaps and Isomap have a small edge.

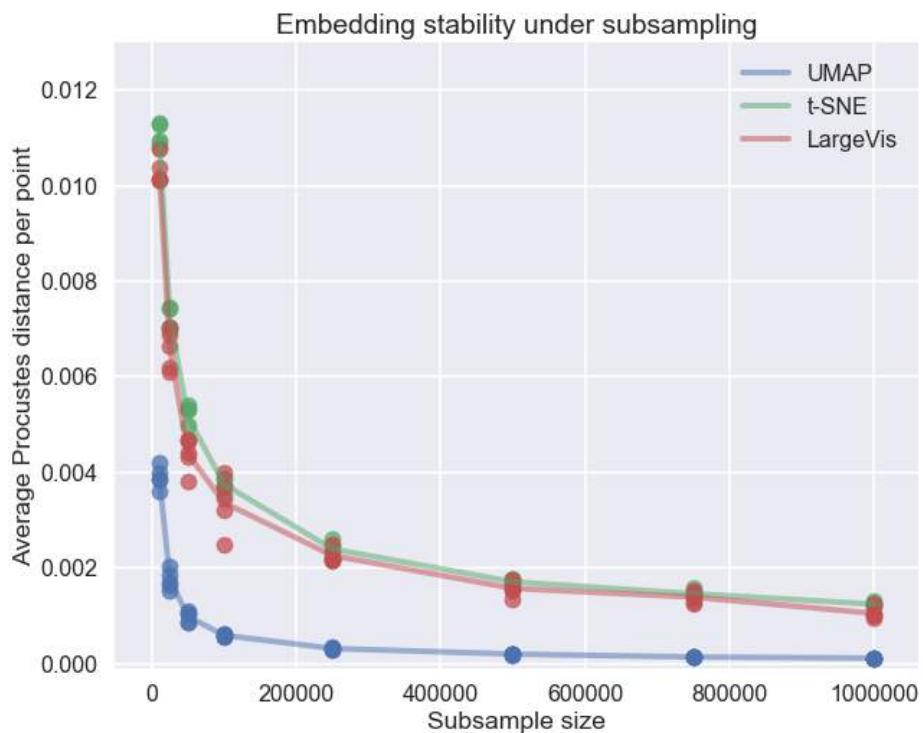


Figure 8: Comparison of average Procrustes distance per point for t-SNE, LargeVis and UMAP over a variety of sizes of subsamples from the full Flow Cytometry dataset. UMAP sub-sample embeddings are very close to the full embedding even for subsamples of 5% of the full dataset, outperforming the results of t-SNE and LargeVis even when they use the full Flow Cytometry dataset.

	UMAP	FLt-SNE	t-SNE	LargeVis	Eigenmaps	Isomap
Pen Digits (1797x64)	9s	48s	17s	20s	2s	2s
COIL20 (1440x16384)	12s	75s	22s	82s	47s	58s
COIL100 (7200x49152)	85s	2681s	810s	3197s	3268s	3210s
scRNA (21086x1000)	28s	131s	258s	377s	470s	923s
Shuttle (58000x9)	94s	108s	714s	615s	133s	–
MNIST (70000x784)	87s	292s	1450s	1298s	40709s	–
F-MNIST (70000x784)	65s	278s	934s	1173s	6356s	–
Flow (100000x17)	102s	164s	1135s	1127s	30654s	–
Google News (200000x300)	361s	652s	16906s	5392s	–	–

Table 3: Runtime of several dimension reduction algorithms on various datasets. To allow a broader range of algorithms to run some of the datasets where subsampled or had their dimension reduced by PCA. The Flow Cytometry dataset was benchmarked on a 10% sample and the GoogleNews was subsampled down to 200,000 data points. Finally, the Mouse scRNA dataset was reduced to 1,000 dimensions via PCA. The fastest runtime for each dataset has been bolded.

5.4.1 Scaling with Embedding Dimension

UMAP is significantly more performant than t-SNE⁴ when embedding into dimensions larger than 2. This is particularly important when the intention is to use the low dimensional representation for further machine learning tasks such as clustering or anomaly detection rather than merely for visualization. The computation performance of UMAP is far more efficient than t-SNE, even for very small embedding dimensions of 6 or 8 (see Figure 9). This is largely due to the fact that UMAP does not require global normalisation (since it represents data as a fuzzy topological structure rather than as a probability distribution). This allows the algorithm to work without the need for space trees —such as the quad-trees and oct-trees that t-SNE uses [58]—. Such space trees scale exponentially in dimension, resulting in t-SNE’s relatively poor scaling with respect to embedding dimension. By contrast, we see that UMAP consistently scales well in embedding dimension, making the algorithm practical for a wider range of applications beyond visualization.

5.4.2 Scaling with Ambient Dimension

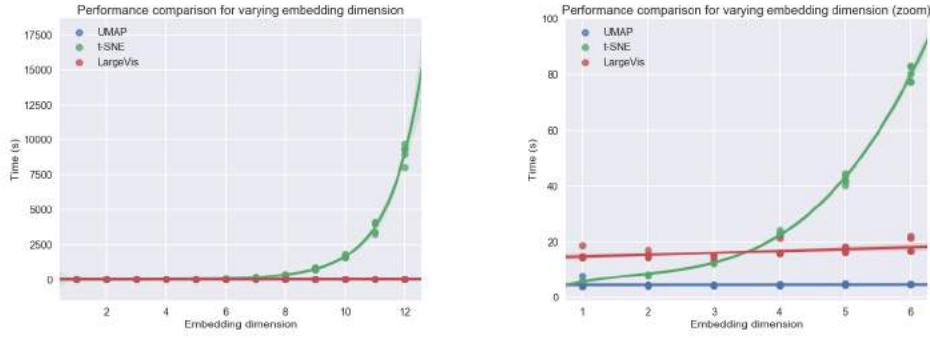
Through a combination of the local-connectivity constraint and the approximate nearest neighbor search, UMAP can perform effective dimension reduction even for very high dimensional data (see Figure 13 for an example of UMAP operating directly on 1.8 million dimensional data). This stands in contrast to many other manifold learning techniques, including t-SNE and LargeVis, for which it is generally recommended to reduce the dimension with PCA before applying these techniques (see [59] for example).

To compare runtime performance scaling with respect to the ambient dimension of the data we chose to use the Mouse scRNA dataset, which is high dimensional, but is also amenable to the use of PCA to reduce the dimension of the data as a pre-processing step without losing too much of the important structure⁵. We compare the performance of UMAP, FIt-SNE, MulticoreTSNE, and LargeVis on PCA reductions of the Mouse scRNA dataset to varying dimensionalities, and on the original dataset, in Figure 10.

While all the implementations tested show a significant increase in runtime with increasing dimension, UMAP is dramatically more efficient for

⁴Comparisons were performed against MulticoreTSNE as the current implementation of FIt-SNE does not support embedding into any dimension larger than 2.

⁵In contrast to COIL100, on which PCA destroys much of the manifold structure



(a) A comparison of run time for UMAP, t-SNE and LargeVis with respect to embedding dimension on the Pen digits dataset. We see that t-SNE scales worse than exponentially while UMAP and LargeVis scale linearly with a slope so slight to be undetectable at this scale.

(b) Detail of scaling for embedding dimension of six or less. We can see that UMAP and LargeVis are essentially flat. In practice they appear to scale linearly, but the slope is essentially undetectable at this scale.

Figure 9: Scaling performance with respect to embedding dimension of UMAP, t-SNE and LargeVis on the Pen digits dataset.

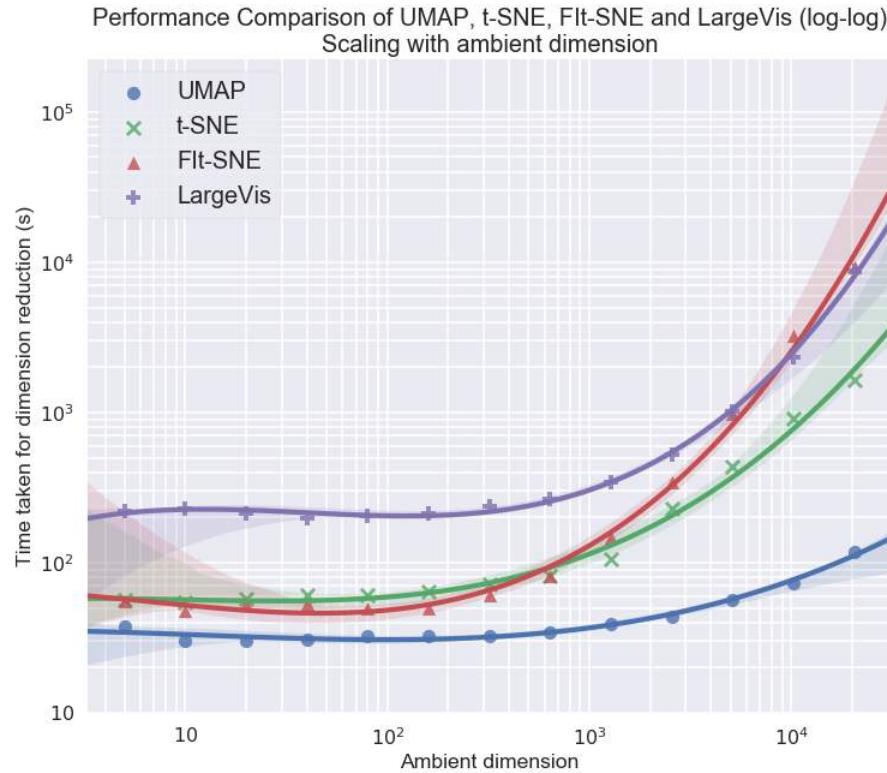


Figure 10: Runtime performance scaling of UMAP, t-SNE, FIt-SNE and Largevis with respect to the ambient dimension of the data. As the ambient dimension increases beyond a few thousand dimensions the computational cost of t-SNE, FIt-SNE, and LargeVis all increase dramatically, while UMAP continues to perform well into the tens-of-thousands of dimensions.

large ambient dimensions, easily scaling to run on the original unreduced dataset. The ability to run manifold learning on raw source data, rather than dimension reduced data that may have lost important manifold structure in the pre-processing, is a significant advantage. This advantage comes from the local connectivity assumption which ensures good topological representation of high dimensional data, particularly with smaller numbers of near neighbors, and the efficiency of the NN-Descent algorithm for approximate nearest neighbor search even in high dimensions.

Since UMAP scales well with ambient dimension the python implementation also supports input in sparse matrix format, allowing scaling to extremely high dimensional data, such as the integer data shown in Figures 13 and 14

5.4.3 Scaling with the Number of Samples

For dataset size performance comparisons we chose to compare UMAP with FIt-SNE [37], a version of t-SNE that uses approximate nearest neighbor search and a Fourier interpolation optimisation approach; MulticoreTSNE [57], which we believe to be the fastest extant implementation of Barnes-Hut t-SNE; and LargeVis [54]. It should be noted that FIt-SNE, MulticoreTSNE, and LargeVis are all heavily optimized implementations written in C++. In contrast our UMAP implementation was written in Python – making use of the numba [31] library for performance. MulticoreTSNE and LargeVis were run in single threaded mode to make fair comparisons to our single threaded UMAP implementation.

We benchmarked all four implementations using subsamples of the Google-News dataset. The results can be seen in Figure 11. This demonstrates that UMAP has superior scaling performance in comparison to Barnes-Hut t-SNE, even when Barnes-Hut t-SNE is given multiple cores. Asymptotic scaling of UMAP is comparable to that of FIt-SNE (and LargeVis). On this dataset UMAP demonstrated somewhat faster absolute performance compared to FIt-SNE, and was dramatically faster than LargeVis.

The UMAP embedding of the full GoogleNews dataset of 3 million word vectors, as seen in Figure 12 was completed in around 200 minutes, as compared with several days required for MulticoreTSNE, even using multiple cores.

To scale even further we were inspired by the work of John Williamson on embedding integers [61], as represented by (sparse) binary vectors of their prime divisibility. This allows the generation of arbitrarily large, extremely high dimension datasets that still have meaningful structure to be

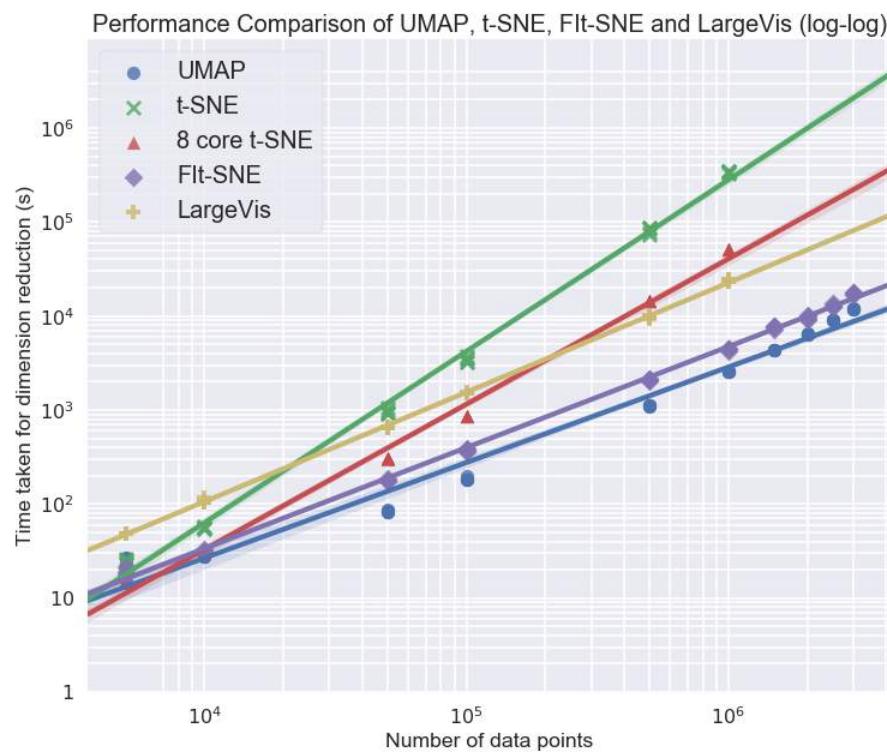


Figure 11: Runtime performance scaling of t-SNE and UMAP on various sized sub-samples of the full Google News dataset. The lower t-SNE line is the wall clock runtime for Multicore t-SNE using 8 cores.



Figure 12: Visualization of the full 3 million word vectors from the GoogleNews dataset as embedded by UMAP.

explored. In Figures 13 and 14 we show an embedding of 30,000,000 data samples from an ambient space of approximately 1.8 million dimensions. This computation took approximately 2 weeks on a large memory SMP. Note that despite the high ambient dimension, and vast amount of data, UMAP is still able to find and display interesting structure. In Figure 15 we show local regions of the embedding, demonstrating the fine detail structure that was captured.

6 Weaknesses

While we believe UMAP to be a very effective algorithm for both visualization and dimension reduction, most algorithms must make trade-offs and UMAP is no exception. In this section we will briefly discuss those areas or use cases where UMAP is less effective, and suggest potential alternatives.

For a number of use cases the interpretability of the reduced dimension results is of critical importance. Similarly to most non-linear dimension reduction techniques (including t-SNE and Isomap), UMAP lacks the strong interpretability of Principal Component Analysis (PCA) and related techniques such as Non-Negative Matrix Factorization (NMF). In particular the dimensions of the UMAP embedding space have no specific meaning, unlike PCA where the dimensions are the directions of greatest variance in the source data. Furthermore, since UMAP is based on the distance between observations rather than the source features, it does not have an equivalent of factor loadings that linear techniques such as PCA, or Factor Analysis can provide. If strong interpretability is critical we therefore recommend linear techniques such as PCA, NMF or pLSA.

One of the core assumptions of UMAP is that there exists manifold structure in the data. Because of this UMAP can tend to find manifold structure within the noise of a dataset – similar to the way the human mind finds structured constellations among the stars. As more data is sampled the amount of structure evident from noise will tend to decrease and UMAP becomes more robust, however care must be taken with small sample sizes of noisy data, or data with only large scale manifold structure. Detecting when a spurious embedding has occurred is a topic of further research.

UMAP is derived from the axiom that local distance is of more importance than long range distances (similar to techniques like t-SNE and LargeVis). UMAP therefore concerns itself primarily with accurately representing local structure. While we believe that UMAP can capture more global structure than these other techniques, it remains true that if global

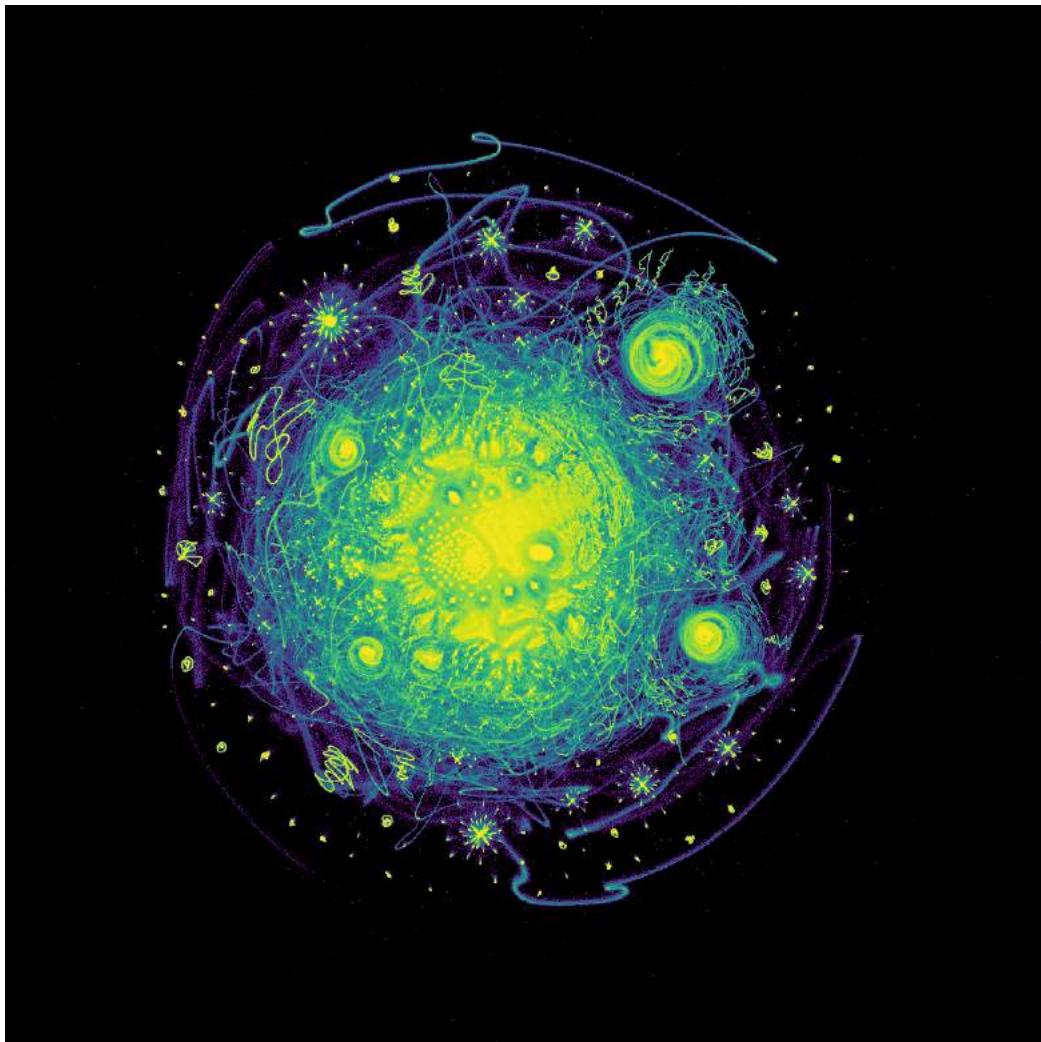


Figure 13: Visualization of 30,000,000 integers as represented by binary vectors of prime divisibility, colored by density of points.

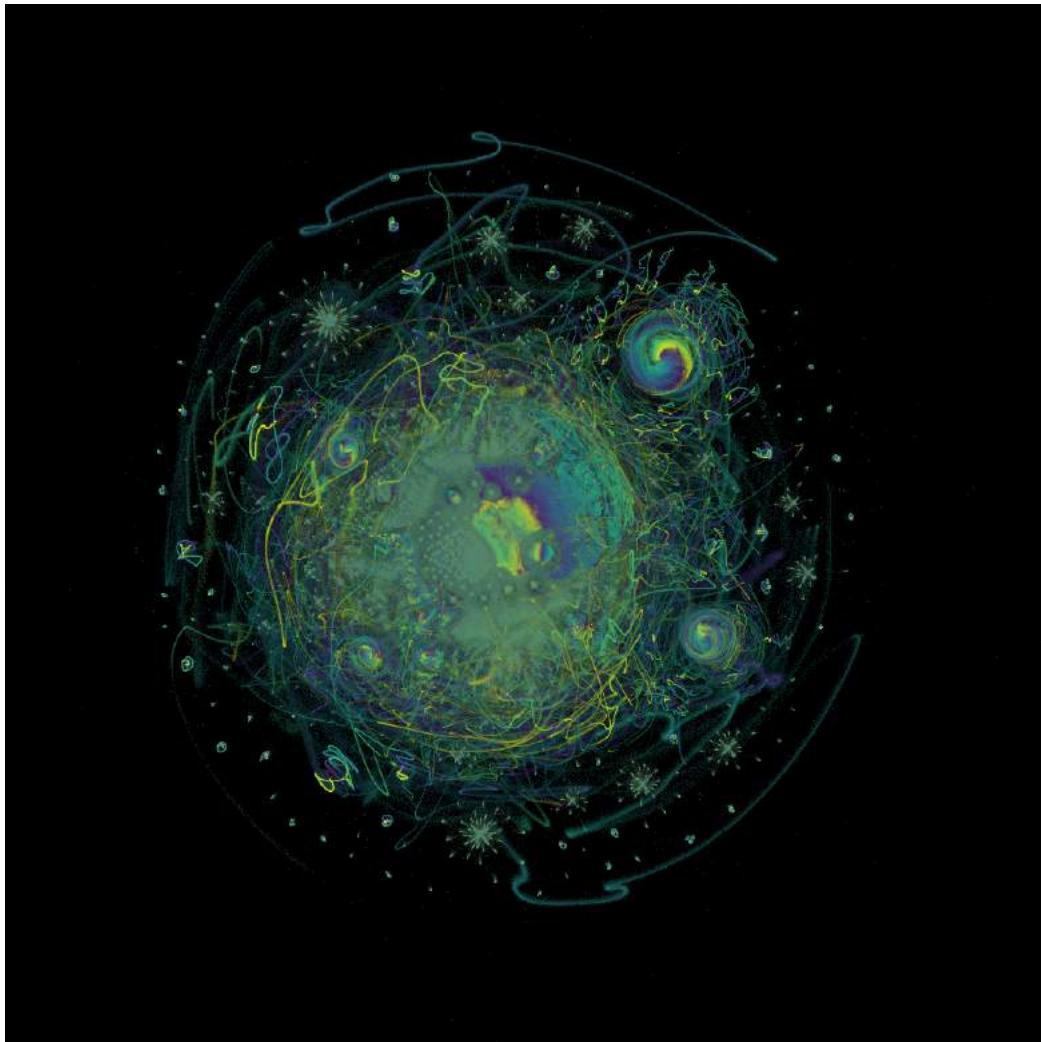
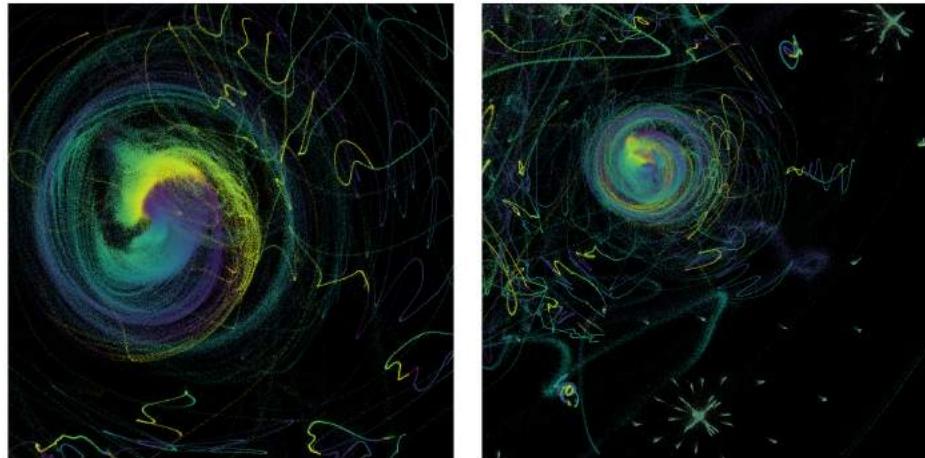
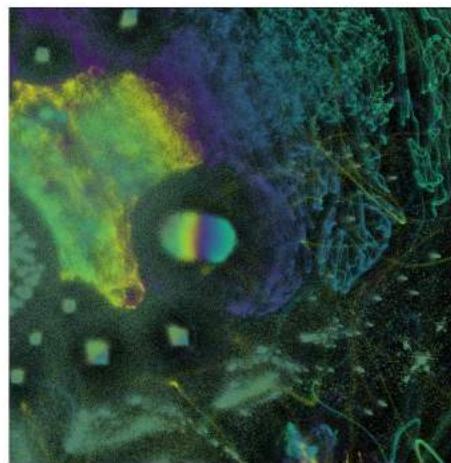


Figure 14: Visualization of 30,000,000 integers as represented by binary vectors of prime divisibility, colored by integer value of the point (larger values are green or yellow, smaller values are blue or purple).



(a) Upper right spiral

(b) Lower right spiral and starbursts



(c) Central cloud

Figure 15: Zooming in on various regions of the integer embedding reveals further layers of fine structure have been preserved.

structure is of primary interest then UMAP may not be the best choice for dimension reduction. Multi-dimensional scaling specifically seeks to preserve the full distance matrix of the data, and as such is a good candidate when all scales of structure are of equal importance. PHATE [42] is a good example of a hybrid approach that begins with local structure information and makes use of MDS to attempt to preserve long scale distances as well. It should be noted that these techniques are more computationally intensive and thus rely on landmarking approaches for scalability.

It should also be noted that a significant contributor to UMAP's relative global structure preservation is derived from the Laplacian Eigenmaps initialization (which, in turn, followed from the theoretical foundations). This was noted in, for example, [29]. The authors of that paper demonstrate that t-SNE, with similar initialization, can perform equivalently to UMAP in a particular measure of global structure preservation. However, the objective function derived for UMAP (cross-entropy) is significantly different from that of t-SNE (KL-divergence), in how it penalizes failures to preserve non-local and global structure, and is also a significant contributor⁶.

It is worth noting that, in combining the local simplicial set structures, pure nearest neighbor structure in the high dimensional space is not explicitly preserved. In particular it introduces so called "reverse-nearest-neighbors" into the classical knn-graph. This, combined with the fact that UMAP is preserving topology rather than pure metric structures, mean that UMAP will not perform as well as some methods on quality measures based on metric structure preservation – particularly methods, such as MDS – which are explicitly designed to optimize metric structure preservation.

UMAP attempts to discover a manifold on which your data is uniformly distributed. If you have strong confidence in the ambient distances of your data you should make use of a technique that explicitly attempts to preserve these distances. For example if your data consisted of a very loose structure in one area of your ambient space and a very dense structure in another region UMAP would attempt to put these local areas on an even footing.

Finally, to improve the computational efficiency of the algorithm a number of approximations are made. This can have an impact on the results of UMAP for small (less than 500 samples) dataset sizes. In particular the use of approximate nearest neighbor algorithms, and the negative sampling used in optimization, can result in suboptimal embeddings. For this reason

⁶The authors would like to thank Nikolay Oskolkov for his article ([tSNE vs. UMAP: Global Structure](#)) which does an excellent job of highlighting these aspects from an empirical and theoretical basis.

we encourage users to take care with particularly small datasets. A slower but exact implementation of UMAP for small datasets is a future project.

7 Future Work

Having established both relevant mathematical theory and a concrete implementation, there still remains significant scope for future developments of UMAP.

A comprehensive empirical study which examines the impact of the various algorithmic components, choices, and hyper-parameters of the algorithm would be beneficial. While the structure and choices of the algorithm presented were derived from our foundational mathematical framework, examining the impacts that these choices have on practical results would be enlightening and a significant contribution to the literature.

As noted in the weaknesses section there is a great deal of uncertainty surrounding the preservation of global structure among the field of manifold learning algorithms. In particular this is hampered by the lack clear objective measures, or even definitions, of global structure preservation. While some metrics exist, they are not comprehensive, and are often specific to various downstream tasks. A systematic study of both metrics of non-local and global structure preservation, and performance of various manifold learning algorithms with respect to them, would be of great benefit. We believe this would aid in better understanding UMAP’s success in various downstream tasks.

Making use of the fuzzy simplicial set representation of data UMAP can potentially be extended to support (semi-)supervised dimension reduction, and dimension reduction for datasets with heterogeneous data types. Each data type (or prediction variables in the supervised case) can be seen as an alternative view of the underlying structure, each with a different associated metric – for example categorical data may use Jaccard or Dice distance, while ordinal data might use Manhattan distance. Each view and metric can be used to independently generate fuzzy simplicial sets, which can then be intersected together to create a single fuzzy simplicial set for embedding. Extending UMAP to work with mixed data types would vastly increase the range of datasets to which it can be applied. Use cases for (semi-)supervised dimension reduction include semi-supervised clustering, and interactive labelling tools.

The computational framework established for UMAP allows for the potential development of techniques to add new unseen data points into an

existing embedding, and to generate high dimensional representations of arbitrary points in the embedded space. Furthermore, the combination of supervision and the addition of new samples to an existing embedding provides avenues for metric learning. The addition of new samples to an existing embedding would allow UMAP to be used as a feature engineering tool as part of a general machine learning pipeline for either clustering or classification tasks. Pulling points back to the original high dimensional space from the embedded space would potentially allow UMAP to be used as a generative model similar to some use cases for autoencoders. Finally, there are many use cases for metric learning; see [64] or [8] for example.

There also remains significant scope to develop techniques to both detect and mitigate against potentially spurious embeddings, particularly for small data cases. The addition of such techniques would make UMAP far more robust as a tool for exploratory data analysis, a common use case when reducing to two dimensions for visualization purposes.

Experimental versions of some of this work are already available in the referenced implementations.

8 Conclusions

We have developed a general purpose dimension reduction technique that is grounded in strong mathematical foundations. The algorithm implementing this technique is demonstrably faster than t-SNE and provides better scaling. This allows us to generate high quality embeddings of larger data sets than had previously been attainable. The use and effectiveness of UMAP in various scientific fields demonstrates the strength of the algorithm.

Acknowledgements The authors would like to thank Colin Weir, Rick Jardine, Brendan Fong, David Spivak and Dmitry Kobak for discussion and useful commentary on various drafts of this paper.

A Proof of Lemma 1

Lemma 1. *Let (\mathcal{M}, g) be a Riemannian manifold in an ambient \mathbb{R}^n , and let $p \in M$ be a point. If g is locally constant about p in an open neighbourhood U such that g is a constant diagonal matrix in ambient coordinates, then in a ball $B \subseteq U$ centered at p with volume $\frac{\pi^{n/2}}{\Gamma(n/2+1)}$ with respect to g , the geodesic*

distance from p to any point $q \in B$ is $\frac{1}{r}d_{\mathbb{R}^n}(p, q)$, where r is the radius of the ball in the ambient space and $d_{\mathbb{R}^n}$ is the existing metric on the ambient space.

Proof. Let x^1, \dots, x^n be the coordinate system for the ambient space. A ball B in \mathcal{M} under Riemannian metric g has volume given by

$$\int_B \sqrt{\det(g)} dx^1 \wedge \cdots \wedge dx^n.$$

If B is contained in U , then g is constant in B and hence $\sqrt{\det(g)}$ is constant and can be brought outside the integral. Thus, the volume of B is

$$\sqrt{\det(g)} \int_B dx^1 \wedge \cdots \wedge dx^n = \sqrt{\det(g)} \frac{\pi^{n/2} r^n}{\Gamma(n/2 + 1)},$$

where r is the radius of the ball in the ambient \mathbb{R}^n . If we fix the volume of the ball to be $\frac{\pi^{n/2}}{\Gamma(n/2 + 1)}$ we arrive at the requirement that

$$\det(g) = \frac{1}{r^{2n}}.$$

Now, since g is assumed to be diagonal with constant entries we can solve for g itself as

$$g_{ij} = \begin{cases} \frac{1}{r^2} & \text{if } i = j, \\ 0 & \text{otherwise} \end{cases}. \quad (2)$$

The geodesic distance on \mathcal{M} under g from p to q (where $p, q \in B$) is defined as

$$\inf_{c \in C} \int_a^b \sqrt{g(\dot{c}(t), \dot{c}(t))} dt,$$

where C is the class of smooth curves c on \mathcal{M} such that $c(a) = p$ and $c(b) = q$, and \dot{c} denotes the first derivative of c on \mathcal{M} . Given that g is as defined in (2) we see that this can be simplified to

$$\begin{aligned} & \frac{1}{r} \inf_{c \in C} \int_a^b \langle \sqrt{g(\dot{c}(t), \dot{c}(t))}, \dot{c}(t) \rangle dt \\ &= \frac{1}{r} \inf_{c \in C} \int_a^b \langle \|\dot{c}(t)\|, \dot{c}(t) \rangle dt \\ &= \frac{1}{r} d_{\mathbb{R}^n}(p, q). \end{aligned} \quad (3)$$

□

B Proof that FinReal and FinSing are adjoint

Theorem 2. *The functors $\text{FinReal} : \text{Fin-sFuzz} \rightarrow \text{FinEPMet}$ and $\text{FinSing} : \text{FinEPMet} \rightarrow \text{Fin-sFuzz}$ form an adjunction with FinReal the left adjoint and FinSing the right adjoint.*

Proof. The adjunction is evident by construction, but can be made more explicit as follows. Define a functor $F : \Delta \times I \rightarrow \text{FinEPMet}$ by

$$F([n], [0, a)) = (\{x_1, x_2, \dots, x_n\}, d_a),$$

where

$$d_a(x_i, x_j) = \begin{cases} -\log(a) & \text{if } i \neq j, \\ 0 & \text{otherwise} \end{cases}.$$

Now FinSing can be defined in terms of F as

$$\text{FinSing}(Y) : ([n], [0, a)) \mapsto \hom_{\text{FinEPMet}}(F([n], [0, a)), Y).$$

where the face maps d_i are given by pre-composition with Fd^i , and similarly for degeneracy maps, at any given value of a . Furthermore post-composition with F level-wise for each a defines maps of fuzzy simplicial sets making FinSing a functor.

We now construct FinReal as the left Kan extension of F along the Yoneda embedding:

$$\begin{array}{ccc} & \text{Fin-sFuzz} & \\ & \nearrow y & \searrow \text{FinReal} \\ \Delta \times I & \xrightarrow{F} & \text{FinEPMet} \end{array}$$

Explicitly this results in a definition of FinReal at a fuzzy simplicial set X as a colimit:

$$\text{FinReal}(X) = \underset{y([n], [0, a)) \rightarrow X}{\text{colim}} F([n]).$$

Further, it follows from the Yoneda lemma that $\text{FinReal}(\Delta_{<a}^n) \cong F([n], [0, a))$, and hence this definition as a left Kan extension agrees with Definition 7, and the definition of FinSing above agrees with that of Definition 8. To see that FinReal and FinSing are adjoint we note that

$$\begin{aligned} \hom_{\text{Fin-sFuzz}}(\Delta_{<a}^n, \text{FinSing}(Y)) &\cong \text{FinSing}(Y)_{<a}^n \\ &= \hom_{\text{FinEPMet}}(F([n], [0, a)), Y) \\ &\cong \hom_{\text{FinEPMet}}(\text{FinReal}(\Delta_{<a}^n), Y)). \end{aligned} \tag{4}$$

The first isomorphism follows from the Yoneda lemma, the equality is by construction, and the final isomorphism follows by another application of the Yoneda lemma. Since every simplicial set can be canonically expressed as a colimit of standard simplices and FinReal commutes with colimits (as it was defined via a colimit formula), it follows that FinReal is completely determined by its image on standard simplices. As a result the isomorphism of equation (4) extends to the required isomorphism demonstrating the adjunction. \square

C From t-SNE to UMAP

As an aid to implementation of UMAP and to illuminate the algorithmic similarities with t-SNE and LargeVis, here we review the main equations used in those methods, and then present the equivalent UMAP expressions in a notation which may be more familiar to users of those other methods.

In what follows we are concerned with defining similarities between two objects i and j in the high dimensional input space X and low dimensional embedded space Y . These are normalized and symmetrized in various ways. In a typical implementation, these pair-wise quantities are stored and manipulated as (potentially sparse) matrices. Quantities with the subscript ij are symmetric, i.e. $v_{ij} = v_{ji}$. Extending the conditional probability notation used in t-SNE, $j \mid i$ indicates an asymmetric similarity, i.e. $v_{j|i} \neq v_{i|j}$.

t-SNE defines input probabilities in three stages. First, for each pair of points, i and j , in X , a pair-wise similarity, v_{ij} , is calculated, Gaussian with respect to the Euclidean distance between x_i and x_j :

$$v_{j|i} = \exp(-\|x_i - x_j\|_2^2 / 2\sigma_i^2) \quad (5)$$

where σ_i^2 is the variance of the Gaussian.

Second, the similarities are converted into N conditional probability distributions by normalization:

$$p_{j|i} = \frac{v_{j|i}}{\sum_{k \neq i} v_{k|i}} \quad (6)$$

σ_i is chosen by searching for a value such that the perplexity of the probability distribution $p_{\cdot|i}$ matches a user-specified value.

Third, these probability distributions are symmetrized and then further normalized over the entire matrix of values to give a joint probability distribution:

$$p_{ij} = \frac{p_{j|i} + p_{i|j}}{2N} \quad (7)$$

We note that this is a heuristic definition and not in accordance with standard relationship between conditional and joint probabilities that would be expected under probability semantics usually used to describe t-SNE.

Similarities between pairs of points in the output space Y are defined using a Student t-distribution with one degree of freedom on the squared Euclidean distance:

$$w_{ij} = \left(1 + \|y_i - y_j\|_2^2\right)^{-1} \quad (8)$$

followed by the matrix-wise normalization, to form q_{ij} :

$$q_{ij} = \frac{w_{ij}}{\sum_{k \neq l} w_{kl}} \quad (9)$$

The t-SNE cost is the Kullback-Leibler divergence between the two probability distributions:

$$C_{t-SNE} = \sum_{i \neq j} p_{ij} \log \frac{p_{ij}}{q_{ij}} \quad (10)$$

this can be expanded into constant and non-constant contributions:

$$C_{t-SNE} = \sum_{i \neq j} p_{ij} \log p_{ij} - p_{ij} \log q_{ij} \quad (11)$$

Because both p_{ij} and q_{ij} require calculations over all pairs of points, improving the efficiency of t-SNE algorithms has involved separate strategies for approximating these quantities. Similarities in the high dimensions are effectively zero outside of the nearest neighbors of each point due to the calibration of the $p_{j|i}$ values to reproduce a desired perplexity. Therefore an approximation used in Barnes-Hut t-SNE is to only calculate $v_{j|i}$ for n nearest neighbors of i , where n is a multiple of the user-selected perplexity and to assume $v_{j|i} = 0$ for all other j . Because the low dimensional coordinates change with each iteration, a different approach is used to approximate q_{ij} . In Barnes-Hut t-SNE and related methods this usually involves grouping together points whose contributions can be approximated as a single point.

A further heuristic algorithm optimization technique employed by t-SNE implementations is the use of *early exaggeration* where, for some number of initial iterations, the p_{ij} are multiplied by some constant greater than

1.0 (usually 12.0). In theoretical analyses of t-SNE such as [38] results are obtained only under an *early exaggeration* regimen with either large constant (of order of the number of samples), or in the limit of infinite exaggeration. Further papers such as [37], and [28], suggest the option of using exaggeration for all iterations rather than just early ones, and demonstrate the utility of this. The effectiveness of these analyses and practical approaches suggests that KL-divergence as a measure between *probability distributions* is not what makes the t-SNE algorithm work, since, under exaggeration, the p_{ij} are manifestly not a probability distribution. This is another example of the probability semantics used to describe t-SNE are primarily descriptive rather than foundational. None the less, t-SNE is highly effective and clearly produces useful results on a very wide variety of tasks.

LargeVis uses a similar approach to Barnes-Hut t-SNE when approximating p_{ij} , but further improves efficiency by only requiring approximate nearest neighbors for each point. For the low dimensional coordinates, it abandons normalization of w_{ij} entirely. Rather than use the Kullback-Leibler divergence, it optimizes a likelihood function, and hence is maximized, not minimized:

$$C_{LV} = \sum_{i \neq j} p_{ij} \log w_{ij} + \gamma \sum_{i \neq j} \log (1 - w_{ij}) \quad (12)$$

p_{ij} and w_{ij} are defined as in Barnes-Hut t-SNE (apart from the use of approximate nearest neighbors for p_{ij} , and the fact that, in implementation, LargeVis does not normalize the p_{ij} by N) and γ is a user-chosen positive constant which weights the strength of the repulsive contributions (second term) relative to the attractive contribution (first term). Note also that the first term resembles the optimizable part of the Kullback-Leibler divergence but using w_{ij} instead of q_{ij} . Abandoning calculation of q_{ij} is a crucial change, because the LargeVis cost function is amenable to optimization via stochastic gradient descent.

Ignoring specific definitions of v_{ij} and w_{ij} , the UMAP cost function, the cross entropy, is:

$$C_{UMAP} = \sum_{i \neq j} v_{ij} \log \left(\frac{v_{ij}}{w_{ij}} \right) + (1 - v_{ij}) \log \left(\frac{1 - v_{ij}}{1 - w_{ij}} \right) \quad (13)$$

Like the Kullback-Leibler divergence, this can be arranged into two constant contributions (those containing v_{ij} only) and two optimizable contributions (containing w_{ij}):

$$C_{UMAP} = \sum_{i \neq j} v_{ij} \log v_{ij} + (1 - v_{ij}) \log (1 - v_{ij}) - v_{ij} \log w_{ij} - (1 - v_{ij}) \log (1 - w_{ij}) \quad (14)$$

Ignoring the two constant terms, the UMAP cost function has a very similar form to that of LargeVis, but without a γ term to weight the repulsive component of the cost function, and without requiring matrix-wise normalization in the high dimensional space. The cost function for UMAP can therefore be optimized (in this case, minimized) with stochastic gradient descent in the same way as LargeVis.

Although the above discussion places UMAP in the same family of methods as t-SNE and LargeVis, it does not use the same definitions for v_{ij} and w_{ij} . Using the notation established above, we now provide the equivalent expressions for the UMAP similarities. In the high dimensional space, the similarities $v_{j|i}$ are the local fuzzy simplicial set memberships, based on the smooth nearest neighbors distances:

$$v_{j|i} = \exp[-d(x_i, x_j) - \rho_i] / \sigma_i \quad (15)$$

As with LargeVis, $v_{j|i}$ is calculated only for n approximate nearest neighbors and $v_{j|i} = 0$ for all other j . $d(x_i, x_j)$ is the distance between x_i and x_j , which UMAP does not require to be Euclidean. ρ_i is the distance to the nearest neighbor of i . σ_i is the normalizing factor, which is chosen by Algorithm 3 and plays a similar role to the perplexity-based calibration of σ_i in t-SNE. Calculation of $v_{j|i}$ with Equation 15 corresponds to Algorithm 2.

Symmetrization is carried out by fuzzy set union using the probabilistic t-conorm and can be expressed as:

$$v_{ij} = (v_{j|i} + v_{i|j}) - v_{j|i}v_{i|j} \quad (16)$$

Equation 16 corresponds to forming top-rep in Algorithm 1. Unlike t-SNE, further normalization is not carried out.

The low dimensional similarities are given by:

$$w_{ij} = \left(1 + a \|y_i - y_j\|_2^{2b}\right)^{-1} \quad (17)$$

where a and b are user-defined positive values. The procedure for finding them is given in Definition 11. Use of this procedure with the default values in the UMAP implementation results in $a \approx 1.929$ and $b \approx 0.7915$. Setting $a = 1$ and $b = 1$ results in the Student t-distribution used in t-SNE.

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Consumption Authenticity in the Accommodations Industry: The Keys to Brand Love and Brand Loyalty for Hotels and Airbnb

Journal of Travel Research
2020, Vol. 59(1) 173–189
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DOI: 10.1177/0047287519826233
journals.sagepub.com/home/jtr


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Abstract

Airbnb has gained popularity as an alternative to hotels, with the authenticity of the consumption experience being a critical differentiating factor. However, the hospitality and tourism literature has not fully explored how Airbnb and traditional hotel brands are facilitating authentic travel experiences and the impact of these experiences on brand love and brand loyalty. In this study, we explore three elements of consumption authenticity and examine their how they interact in the context of an accommodation brand. Second, we compare the components of consumption authenticity across hotels and Airbnb, and examine their relative impact on brand love for these two segments of the accommodations industry. We found that hotels and Airbnb draw upon different sources of authenticity to create brand-loving customers. Our results indicated that Airbnb leverages brand, existential, and intrapersonal authenticity in creating brand-loving and brand-loyal customers, while hotels utilize only brand authenticity. Thus, the keys to creating customers who love and are loyal to the brand differ between hotels and Airbnb. Implications for theory and practice are discussed, and areas of future research are identified.

Keywords

authenticity, brand love, brand loyalty, Airbnb, sharing economy

Introduction

Boasting over three million listings in 191 countries, Airbnb has become a powerful player in the hospitality, travel, and tourism industries. As Airbnb continues to grow in both popularity and availability, the platform provides travelers with alternatives to hotels in the economy, luxury, and business travel markets (Trivett 2013), with accommodations ranging from a \$15 spot on a sofa to an \$8,000 per night mansion. As a result, hotels now find themselves competing not only with each other but also with this new segment of the lodging industry. The hospitality and tourism literature has very recently begun to pay attention to the effects of Airbnb on the lodging and tourism industries, including such issues as experiences (Mody, Suess, and Lehto 2017; Wiles and Crawford 2017), online presence (Pizam 2016; Lu and Kandampully 2016; Xie and Mao 2017), marketing strategy (S. Liu and Mattila 2017; Mao and Lyu 2017), and industry disruption (Guttentag 2015; Guttentag and Smith 2017; Zervas, Proserpio, and Byers 2017).

One of Airbnb's key positioning platforms is the concept of authenticity, as evidenced by the company's mottos: *Belong Anywhere* and *Live There*. Because each Airbnb

accommodation is individually owned, unique, and embedded in the local landscape, the company has an inherent focus on facilitating an authentic guest experience (Ting 2016). The opportunity to stay in a private home in a residential neighborhood, rather than in a corporate-designed, "cookie cutter" hotel provides travelers the chance to experience authentic local flavors, nuances, and interactions that may not be available in a typical hotel environment. As such, the authenticity of this consumption experience is a key differentiating factor for Airbnb accommodations. Jonathan Mildenhall, Chief Marketing Officer of Airbnb, notes: "At Airbnb we're very clear that our authentic experiences are local experiences that you can't get anywhere else" (Peltier 2015). In a 2016 study by Morgan Stanley, "authentic experience" was one of the top

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three reasons travelers chose to stay at an Airbnb property rather than at a traditional hotel (Ting 2017).

Despite the fact that authentic experience is one of the key tenets of the Airbnb value proposition, the hospitality literature is scant with regard to whether and how Airbnb is facilitating more authentic travel experiences and the impacts of such consumption experiences on brand love and brand loyalty. Moreover, it remains unclear how traditional hotel brands are performing in their provision of authentic consumption experiences, given the changing dynamics of the accommodations industry due to the rise of Airbnb (Mody, Suess, and Lehto 2017; Tussyadiah and Pesonen 2016; Trivett 2013). To bridge this gap, the purpose of the current study is twofold. First, we bring together three elements of consumption authenticity (brand, existential, and intrapersonal) and examine how they interact in the context of an accommodation brand. Second, we compare the components of consumption authenticity across hotels and Airbnb, and examine their relative impact on brand love for these two segments of the accommodations industry. Following the results of these tests, we discuss implications for theory and practice and identify directions for future research.

Literature Review

Authenticity

"Authenticity is a multifaceted construct that contains various ontological assumptions, perspectives, and typologies" (C. Y. Wang and Mattila 2015, p. 348). At the most basic level, authenticity can be defined as "genuine, unadulterated, or the real thing" (Theobald 1998, p. 411, as cited in Reisinger and Steiner 2006, p. 68). There are a number of studies exploring the nuances of this construct in the tourism literature (for a review, see Yi et al. 2016). The concept of authenticity was first applied to the travel and tourism context by MacCannell (1973); since then, the concept of authenticity has been further developed and conceptualizations of authenticity can generally be divided into objective and subjective authenticity. An object or experience can be evaluated using objective, concrete criteria to measure its level of authenticity (Leigh, Peters, and Shelton 2006). This type of objective authenticity establishes that an object or experience is what it purports to be and is measured against a set of empirical, objective criteria. For example, a piece of Neolithic pottery could be judged to be authentic if it were ascertained that it was indeed pottery and carbon dating indicated that it did indeed originate in the Neolithic period.

In addition to such objective measures of authenticity, however, many researchers have acknowledged the phenomenon of subjective authenticity, wherein the level of authenticity of an object or experience is understood to be the product of a particular observer's evaluation within a certain context (Cohen 1988; Mkono 2013a). An experience may be determined by the evaluator to be objectively authentic, subjectively authentic,

neither, or both, as these conceptualizations are not mutually exclusive. In this study, we are primarily interested in the notion of subjective authenticity as perceived by a traveler or tourist. As noted in the introduction, one of Airbnb's key marketing propositions is that it purports to provide a more authentic experience of a destination than does a standard hotel. In the next section, we review the extant literature authenticity in the accommodations sector.

Authenticity in the Accommodations Sector

While the current study is, to our knowledge, the first to directly compare the consumer's perception of authenticity in Airbnb properties and traditional hotels through the lens of the consumption experience, there is a significant body of literature in hospitality and tourism regarding the concept of authenticity in the accommodations sector. Some of this research has been conducted in the context of homestay experiences. For example, in a study conducted on homestays in Lijiang, China, Y. Wang (2007) suggested that the customer's concept of authenticity in his or her accommodations is not only subjective but customized to the individual. He argues that this is a result of the tourist desiring his or her accommodations to not only be authentic but also a substitute for home. As a result, the host makes changes to the home that results in a loss of objective authenticity at the expense of comfort and familiarity for the guest. Similarly, Mura (2015) conducted a study of Malaysian homestays and found that while tourists craved authenticity in their accommodations, they also wanted the comforts of home to some extent. Mura argues that the traveler combines the authentic elements of his stay, along with the inauthentic aspects that have been modified for his comfort, and constructs his own narrative about the authenticity of this experience. In a study conducted on homestay visits in Thailand, Dolezal (2011) argues that despite the tourist's desire for authenticity and the host's intention to provide as authentic an experience as possible, factors such as economic divides, power differentials, and language barriers are inherent in any such situation. Thus, true authenticity is never possible, but rather the perception of authenticity is constructed by the guest. In a similar vein, Aziz and Selamat (2016), in a study on the Malaysian homestay sector, point out that the same tourist who desires an authentic homestay experience in rural Malaysia also makes selection decisions based on the quality of accommodations, resulting in many hosts upgrading their homes to attract tourists. This results in an experience that the tourist perceives as authentic, yet is not quite so.

In addition to such literature on the general nature of authenticity in the accommodations sector, there is a body of research on the antecedents of consumers' perceptions of authenticity. For example, Paulauskaite et al. (2017) suggest that for Airbnb customers, the elements that most contribute to the guest's perception of an authentic experience are a unique accommodation interior, interactions with the

host, and interactions with the local culture. S. Liu and Mattila (2017) also found that uniqueness was a key antecedent to authenticity for Airbnb guests, as was a sense of belongingness. These two factors were significant in forming a connection between brand Airbnb and the guest. Lalicic and Weismayer (2017) also found that interactions with the host was a significant factor in the guest's perception of an Airbnb's perceived authenticity. Hosts are often rich sources of knowledge about local attractions, activities, and culture, and talking with and engaging in activities with hosts contributes to the guest's attachment to the destination (Pizam, Uriely, and Reichel 2000). Thus, a high level of interaction and engagement creates an experience of authenticity for the guest; it is the social factor that make tourists feel like they have "lived there" rather than just visited there as an outsider (Paulauskaite et al. 2017).

A number of researchers have also examined the outcomes of perceived authenticity in the accommodations and tourism context. A high level of perceived authenticity has been demonstrated to lead to a strong sense of place attachment (van der Heide 2015), greater consumer satisfaction (Krösbacher and Mazanec 2010), a lowered perceived risk in accommodation choice, a higher level of perceived value (Liang, Choi, and Joppe 2018), and destination loyalty (Yi et al. 2016).

In light of this body of research, as we consider how the authenticity of the experience impacts consumers' evaluations of their accommodations, we introduce the focal construct of consumption authenticity.

Consumption Authenticity

The first objective of this article is to bring together three elements of consumption authenticity (brand, existential, and intrapersonal) and examine their how they interact in the context of an accommodation brand. Research across disciplines has addressed authenticity of place, object, brand, relationship, and self, and while such literature is reviewed later in this article, the hospitality literature lacks a construct that speaks to the authenticity of the traveler's subjective, holistic experience of a consumption event. When traveling, a consumer's consumption experience is made up of several components, such as the objects he encounters, the relationships he forms with others on the trip, the sense of self that grows and changes as a result of the trip, and the brands with which he interacts when traveling. While it is possible to assess the authenticity of each of these components individually, there is also a global assessment of the authenticity of the entire travel experience. It is this holistic assessment of the authenticity of a travel experience that we refer to as "consumption authenticity." Based on previous literature in the marketing, consumer behavior, hospitality, and tourism domains, we propose that consumption authenticity is composed of three components: brand authenticity, existential authenticity, and intrapersonal authenticity.

As the context of this article is a traveler staying at a branded accommodation, interacting with others, and creating meaning from his travel experience, we have synthesized the concepts of authenticity from both the marketing and tourism literatures to build our operationalization of consumption authenticity in the accommodations industry.

We thus propose that an overall assessment of consumption authenticity is composed of three components: brand authenticity, which refers to the originality and genuineness of the brand; existential authenticity, which addresses the authenticity of the relationships the consumer forms with the objects and people on his trip; and intrapersonal authenticity, or the way in which the travel experience helps him create and maintain his identity. In the following sections, we review the literature for each of the three components of consumption authenticity.

Brand Authenticity

The construct of brand authenticity has been robustly studied in the marketing and consumer behavior literatures. The authenticity of brands is based on "original, genuine, and unaffected" associations (Alexander 2009), whereby brand authenticity can be described as "the degree to which a brand is considered original and genuine, meaning it is unique and not derivative, and truthful to what it claims to be" (Akbar and Wymer 2017, p. 29). In an exhaustive meta-analysis, Akbar and Wymer (2017) examined extant operationalizations of brand authenticity and analyzed the various dimensions used to conceptualize this construct. Their results indicated that originality and genuineness are the two key factors of brand authenticity. Originality speaks to the brand's lack of imitation and uniqueness of offering. Genuineness indicates the "degree to which a brand is perceived to be legitimate and undisguised in its claims" (Akbar and Wymer 2017, p. 25). In their study of brands across a variety of product categories, Bruhn et al. (2012) found originality and genuineness to be key dimensions of brand authenticity. From a branding perspective, authenticity is concerned with the originality and genuineness of the product or service offering based on the evaluation of the consumer and, as such, is subjective and malleable (Beverland and Farrelly 2010). In particular, an understanding of the extent to which an organization's offerings are considered original and genuine is critical for effective communication to customers (Molleda 2010).

Lego, the world-famous toy brand, exemplifies the originality dimension of brand authenticity. Founded nearly a century ago, the iconic brand is known for its tiny plastic building blocks. Throughout the last century, the company has cornered the market on plastic bricks, models, playsets, and media tie-in products. While other companies have sold wooden bricks, plastic building components, and toy models, Lego stands out as the company that provides children and adults alike a full-service solution to plastic, interlocking, interconnected building components. The "originality"

dimension of brand authenticity speaks to a lack of imitation of other brands and the uniqueness of offering. Prior to Lego, no other company had mass-produced interchangeable, interlocking building bricks, and the advent of the modern Lego piece heralded a new era in model building, supplying children with an offering that was distinctly unique.

Patagonia, the well-known outdoors sportswear company, is an excellent example of the “genuineness” aspect of brand authenticity. Patagonia’s mission statement is “Build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis” (“Patagonia’s Mission Statement” 2018). Everything it does as a company ties back to this mission. For example, the company invests in renewable energy, rewards workers for carpooling, mitigates the impact of their production chemicals on the environment, builds durable products, donates money to environmental groups, engages in fair labor practices, and sponsors a program to assist customers to buy and sell used Patagonia gear in order to reduce their overall consumption. By actively engaging in such business practices, Patagonia is indicating to the customer that they are who they say they are—a company that builds good products, causes no unnecessary harm, and cares about the environment. This alignment of “who we say we are” and “how we act as a company” is the essence of genuine brand authenticity.

The critical relationship between brand authenticity and brand love has been repeatedly suggested in the literature. According to Round and Roper (2012), a brand’s relationship function—the generation of brand love—is “the main function of branding and of growing importance as a provider of stability and authenticity in a rapidly changing world” (p. 941). According to Batra, Ahuvia, and Bagozzi (2012), creating positive emotional connections with the brand—brand love—can be achieved “by endowing the brand with a sense of authenticity from its origin and history, the vision of its founders, and its corporate culture, so that the brand buyer feels a sense of kinship about it” (p. 14). Alnawas and Altarifi (2016) made a similar recommendation for hotel brands, and Yannopoulou, Moufahim, and Bian (2013) found authenticity to be a key ingredient in Airbnb’s generation of brand love. In a study comparing consumers’ relationships with original brands and their counterfeits, Castaño and Perez (2014) found that consumers feel higher levels of love toward the original brands; consequently, they urged brand managers to emphasize issues of authenticity in order to encourage consumers to be faithful. Similarly, Riivits-Arkonsuo, Kaljund, and Leppiman (2014) highlight authenticity as one of the key elements of the brand experience that contributes to brand love, and subsequently, brand evangelism. Based on these previous studies, we expect that a high level of brand authenticity will lead consumers to experience a high level of brand love. Thus, we hypothesize:

Hypothesis 1: Brand authenticity has a significant and positive impact on brand love.

Existential Authenticity

Existential authenticity can be defined as a state of existence in which one is true to oneself (Yi et al. 2016). The notion of existential authenticity has been explored by several tourism researchers. Brown (2013) notes that the environments and surroundings of a tourism experience can serve as a catalyst for existential authenticity. Likewise, Steiner and Reisinger (2006) suggest that existential authenticity is experience oriented and, as such, travel and tourism experiences are uniquely positioned to facilitate existential authenticity.

The discussion of existential authenticity has its roots in Heidegger’s (1962) work, which notes that the connections between objects and people give meaning to the tourist experience, allowing individuals to see what objects mean, how they can be used, and how these objects relate to their sense of self. Indeed, a key part of any travel experience is going to “see things” such as art, architecture, nature, shows, and many others. The authenticity of these objects, referred to herein as object authenticity, is an important component of existential authenticity.

In addition to object authenticity, existential authenticity has an interpersonal component. By its very nature, existentialism is person-centered, concerned with the authenticity of people, relationships, and social existence. In fact, N. Wang (1999) states that toured objects are merely a means for tourists to relate to each other and come together. Interpersonal authenticity is largely about creating authentic relationships with other people in a natural way, free from the constraints of the roles and hierarchies that exist in everyday life (Yi et al. 2016). Researchers have found that tourists desire to form relationships and have contact with family members and other travelers in a way that is free from their typical roles back home is a key element of authentic, memorable tourism experiences (Caton and Santos 2007; Park and Santos 2016). Tourists seek genuine, natural intimacy and emotional connection with others, and through these interactions, experience a new level of authenticity (Steiner and Reisinger 2006). This is particularly relevant in the context of Airbnb, given the highly social element of the platform. Airbnb customers interact with local hosts, and a sense of congruity with these hosts can facilitate a sense of belonging, comfort, and identity confirmation. Indeed, self-congruity theory (Sirgy 1986) posits that consumers attempt to match the attributes of a brand or company with their own self-image in an attempt to meet their inherent need for self-consistency, self-identity, and self-esteem (Aaker 1997; Sirgy 1986). For example, both Bergkvist and Bech-Larsen (2010) and Carroll and Ahuvia (2006) established that consumers love brands that are seen as self-congruent, as they are seen as an expression of and extension of the self. Line, Hanks, and Kim (2018) and Hanks and Line (2018) found that hospitality consumers prefer to patronize establishments where there is a high level of congruity between the image of the establishment and the focal consumer’s self-image, and that high levels of congruity between

the others in a service environment leads to an identification with the company and the brand. Because consumers tend to love brands that facilitate and reinforce their relationships with objects and people, we predict that there will be a close relationship between existential authenticity and brand love. Thus, we hypothesize:

Hypothesis 2: Existential authenticity has a significant and positive impact on brand love.

Intrapersonal Authenticity

“Intrapersonal authenticity relates to the individual self, and includes physical aspects (for example relaxation and invigoration), and psychological aspects, such as self-discovery and self-realization” (Mkono 2013a, p. 355). The physical elements speak to how the experience assists the consumer in having pleasurable or sensual experiences that he might not experience at home or in day-to-day life. A relaxing massage, an invigorating hike, a swim with dolphins, or a sun-soaked afternoon on the beach free the body from the constraints of mundane life and allow the traveler to have new physical experiences that enhance his sense of well-being. N. Wang (1999) notes that tourism “involves a bodily experience of personal authenticity” (p. 362). Travel and tourism experiences that create opportunities for new physical experiences or help consumers explore their physical limitations thereby contribute to holistic perceptions of intrapersonal authenticity.

The intrapersonal aspect of hospitality and tourism experiences also highlights self-development, self-realization, and self-identity (Berman 1970). Authentic tourism experiences facilitate such self-realization by allowing the individual to free themselves from social constraints and roles and explore new elements of their identity (N. Wang 1999). This self-exploration and self-realization is closely tied to the individual’s sense of identity, as new tourism experiences give rise to autonomy, individuality, self-development, and self-actualization (Berman 1970). The insights gathered from new experiences assist in the creation and affirmation of identity, helping to establish and delineate the person’s understanding of their own place in time, space, and society (McIntosh and Prentice 1999). For example, people might have, as part of their self-identity, a thirst for adventure and risk-taking. They may see themselves as a bold adventurer, someone who loves new and exhilarating experiences. However, in their regular lives, they may live in the suburbs, drive a sedan to work, and spend their day in an office cubicle to pay the bills. As such, they experience a sense of loss, and an incongruity between their self-identity and their actual life. For many people, travel and tourism is a way to bridge this cognitive dissonance. For example, this person may decide to go on a zip-lining adventure over a rain forest, hike a challenging mountain, or go skydiving on vacation, thereby actualizing the part of his or her self-identity that is missing in his or her regular life. Brands that can assist the

traveler in connecting to the authentic self enable a high level of intrapersonal authenticity.

The relationship between intrapersonal authenticity and brand love has been well established in the literature. For example, both Bergkvist and Bech-Larsen (2010) and Carroll and Ahuvia (2006) established that consumers love brands that are congruent with the consumer’s sense of self, as these brands are viewed as an expression of and extension of the self. Wallace, Buil, and Chernatony (2014) found that brands that are expressive of consumers’ inner and social selves are loved more by consumers. Alnawas and Altarifi (2016) found a similar relationship between brand identification and brand love in the context of the hotel industry. Given these relationships in the branding literature and in the context of the accommodations industry, we predict that an accommodation brand that facilitates high levels of intrapersonal authenticity in an accommodation experience will enjoy high levels of brand love. Thus, we hypothesize:

Hypothesis 3: Intrapersonal authenticity has a significant and positive impact on brand love.

Brand Love

Brand love can be defined as “the degree of passionate emotional attachment a satisfied consumer has for a particular trade name” (Carroll and Ahuvia 2006, p. 81). Brand love encompasses a number of affective responses toward the brand, including passion, attachment, positive evaluation, positive emotions, and declarations of love. The notion of brand love has its roots in theories of interpersonal love (Carroll and Ahuvia 2006; Shimp and Madden 1988). Research on this topic has examined the similarities between interpersonal love and a consumer’s love for objects or brands (Albert, Merunka, and Valette-Florence 2008) and then established empirical relationships around this construct (Albert, Merunka, and Valette-Florence 2008; Batra, Ahuvia, and Bagozzi 2012). This body of work has resulted in a conceptualization of brand love that suggests a positive emotional connection, an intuitive fit between consumer and brand, the integration of the brand into the consumer’s identity, passion-driven behaviors, the desire for a long-term relationship, and separation anxiety (Batra, Ahuvia, and Bagozzi 2012; Rauschnabel and Ahuvia 2014).

While similar to the construct of satisfaction in some ways, brand love differs from satisfaction in that brand love has a much more affective component than satisfaction, which is generally characterized as a primarily cognitive judgment (Carroll and Ahuvia 2006). Brand love is more global than satisfaction, as it is typically an outcome of a relationship with a company over time rather than a response to a specific transaction. Most importantly, brand love is closely tied to the consumer’s identity, involving an integration of the brand into the self-concept.

A number of studies have established the importance of brand love as an important element in the consumer–brand relationship (Batra, Ahuvia, and Bagozzi 2012; Carroll and Ahuvia 2006) and in the construction of self-identity in relation to brands (Belk 1988). Prior research indicates that the relationship between brand love and identity is significant, with consumers feeling a greater level of love for brands that they feel shape, express, or maintain their sense of identity (Fournier 1998; Kwon and Mattila 2015). In addition to identification, Bergkvist and Bech-Larsen (2010) found that a sense of community has a significant and positive impact on the formation of brand love. They found that a sense of belonging and interpersonal identification with other users of the brand resulted in a stronger sense of brand love. In a multicountry study of wine consumers, Drennan et al. (2015) found that brand love was an important mediator and direct influence on brand loyalty. Applying Sternberg's love theory to hotels in Jordan, Alnawas and Altarifi (2016) found the concept of brand love to mediate the relationship between brand identification and brand loyalty. Given the strong relationship between brand love and consumer behavioral outcomes, it can be predicted that a high level of brand love for an accommodations brand will lead to a high level of brand loyalty among customers.

Brand Loyalty

Behavioral brand loyalty is defined as “a customer's overt behavior toward a specific brand in terms of repeat purchasing patterns” (Back and Parks 2003, p. 420). The relationship between brand love and brand loyalty has been robustly documented. Bergkvist and Bech-Larsen (2010) found strong support for this relationship across a number of product categories, including electronics, food, personal care items, and painkillers. Batra Ahuvia, and Richard P Bagozzi (2012) also demonstrated strong relationships between brand love and brand loyalty in a series of three studies. Thomson, MacInnis, and Whan Park (2005) found a strong positive relationship between brand love and brand loyalty across a number of diverse studies, and Back and Parks (2003) examined this relationship in the lodging industry with similar results. Based on the body of extant literature, we hypothesize:

Hypothesis 4: Brand love has a significant and positive impact on brand loyalty.

Consumption Authenticity in Hotels vs. Airbnb

The second objective of this study is to determine whether there are any differences in the three components of consumption authenticity between hotels and Airbnb, and whether these components impact brand love differently in these two contexts. There is evidence to suggest that Airbnb facilitates higher levels of authenticity through its provision of a more local experience than traditional lodging, and by

enabling more authentic contact between members of the travel party and with others at the destination (Guttentag 2015). For example, Poon and Huang (2017) found that Airbnb users perceived Airbnb to be better than hotels in offering authentic experiences. According to Bucher, Lutz, and Fleck (2017), the sharing economy facilitates instances of situational closeness between consumer and provider that would usually occur only within a closed circle of family and friends, which enhances the potential for authenticity, and remains one of the core drivers behind the success of the sharing economy model. Based on these assertions, we hypothesize that customers perceive higher levels of the three components of consumption authenticity in the Airbnb experience than in the hotel experience.

Hypothesis 5: Customers perceive a higher level of brand authenticity in the Airbnb experience than in the hotel experience.

Hypothesis 6: Customers perceive a higher level of existential authenticity in the Airbnb experience than in the hotel experience.

Hypothesis 7: Customers perceive a higher level of interpersonal authenticity in the Airbnb experience than in the hotel experience.

There is also evidence to suggest that Airbnb's higher levels of authenticity are significant antecedents of customers' loyalty toward the service (Lalicic and Weismayer 2018). Guttentag and Smith (2017) note that authenticity of experience is a significant motivation factor when consumers are choosing to stay at an Airbnb, as do Tussyadiah and Pesonen (2016), who cite authentic interactions with people, places, and objects as a key reason that travelers choose Airbnb over more traditional accommodations. Indeed, the very nature of the Airbnb experience possesses an inherent level of authenticity. Rather than staying in a hotel that was built expressly for the purpose of hosting travelers, the customer is staying at a real home, owned by a person that often lives in the host community. Rather than interacting with employees trained to provide standardized customer service, the traveler is having interactions with a host that possesses rich knowledge of the local culture and environment. This authentic interaction with locals leads to positive experiences (Liang, Choi, and Joppe 2018) and loyal customers (Lalicic and Weismayer 2017). We predict that because of this perceived authenticity inherent in the Airbnb experience, the components of consumption authenticity should have a greater impact on brand love for Airbnb travelers than for traditional hotel travelers, such that

Hypothesis 8: Brand authenticity has a greater impact on brand love for Airbnb customers than for hotel customers.

Hypothesis 9: Existential authenticity has a greater impact on brand love for Airbnb customers than for hotel customers.

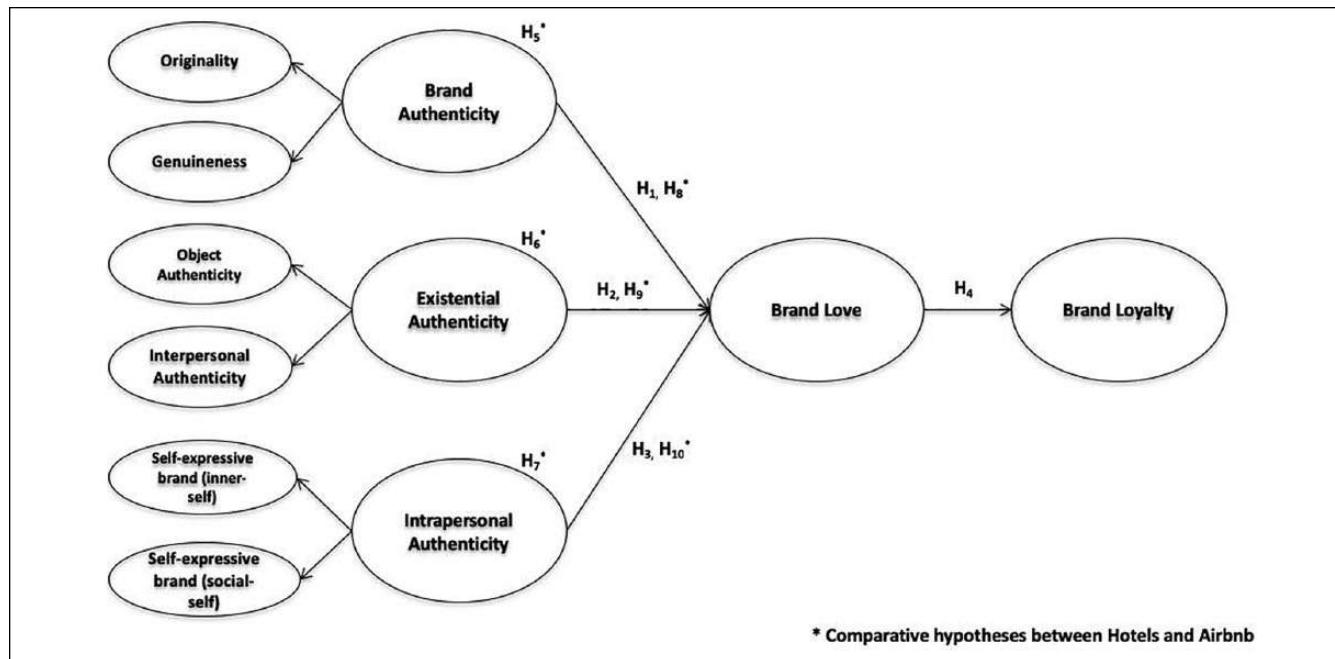


Figure 1. The model of consumption authenticity in the accommodations industry.

Hypothesis 10: Intrapersonal authenticity has a greater impact on brand love for Airbnb customers than for hotel customers.

Figure 1—The Model of Consumption Authenticity in the Accommodations Industry—captures the various hypotheses to be tested in the present study. It depicts that the three components of consumption authenticity—brand authenticity, existential authenticity, and intrapersonal authenticity—positively contribute to brand love, which in turn stimulates loyalty toward the brand. It also depicts the hypotheses that compare the magnitude of these relationships between hotels and Airbnb (H5-H10).

Methodology

Data Collection

The sample for the study was drawn from the micro-task crowdsourcing platform Amazon Mechanical Turk. A total of 1,256 usable responses were collected: 618 from customers who had stayed at an Airbnb in the last year, and 638 from customers who had stayed at a hotel in the last year. The sample comprised respondents from all 50 of the United States (including DC and Puerto Rico), indicating the geographic representativeness of the sample.

Survey Development

The first section of the survey included brand-related questions: brand authenticity, intrapersonal authenticity, and

brand love. The second section required respondents to think about their most recent experience with Airbnb/hotel brand, and then answer questions pertaining to the experience-related components—the characteristics of the trip (duration, travel with, price, etc.) and existential authenticity constructs: object authenticity and interpersonal authenticity. We followed this order of questioning for two reasons. First, asking the brand-related questions before the experience-related questions allowed us to capture respondents' overall perceptions of the brand, and not their perceptions based on their most recent experience alone. In the hotel sample, respondents were first asked to indicate the name of the hotel brand they stay most often with (and whether they have stayed with the brand in the last year, as per the sampling criteria), which allowed us to subsequently tailor the brand-related questions to the respondents' most preferred brands. This strategy enhances the contextual relevance of the study given the importance of the study's central construct of brand love, since one can readily argue that respondents would most love a brand that they stay most often with. Second, the experience-related components of the trip require respondents to recall more specific aspects of the interaction with the brand; the principles of survey design indicate that respondents should be probed on more general questions first before requiring them to retrieve more specific details of their experience (Kasunic 2005). The third section included questions on the outcomes of our model—brand loyalty—while the fourth and final section comprised demographic questions, including age, income, education, ethnicity, gender, state of residence, and zip code.

Analysis

Since the objective of the study is to compare and contrast the model of consumption authenticity across hotels and Airbnb, we used multiple-group structural equation modeling (SEM) to analyze the data. As the first stage in analyzing the data, descriptive statistics and distributions were assessed. Second, we conducted a confirmatory factor analysis (CFA) on the model presented in Figure 1 to test for the validity and reliability of the various constructs. The three components of consumption authenticity—brand authenticity, existential authenticity, and intrapersonal authenticity—were modeled as second-order constructs, based on their operationalization in previous studies and/or their conceptualization in the present study (Akbar and Wymer 2017; Mkono 2013a; Morhart et al. 2015; Wallace, Buil, and Chernatony 2014; N. Wang 1999; Yi et al. 2016), as discussed and described in the literature review. Also, given the use of the multiple-group SEM procedure, we tested for the invariance of the measurement model across the Airbnb and hotel groups before proceeding to the third stage of structural modeling. Multiple measures suggested by Hair et al. (2010) were used to assess the fit between both the measurement and structural components of the models and the data, including normed chi-square (χ^2/df), comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR).

In the fourth stage of analysis, we used pairwise parameter comparisons to determine whether any of the structural parameters were significantly different between the Airbnb and hotel groups in the SEM stage. This allowed us to test whether the keys to creating customers who love and are subsequently loyal to the brand differ between hotels and sharing economy providers, thus testing hypotheses 8–11. For the pairwise parameter comparison test, critical ratios for differences between the two structural parameters in question are calculated by dividing the difference between the parameter estimates by an estimate of the standard error of the difference. Under appropriate assumptions and with a correct model, the critical ratios follow a standard normal distribution (“Structural Equation Modeling,” n.d.). In the fifth and final stage of analysis, we conducted one-way analyses of variance to compare the mean scores on the various constructs across hotels and Airbnb, thus testing hypotheses 5–7, to supplement the insights gained from structural equation modeling in assessing the relative performance of these two components of the accommodations industry.

Results

The profile of the respondents in the Airbnb and hotel groups is presented in Table 1. Interestingly, there were significant differences between the two groups. Using a series of chi-square tests, we found that the Airbnb and hotel groups differed in terms of respondents’ age ($p = .001$), education ($p = .013$), and ethnicity ($p < .001$). Table 1 indicates that respondents in the

Airbnb group were younger, where 71.2% of respondents in the group can be classified as Millennials (between 18 and 35 years of age), versus only 57.3% of the respondents for the hotel group. Also, respondents in the Airbnb group were better educated: nearly 71% of the sample had at least a college degree as compared to around 62% of the hotel sample. A significantly higher proportion of the hotel group was Caucasian (78.7% vs. 70.6%), while Airbnb had more Asian customers (11.3% vs. 6.6%). In sum, respondents in the Airbnb group were younger, better educated, and more likely to comprise a variety of ethnicities than those in the hotel group. These demographic characteristics are consistent with the profiles found by Mody, Suess, and Lehto (2017) in their study of Airbnb and hotel customers.

Table 2 presents the summary statistics for the items used to measure the various constructs of the model for both the Airbnb and hotel groups. Table 2 also indicates the literature sources from which these measures were adapted, as well as the Cronbach’s α values for various constructs. Cronbach’s α ranged from .83 to .96 across the two groups, well above the recommended .70 level (Nunnally and Bernstein 1994), indicating high internal consistency between the items measuring the various constructs. Since the measures have been previously validated in the branding and tourism literatures (the reader is referred to the last column of Table 2), we were able to move directly to the CFA without the need for an exploratory phase.

The CFA for the multiple-group model of consumption authenticity in the accommodations industry, presented in Figure 1, indicated that the model fit the data well ($\chi^2/\text{df} = 3.496$, CFI = 0.938, TLI = 0.928, RMSEA = 0.045, SRMR = 0.054). While the scales indicated high reliability (Cronbach’s α), as discussed in the Table 2 results, the authors also checked for the validity of the CFA model (Y. Liu and Jang 2009). All the items loaded on to their respective constructs with high and significant ($p = .000$) standardized factor loadings that ranged from 0.637 to 0.988 for the Airbnb group and from 0.637 to 0.985 for the hotel group, indicating convergent validity. While the constructs demonstrated discriminant validity in the case of the Airbnb group, in the hotel group, we observed a discriminant validity issue between the constructs of brand authenticity and brand love; the square root of the AVE for each of these constructs was less than the bivariate correlation between the constructs. This issue can be attributed to the high correlation between brand authenticity and brand love in the hotel group ($\rho = .914$). However, given the lack of discriminant validity issues in the Airbnb group, the face validity of the items measuring these constructs, and the previous validation of these constructs in the branding literature, we concluded that the multiple-group model was suitable for subsequent structural estimation.

While the Mardia’s multivariate kurtosis coefficient was significant ($p < .05$) for both Airbnb and hotel groups (601.232 and 582.265, respectively), indicating multivariate

Table 1. Respondent Profile.

Demographic Category	Airbnb Group		Hotel Group		Chi-Square Value (df)
	Sample Size (n = 618)	%	Sample Size (n = 638)	%	
Age, years					21.259 ^a (5)
18–25	140	22.7	98	15.4	
26–35	300	48.5	45.8	41.9	
36–45	103	16.7	142	22.3	
46–55	42	6.8	65	10.2	
56–65	28	4.5	29	4.5	
>65	5	.8	12	1.9	
Gender					.087 ^b (3)
Male	315	51	326	51.1	
Female	298	49.2	306	51.1	
Other	5	.8	6	1	
Education					
High school or less	47	7.6	59	9.2	10.713 ^c (3)
Some college	133	21.5	182	28.5	
College	343	55.5	313	49.1	
Graduate school	95	15.4	84	13.2	
Ethnicity					23.666 ^d (5)
Caucasian	436	70.6	502	78.7	
African American	52	8.4	47	7.4	
Hispanic	44	7.1	34	5.3	
Asian	70	11.3	42	6.6	
American Indian, Alaskan, Hawaiian, or Pacific Islander	7	1.1	13	2	
Other					
Income					
<\$20,000	40	6.5	72	11.3	10.991 ^e (5)
\$20,000–\$39,999	142	23	138	21.6	
\$40,000–\$59,999	147	23.8	153	24	
\$60,000–\$79,999	113	18.3	108	16.9	
\$80,000–\$99,999	65	10.5	73	11.4	
≥\$100,000	111	18	94	14.7	

^aSignificant at p = .001.^bNot significant; p = .993.^cSignificant at p = .013.^dSignificant at p < .001.^eNot significant; p = .052.

non-normality, an examination of the univariate skewness (Airbnb group: between -1.605 and -0.014; Hotel group: between -1.286 and .144) and kurtosis (Airbnb group: between -0.861 and 3.374; Hotel group: between -0.992 and 2.609) indices for the variables in the overall model as well as the normal quantile plots for these variables indicated that the data were only moderately non-normal. The maximum likelihood estimation technique has been shown to be fairly robust to these conditions and was thus used for structural estimation (Bryne 2010; Finney and DiStefano 2006).

The structural model indicated an acceptable fit to the data ($\chi^2/df = 3.543$; CFI = 0.936; TLI = 0.926; RMSEA = 0.045; SRMR = 0.055). The parameter estimates, presented in Table 3, indicated that all four structural relationships in

the model were highly significant ($p < .001$) for the Airbnb group. However, in the case of the hotel group, the relationships between the second-order construct of existential authenticity and brand love ($\beta = 0.046$) and between the second-order construct of intrapersonal authenticity and brand love ($\beta = -0.113$) were not significant at the .05 level. For the hotel group, brand authenticity was the only significant antecedent of brand love, which subsequently predicted respondents' brand loyalty intentions. Thus, while hypotheses 1 and 4 were supported, we found only partial support for hypotheses 2 and 3.

Prior to testing for structural differences between the Airbnb and hotel groups using pairwise parameter comparisons, we conducted a test for measurement invariance.

Table 2. Summary Statistics and Literature Sources.

Constructs and Measurement Items ^a	Airbnb Group			Hotel Group			Adapted from
	Mean	SD	Cronbach's α	Mean	SD	Cronbach's α	
Brand Authenticity—Originality^a							
Pioneer	5.84	1.18	.84	4.71	1.39	.90	Akbar and Wymer (2017)
Innovative	5.80	1.30		4.59	1.64		
Unique	5.70	1.27		4.58	1.49		
Brand Authenticity—Genuineness^a							
Unpretentious	4.97	1.49	.90	5.22	1.23	.87	Akbar and Wymer (2017)
Sincere	5.34	1.32		5.52	1.31		
Real	5.71	1.29		5.46	1.26		
Honest	5.45	1.27		5.49	1.17		
Undisguised	5.27	1.35		5.23	1.30		
Legitimate	5.92	1.23		5.92	1.14		
Existential Authenticity—Object Authenticity^b							
Understand local culture	5.28	1.17	.92	4.21	1.50	.94	Lalicic and Weismayer (2017); Ramkisson and Uysal (2011)
Experience local life	5.59	1.18		4.61	1.51		
Experience the local community	5.61	1.16		4.68	1.48		
Interact with the local community	5.48	1.22		4.61	1.48		
Existential Authenticity—Interpersonal Authenticity^b							
Authentic contact with local people	5.39	1.16	.83	4.55	1.44	.86	Yi et al. (2016)
Authentic contact with members of travel group	5.37	1.25		4.90	1.32		
Authentic contact with members outside of travel group	5.07	1.30		4.77	1.35		
Intrapersonal Authenticity—Self-expressive brand (inner self)^b							
Airbnb/Hotel brand symbolizes the person I am inside	4.32	1.50	.95	3.95	1.56	.96	Wallace, Buil, and Chernatony (2014)
Reflects my personality	4.46	1.57		4.13	1.65		
Is an extension of my inner self	3.96	1.65		3.64	1.70		
Mirrors the real me	3.99	1.67		3.68	1.70		
Intrapersonal Authenticity—Self-expressive brand (social self)^b							
Airbnb/Hotel brand contributes to my image	3.92	1.66	.94	3.61	1.68	.95	Wallace, Buil, and Chernatony (2014)
Adds to the social role I play	4.06	1.68		3.55	1.73		
Has a positive impact on what others think of me	3.93	1.68		3.69	1.67		
Improves the way society views me	3.69	1.65		3.48	1.66		
Brand Love^b							
Is a wonderful brand	5.48	1.14	.94	5.33	1.63	.94	Carroll and Ahuvia (2006)
Makes me feel good	5.26	1.25		5.20	1.21		
Is totally awesome	5.40	1.26		5.08	1.28		
Makes me very happy	5.25	1.24	5.09	1.19			
I love Airbnb/Hotel brand	5.07	1.36	4.81	1.38			
Is a pure delight	4.88	1.25	4.72	1.31			
Brand Loyalty^c							
Consider Airbnb/Hotel brand your first choice when traveling	5.31	1.36	.93	5.52	1.23	.93	Hanks, Line, and Mattila (2016); Zeithaml, Berry, and Parasuraman (1996)
Do more business with Airbnb/Hotel brand	5.72	1.26		5.78	1.14		
Likelihood to choose Airbnb/Hotel brand for future travel	5.84	1.23		5.97	1.07		
Likelihood to choose Airbnb/Hotel brand to find accommodations for a future trip	5.87	1.23		6.00	1.07		

^aRespondents viewed the survey with the appropriate wording (Airbnb/Hotel brand) depending on the group to which they belonged.

^bMeasured using a 7-point semantic differential scale.

^bMeasured using a 7-point Likert-type scale (1 = strongly disagree to 7 = strongly agree).

^cMeasured using a 7-point Likert-type scale (1 = highly unlikely to 7 = highly likely).

Table 3. Results of Structural Equation Modeling.

Path	Airbnb Group		Hotel Group		Pairwise Comparison Z score
	Estimate ^a (CR)	P	Estimate ^a (CR)	P	
Brand Authenticity → Brand Love	0.634 (11.207)	<.001	1.568 (6.578)	<.001	3.8***
Existential Authenticity → Brand Love	0.146 (3.297)	<.001	0.046 (0.963)	.336	-1.498
Intrapersonal Authenticity → Brand Love	0.177 (9.332)	<.001	-0.113 (-1.772)	.076	4.338***
Brand Love → Brand Loyalty	0.841 (18.085)	<.001	0.787 (17.752)	<.001	-0.826

^aUnstandardized estimates.

***Significant at p < .001.

Following Chen, Sousa, and West's (2005) recommendations for testing measurement invariance of second-order factor models, the authors tested for the configural and metric invariance of the multiple-group model created by the type of accommodations (hotels and Airbnb) as the moderator. To test for configural invariance, two groups (in this case, hotels and Airbnb) are tested together and freely, and configural invariance is established if the resultant model for that moderator indicates acceptable fit to the data. To test for metric invariance, all the first- and second-order factor loadings are constrained to be equal across groups. The fit of the resultant model is then compared with that of the configural model; the *lack* of a significant difference in chi-square establishes metric invariance. As previously indicated, the multiple-group (CFA) model indicated an acceptable fit to the data ($\chi^2/df = 3.496$; CFI = 0.938; TLI = 0.928; RMSEA = 0.045; SRMR = 0.054), thus establishing configural invariance. While the chi-square difference test between the configural and metric invariant models was significant ($p < .001$), the performance of this test is affected by large sample size, particularly for psychological research, in which case one can examine the differences in the other fit indices as evidence of measurement invariance. There were no substantial differences between the other fit indices ($\Delta\text{CFI} = 0.001$, $\Delta\text{TLI} = 0.001$, $\Delta\text{RMSEA} = -0.001$, and $\Delta\text{SRMR} = 0$) across the configural and metric invariant models, which allowed the authors to proceed to the next step of testing for structural differences.

The critical ratios for differences for each pair of structural parameter estimates, presented in the final column of Table 3, indicated that two of the four structural relationships represented by the various hypotheses of this study were significantly different across the Airbnb and hotel groups. The relationship between intrapersonal authenticity and brand love was significantly higher for Airbnb customers than that for hotel customers, thus supporting hypothesis 10. On the other hand, the relationship between brand authenticity and brand love was significantly higher for hotel customers than that for Airbnb customers, a finding that is the exact opposite of hypothesis 8. There were no significant differences between the two groups in the strength of the relationship between existential authenticity and brand love; thus, we did not find support for hypothesis 9.

Table 4 presents the results of the one-way analyses of variance to compare the means on the various constructs between the Airbnb and hotel groups. Means were calculated as the average score of the items used to measure each construct. Respondents in the Airbnb group reported significantly higher mean scores on all but two dimensions of the model of consumption authenticity. The two dimensions of existential authenticity—object authenticity and interpersonal authenticity—and the two dimensions of intrapersonal authenticity—self-expressive brand (inner self) and self-expressive brand (social self)—were significantly higher for the Airbnb group than the hotel group, thus supporting hypotheses 6 and 7. On the other hand, there was no significant difference between hotels and Airbnb in terms of the perceived genuineness of the brands, only in terms of originality of the brands. Thus, hypothesis 5 was only partially supported. Also, interestingly, and opposite to the direction of all other differences between the two groups, respondents in the hotel group indicated significantly higher brand loyalty—they were more likely to use their most preferred/most used hotel brand again in the future as compared to respondents in the Airbnb group. Table 5 summarizes the results of the hypotheses testing.

Discussion and Theoretical Implications

Given the changing nature of the consumption experience in the accommodations industry, the purpose of the present study was twofold. First, we brought together three elements of consumption authenticity and examined these components in the context of an accommodation brand. The second-order dimensions of brand authenticity, existential authenticity, and intrapersonal authenticity were found to adequately reflect a traveler's subjective, holistic experience of the accommodation consumption event. All measurement items indicated high levels of conformity to the hypothesized constructs.

The second objective of this study was to compare the components and the impacts of consumption authenticity on brand love across hotel and Airbnb accommodations. We predicted that customers would experience all three components of consumption authenticity to a greater degree in the case of Airbnb than hotels, and that these components would

Table 4. One-Way Analysis of Variance on Model Constructs: Airbnb vs. Hotels.

Constructs	Mean: Airbnb Group	Mean: Hotel Group	Difference (Airbnb – Hotel)	F	P
Originality	5.78	4.63	1.15	271.58	<.001
Genuineness	5.45	5.37	0.08	1.88	.171
Object authenticity	5.49	4.53	0.96	192.29	<.001
Interpersonal authenticity	5.28	4.73	0.55	71.56	<.001
Self-expressive brand (inner self)	4.19	3.84	0.35	16.07	<.001
Self-expressive brand (social self)	3.90	3.58	0.32	13.63	<.001
Brand love	5.23	5.04	0.19	9.35	<.001
Brand loyalty	5.69	5.82	-0.13	4.55	<.001

Table 5. Summary of hypotheses testing.

Hypothesis No.	Proposition	Result		Overall Hypothesis Support
		Airbnb Sample	Hotel Sample	
1	Brand authenticity → Brand love	Yes	Yes	Supported
2	Existential authenticity → Brand love	Yes	No	Partially supported
3	Intrapersonal authenticity → Brand love	Yes	No	Partially supported
4	Brand love → Brand loyalty	Yes	Yes	Supported
Comparative Hypothesis No.	Proposition	Result		Overall Hypothesis Support
		Yes: Originality No: Genuineness	Partially supported	
5	Brand authenticity for Airbnb > Brand authenticity for hotels	Yes: Object authenticity Yes: Interpersonal authenticity	Supported	
6	Existential authenticity for Airbnb > Existential authenticity for hotels	Yes: Self-expressive brand (inner self) Yes: Self-expressive brand (social self)	Supported	
7	Intrapersonal authenticity for Airbnb > Existential authenticity for hotels	No: Higher for hotels than Airbnb	Not supported	
8	Brand authenticity → Brand love: higher for Airbnb than Hotels	No: Not statistically significant	Not supported	
9	Existential authenticity → Brand love: higher for Airbnb than hotels	Yes: statistically significant	Supported	
10	Intrapersonal authenticity → Brand love: higher for Airbnb than hotels			

have a significantly stronger impact on brand love for Airbnb versus hotels, given the perceived authenticity inherent in an Airbnb experience. However, our predictions were partially supported. One of the most interesting findings of this study was that hotels and Airbnb draw upon different sources of authenticity to create brand-loving customers.

In terms of the impact of the components of consumption authenticity on brand love, we found that all three relationships were significant in the case of Airbnb, indicating that Airbnb leverages brand, existential, and intrapersonal authenticity in creating brand-loving and brand-loyal customers. For hotels, only the relationship between brand authenticity and brand love was significant. Moreover, this relationship was significantly stronger for hotel brands than for Airbnb, while

the relationship between intrapersonal authenticity and brand love was significantly stronger for Airbnb.

We proffer that these results may have occurred because of the fundamentally distinct nature of Airbnb as an accommodation brand. It is possible that brand authenticity—the true meaning of the brand—is diluted in the case of Airbnb because of the variety of experiences it offers, which, however, potentially contributes to the stronger impact of experiential authenticity—existential and intrapersonal authenticity—on brand love. Thus, the diversity of experiences on Airbnb precludes a certain level of coherence that is required for brand authenticity; however, it is this same diversity that enables consumers to feel that their travels are experientially authentic to the places they travel to, the

people they travel with and meet, and to their definition of self, both personally and socially.

These findings demonstrate that the keys to creating customers who love and are loyal to the brand differ between hotels and Airbnb. Hotel brands that remain true to themselves can facilitate higher levels of brand love and brand loyalty than Airbnb can. On the other hand, Airbnb draws much of its brand love from the fact that it facilitates higher levels of authenticity through its provision of a more authentic “local” experience than traditional lodging and by enabling more authentic contact between members of the travel party and with others at the destination (Guttentag 2015; Guttentag and Smith 2017; Oskam and Boswijk 2016; Tussyadiah and Pesonen 2016; van der Heide 2015). This was demonstrated by the significant positive relationship between existential authenticity and brand love for Airbnb (i.e., support for hypothesis 2 in the case of Airbnb), and that the two dimensions of existential authenticity—object authenticity and interpersonal authenticity—were higher for Airbnb than hotels (support for hypothesis 6). Moreover, in the case of Airbnb, the significantly stronger relationship between intrapersonal authenticity and brand love (support for hypothesis 10), and that the two dimensions of intrapersonal authenticity—self-expressive brand (inner self) and self-expressive brand (social self)—were higher for Airbnb than hotels (support for hypothesis 7), indicate that Airbnb’s strong brand community authenticates brand meanings (Fournier and Lee 2009) and thus facilitates higher levels of brand love, a finding that is consistent with Bergkvist and Bech-Larsen (2010). These findings carry important theoretical implications for authenticity and branding research in hospitality and tourism, as well as practical implications for the lodging industry.

Theoretical Implications

Our results make a significant contribution to the branding literature in the field of hospitality. In contrast to the mainstream marketing and services literature, brand management research in the hospitality literature is limited both in its depth and breadth (King 2017). While hospitality researchers have more extensively studied the guest experience in terms of its relationship with and/or contribution to brand equity (e.g., Nam, Ekinci, and Whyatt 2011; Xu and Chan 2010), a discussion of how an authentic consumption experience impacts customers’ relationships with brands has not been explored. In examining the impacts of the three components of consumption authenticity on brand love, the present study makes a significant contribution to the still limited area of brand management in hospitality research (Line and Runyan 2012). Second, while the concept of brand love enjoys a more established stream of research in the marketing and branding literatures, it is a nascent area of research in the specific domain of hospitality services, and to our knowledge, the present study is the first to enable an understanding

of the various authenticity-related antecedents of brand love. Lastly, the concept of authenticity has primarily been developed from a tourism perspective and has thus focused mainly on the notion of existential authenticity. However, in addressing the lack of a construct that facilitates a holistic assessment of the authenticity of an accommodation experience, the construct of consumption authenticity effectively combines the brand and experience-related components of authenticity facilitated by an accommodation brand (hotel or Airbnb) during the travel experience. Thus, the present study advances our understanding of authenticity from a tourism and hospitality perspective.

Practical Implications

The rise of the experiential traveler has been well documented. “Intense global demand for travel experiences that resonate on a deeper emotional level is driving travel brands to develop products that are more adventurous, more personalized, and more attuned to local culture, inspiring consumers toward a path of self discovery” (*The Rise of Experiential Travel*, 2014, p. 1). Authenticity is a key contributor to deeper experiences, and while the concept is relative, a consumer-based perspective is critical; brands that understand how consumers perceive deeper, authentic travel and cater to these needs will be successful in today’s dynamic marketing environment (Oates 2014). Our findings indicate that while authenticity is Airbnb’s key positioning platform, hotels must focus on building brand love through marketing activities that heighten customers’ perceptions of the authenticity of their brands. Hotel brands should leverage their “legacy” connotations as sincere and genuine providers of authentic hospitality. For example, the idea of localness, a dimension that is actively absorbed by the customer, is often a source of authentication of the consumption experience (Mkono 2013b). Hotel websites could highlight lifestyle content about local music, food, and arts, both on-property and off-site, with the hotels positioned as a base from which to explore the locale (Oates 2015a). Hotel marketing materials could feature photography, local editorial perspective, insider tips from locals, and practical information about neighborhoods in order to make the point that staying at the hotel will facilitate an authentic local experience.

Relatedly, hotel brands must leverage the philosophy and practice of strategic content marketing to heighten customer perceptions of their authenticity as travel brands. Thus, even if the content of a brand’s marketing endeavors does not relate directly to the business itself, in this case the hotel product, it is considered important if it provides the customer with a relevant and memorable experience. Brand managers must adopt a strategic approach to content marketing that enables marketing activities that build brand love through authentic—original and genuine—content. Such content efforts must be informed by sophisticated and creative understanding of the target customers’ demographic

and psychographic characteristics (Oates 2015b). In the present study, the authors found that customers in the Airbnb group were younger, better educated, and more likely to comprise a variety of ethnicities than those in the hotel group, which is likely to have impacted these customers' perceptions of consumption authenticity and subsequent brand-related outcomes. In sum, given the importance of the brand and the loyalty program to hotel companies, we argue that the creation of authentic brands that generate brand love should be of paramount significance to industry marketers.

Limitations and Future Research

As with any research, this study has limitations in both execution and interpretation. First, our participants were largely white and all from the United States. Particularly when speaking of such culturally constructed concepts as authenticity, identity, and brand love, it is wise to consider that our results may not be generalizable across cultures and locations. Future research should explore the ways in which these concepts apply to other populations. Second, it is important to note that many of our measurement items were derived from studies previously published not in the hospitality literature but in the sociology, psychology, and marketing literatures. While each scale was adapted from a previously validated study, it is yet unclear whether the application to the travel and tourism context is optimally effective. While the scales chosen to measure our factors did demonstrate good face and construct validity, future research in hospitality and tourism could explore the use of other measurement scales in order to ascertain how constructs such as authenticity and brand love can best be measured in a hospitality context. Third, this study introduced the construct of consumption authenticity as a global, holistic assessment of the authenticity of a travel experience in the context of hotels and Airbnb. We proposed that consumption authenticity comprises brand, existential, and intrapersonal authenticity, but future research could expand our understanding of this critical construct by testing additional components, boundary conditions, and alternative characterizations. Specifically, the testing of alternative models using both covariance-based (traditional SEM) and component-based (PLS-SEM) structural equation modeling presents rich avenues for future research. Lastly, our finding that hotels and Airbnb draw upon different sources of authenticity to create brand-loving customers suggest a fruitful area for future research. Further investigation into these different pathways from consumption authenticity to brand love and brand loyalty could enhance our understanding of the mechanisms through which lodging consumers find meaning in their travel experiences. Moreover, this meaning might be different depending on the type of hotel (e.g., luxury vs. midscale) or Airbnb (e.g., entire home vs. shared room) experience, which offers future researchers the opportunity to explore various subsegments of consumers within the accommodations industry.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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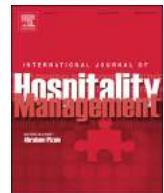
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Going back to its roots: Can hospitability provide hotels competitive advantage over the sharing economy?



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ARTICLE INFO

Keywords:
Hospitability
Experience economy
Experiencescape
Airbnb
Memorable

ABSTRACT

While the customer experience is at the heart of the hospitality industry, experience-related research remains underrepresented. This gap is critical, particularly given the emerging threat of the sharing economy to the hotel industry along experiential factors. Using data from a survey of 630 customers who stayed at a hotel or an Airbnb, the authors use structural equation modeling to compare two models with alternative conceptualizations of the dynamics of experiential consumption in the accommodations industry. Building on the concept of the experiencescape from the branding and hospitality and tourism literatures, the model enhances Pine and Gilmore's (1998) original experience economy construct by demonstrating the critical role of the dimension of hospitability in facilitating favorable experiential and brand-related outcomes, particularly in the context of the hotel experience. The findings have important implications for the hotel industry's strategic experience design initiatives and emphasize the need to use hospitability in order to create a competitive advantage in a rapidly changing environment.

1. Introduction

The sharing economy has emerged recently as a significant competitor for the hotel industry. While previous research suggests that lower-end hotels and hotels not catering to business travelers are more likely to be substituted with accommodations in the sharing economy (Zervas et al., 2017), more recent evidence shows the sharing economy to be a significant current and future competitor to the hotel industry across an even broader variety of consumer markets (Trivett, 2013). Given its position as the world's largest accommodations provider in the sharing economy, following a series of acquisitions, Airbnb is the undoubtedly the hotel industry's largest competitor and the focus of the present study.

A number of economic, social, and technological changes in society have fueled the growth of the sharing economy. These changes are reflected in the experiential value propositions of sharing economy providers (Dredge and Gyimóthy, 2015; Trivett, 2013). In the case of Airbnb, they are evidenced in the company's strategic positioning platforms: *Belong Anywhere* and *Live There*. From providing an unprecedented range of differentiated accommodations—a US\$15 per night spot on the couch to an \$8000 per night mansion—to testing hotel-style packaging and amenities, such as local treats, wines, and

upgraded bath products in a select number of highly rated listings in Sonoma, the company's focus on enhancing the guest experience lies at the very heart of its strategic plans for the future (Carr, 2014). Thus, while regulating the sharing economy is likely to level the playing field to a certain extent, the hotel industry must look to contend with the underlying experiential drivers of the popularity and growth of the sharing economy. The fundamental alteration of customers' overall travel experiences instigated by the emergence of the sharing economy (Guttentag, 2015) warrants an exploration into the evolving nature and dynamics of the accommodations industry, which in the present study is defined as the hotel industry and accommodations service providers in the sharing economy.

There is sufficient evidence in the academic literature to suggest that experience is at the heart of the hospitality and tourism industry (Hwang and Seo, 2016). Despite this recognition, experience-related research remains underrepresented in the hospitality and tourism literature (Ritchie et al., 2011). Moreover, a large portion of studies in the domain of customer experience management (CEM) in the hospitality industry remains conceptual. The uniquely experiential nature of hospitality and tourism services calls for systematic, theory-driven research and more sophisticated models of experiential consumption (Hwang and Seo, 2016; Walls et al., 2011). Thus, in view of these two

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trends—that is, the sharing economy's challenge to the hotel industry along experiential factors and the scope for more experience-related research in the literature—the present study examines the role of *hospitableness* in facilitating memorable experiences and customers' loyalty towards brands in the accommodations industry. The recognition of the importance of hospitableness has resulted in research that identifies its various dimensions. However, an understanding of its impacts on the dynamics of experiential consumption in the accommodations industry is limited, particularly in the context of the sharing economy. Moreover, while "creating memorable experiences is the essence and raison d'être of the hospitality industry" (Pizam, 2010), existing research into hospitality and tourism experiences has ignored the role of the brand in facilitating memorable experiences, and has also ignored subsequent brand-related outcomes (Hwang and Seo, 2016). In this regard, the present study leverages the extensive literature in the branding domain to submit the following proposition: given that brand loyalty stems from repeated brand consumption experiences, firms can gain more control over brand loyalty by creating *experiencescapes* (Mossberg, 2007; O'Dell, 2005) that house cognitively and emotionally stimulating experiences for customers (Ponsonby-Mccabe and Boyle, 2006). The authors examine the role and contribution of hospitableness to the experiencescape in the accommodations industry and in facilitating favorable experiential and brand-related outcomes. In so doing, the authors seek to achieve two objectives:

1. Enhance Pine and Gilmore's (1998) seminal experience economy construct in the context of the accommodations industry i.e. to develop the concept of experiencescape in the accommodations industry to include the dimension of hospitableness.
2. Examine the ability of the enhanced experiencescape that includes the dimension of hospitableness to produce emotional and memorable consumption experiences and subsequent brand loyalty outcomes.

2. Literature review

2.1. Experiential research in hospitality and tourism

The concept of the experience economy, pioneered by Pine and Gilmore, posits that as services become increasingly commoditized, companies must look to differentiate their offerings by focusing on the design and delivery of experiences (Pine and Gilmore, 1998). The concept of the experience economy has particular relevance for the hotel industry, in which "almost any service can be leveraged to stage a more compelling experience" (Gilmore & Pine, 2002, p. 88). While this would suggest a higher output of academic research on experiences, there has been no substantial increase in experience-related papers despite growth in the total number of articles published by each major journal in hospitality and tourism (Ritchie et al., 2011).

To address the dearth of conceptual frameworks for CEM in hospitality and tourism research, particularly given the emerging threat of the sharing economy, we proffer the model of experiential consumption in the accommodations industry (Fig. 1). The model is based on the literature pertaining to consumption experiences in both the branding and hospitality and tourism domains. It is built on the understanding that the consumption experience, a phenomenon that involves the consumer's subjective evaluation of the cognitive, affective, and relational interaction with the item consumed, is the ultimate point of brand differentiation in today's overcrowded marketplace (Morrison and Crane, 2007; Ponsonby-Mccabe and Boyle, 2006; Zomerdijk and Voss, 2010). In line with the objectives of the present study, the model enhances the concept of the experience economy in the accommodations industry, and, in so doing, examines the role of hospitableness in the evolving dynamics of experiential consumption in the accommodations industry. In the following sections, we present the literature from the domains of branding and hospitality and tourism that supports

the model of experiential consumption and its various hypotheses.

2.2. Dimensions of the customer experience

In their seminal work on the nature of the consumption experience, Pine and Gilmore (1998) identified four dimensions—entertainment, education, escapism, and esthetics—differentiated at two levels: (1) the degree of customer involvement (passive vs. active participation) and (2) the degree to which the customer connects or engages with the event or performance (absorption vs. immersion) (Hosany and Witham, 2010). These four dimensions have been extensively researched in hospitality and tourism, with applications in the bed-and-breakfast sector (Oh et al., 2007), cruise industry (Hosany and Witham, 2010), wine tourism (Quadri-Felitti and Fiore, 2016), and golf tourism (Hwang and Lyu, 2015), among others. In a recent study, Mody et al. (2017) added four more dimensions to the experience economy construct in the context of the accommodations industry. However, existing research has ignored the fact that in the hospitality and tourism industry, "the human component of the product [is identified] as the most essential ingredient for a positive consumption experience. Especially for those serviceable products that are generally labeled with the umbrella term of hospitality, the hospitableness element of the human component is what makes the product special." (Tasci & Semrad, 2016, p. 30). Thus, in the context of the accommodations industry, the authors argue for the addition of the concept of hospitableness to the original four-dimensional structure of the experience economy.

2.2.1. Hospitableness and the customer experience

While an essential component of the hospitality industry, the concept of hospitableness has only recently gained the attention of academic researchers. One of the first to delve into the concept, Telfer (2000) differentiated between hospitality as the provision of food, drink, and accommodation to visitors, and hospitableness as an orientation possessed by hospitable people. The distinction is important, for it highlights that hospitableness can exist without the provision of hospitality (as in the case of a receptionist welcoming and dealing with visitors in a hospitable manner); however, for true or genuine hospitality to be delivered, hospitableness is essential (Brotherton, 1999). O'Connor (2005) makes a similar assertion, and further differentiates between service-orientation and hospitableness: while a service-orientation requires skillfulness, attentiveness, and experience, all of which can be developed over time, for genuine hospitality to be delivered, employees must possess and deliver high levels of natural hospitableness. In this regard, true hospitableness comprises the overarching layer of hospitality and surrounds the inner layers that comprise the sustenance needs of food, drink, and shelter, the entertainment needs of socializing, learning, and self-actualization, and the need for high quality service (Tasci and Semrad, 2016: see Fig. 1., p. 32).

Thus, in the context of modern commercial hospitality, which still requires highly interactive and dynamic face-to-face encounters between consumers and providers, hospitableness can serve as a brand differentiator by creating inimitable superior value and positively impacting long-term competitive performance and brand loyalty (Hemmington, 2007; Lashley, 2008; Tasci and Semrad, 2016). This recognition has motivated a line of recent research that measures concept of hospitableness and identifies its various dimensions (Pijls et al., 2017). In their seminal work, Ariffin and colleagues (Ariffin, 2013; Ariffin and Maghzi, 2012; Ariffin et al., 2011) identified three dimensions of hotel hospitality: *personalization*, *comfort*, and *warm welcoming*. Expanding on this research in different consumption contexts, Tasci and Semrad (2016) developed a Hospitableness Scale comprising the dimensions of *heartwarming*, *heart-assuring*, and *heart-soothing*. In general, these scales capture the extent to which hosts' hospitable behavior is motivated by and manifests in a genuine desire to please and care for others (Lashley, 2008; Telfer, 2000) and the extent to which hosts' understand and cater to guests' needs "to feel

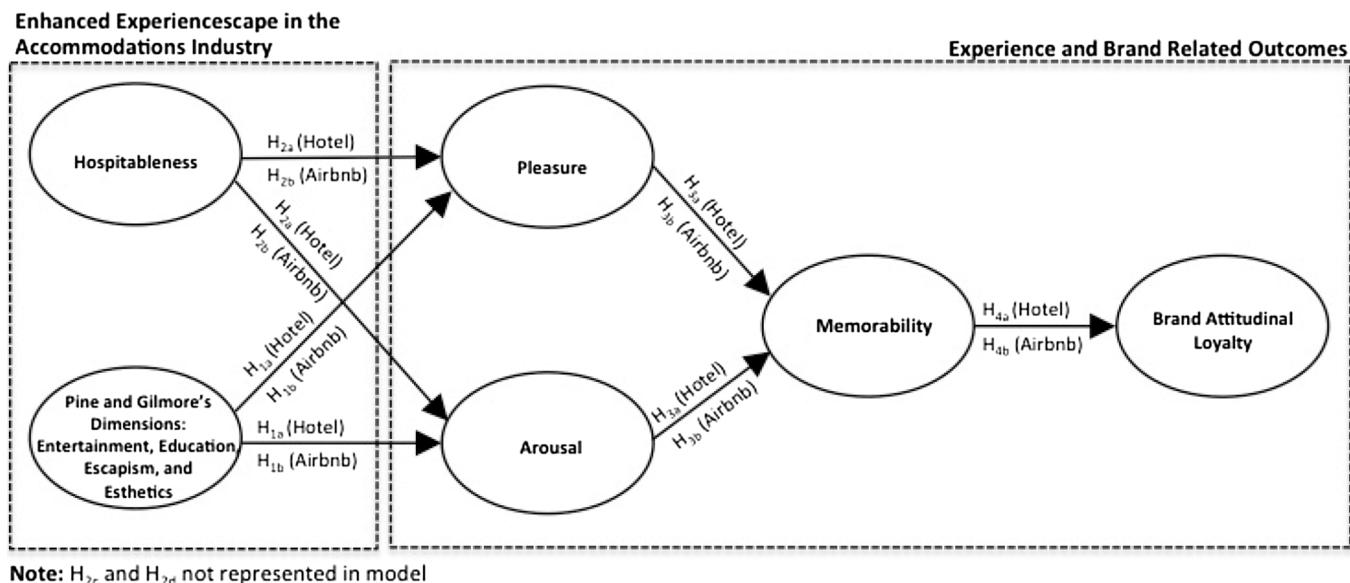


Fig. 1. Model of experiential consumption in the accommodations industry.

welcome as an individual, together with the need to feel respected and valued; the need to feel that the welcome and service by the host(s) is genuine and heartfelt" (Lashley, 2008, p. 82).

While existing research has provided useful measures of the concept and dimensions of hospitality, its role in facilitating memorable experiences and customers' loyalty towards brands in the hospitality industry has not been explored. The "paradigm shift from the utilitarian view to experiential view of consumption in experience economies [has rendered] hospitality as a crucial dimension in the creation of memorable experiences" (Tasci & Semrad, 2016, p. 31). According to Lashley (2008), staff performance and the qualities of hospitality are the key sources to generating emotions that elicit customer satisfaction and long-term customer loyalty. Thus, in the context of hospitality and tourism, not only does the literature makes a persuasive argument to add hospitality to the experiencescape in the accommodations industry, but also to examine its contribution to the outcomes of brand consumption experiences. Our inclusion of hospitality is timely given the sharing economy's challenge to the hotel industry along experiential lines, and, specifically, given Airbnb's efforts and strategic plans to enhance the guest experience through hospitality (Carr, 2014; "Hosting Standards," n.d.).

2.3. Experiencescapes in the accommodations industry

In the present study, the authors facilitate the inclusion of hospitality to the consumption experience by adopting a marketing approach to the tourist experience and leveraging the extensive literature in the branding domain. We propose that Pine and Gilmore's (1998) original experience economy construct—including the four dimensions of entertainment, esthetics, education, and escapism—and the added dimension of hospitality comprise brand environments called *experiencescapes*: experiential brand consumption spaces that house cognitively and emotionally stimulating experiences for customers. From a strategic marketing perspective, the objective of a brand is to facilitate brand loyalty through memorable brand consumption experiences (Ding and Tseng, 2015; Morrison and Crane, 2007; Ponsonby-Mccabe & Boyle, 2006; Voss, Roth, & Chase, 2008; Zomerdijk and Voss, 2010). This recognition motivates our use of the concept of experiencescape in the present context of the accommodations industry.

The concept of experiencescape is based on a marketing perspective which recognizes that "experiences are highly personal, subjectively perceived, intangible, ever fleeting and continuously on-going" (O'Dell,

2005, p. 15). It has an obvious parallel to the concept of servicescape and represents the arena in which experiences are staged and consumed (Mossberg, 2007). Experiencescapes, which represent a blend of many elements (both physical and imagined), "are [thus] spaces of pleasure, enjoyment and entertainment, as well as the meeting grounds in which diverse groups move about and come in contact with one another" (O'Dell, 2005, p. 16). Their study allows us to come to terms with the cognitive, social, and cultural processes that work to define and frame them (O'Dell, 2005). Moreover, the experiencescape is particularly important for its strategic role in effecting favorable customer outcomes, which in the present study, comprise the experiential outcomes of emotions and memorability, and the brand-related outcome of attitudinal loyalty.

2.4. Experiencescapes and emotions

The literature on experience in the fields of branding and hospitality and tourism attests to the ability of a strategically designed brand experience i.e. experiencescape to effect favorable emotional responses in customers. The experiencescape thus serves as the canvas for the consumption experience; the various dimensions that comprise the experiencescape serve as the cognitive cues from which consumers derive "some feeling for the value of the brandscape experience" (Ponsonby-Mccabe and Boyle, 2006, p. 183). Emotions then serve as mediators between experiential stimuli and subsequent customer responses (Hwang and Seo, 2016). In their study of four brands in the foodservice industry, Ding and Tseng (2015) found that the positive hedonic emotions of pleasure and arousal play a powerful mediation role in the relationships between the various dimensions of the brand experiencescape and brand loyalty. Morrison and Crane (2007) also emphasized the need for marketers to build strong service brands by creating and managing emotional brand consumption experiences. A key characteristic of experience-centric services such as hospitality "is that they encourage customer loyalty by creating emotional connections through engaging, compelling, and consistent contexts" (Zomerdijk and Voss, 2010, p. 67). Interestingly, Zomerdijk and Voss (2010) also identified the role of service employees in engaging customers through behaviors that demonstrate genuine and natural hospitality. Thus, the concept of hospitality also has theoretical support in the literature pertaining to branding and service and experience design. Given that "consumers seek positive hedonic emotions in the consumption process and marketers induce positive hedonic emotions by experiential

marketing" (Ding & Tseng, 2015, p. 998), the present study examines the influence of the experiencescape in the accommodations industry on the positive emotions of pleasure and arousal.

2.4.1. Pine and gilmore's dimensions and emotions

The relationships between Pine and Gilmore's (1998) four dimensions of entertainment, esthetics, education, and escapism and the emotions of pleasure and arousal have support in the hospitality and tourism literature (Hosany and Witham, 2010; Kastenholz et al., 2018; Oh et al., 2007). For example, in a study of rural B&B's in Portugal, Loureiro (2014) found the four dimensions had a significant and positive impact on pleasant arousal, a finding that has support in non-tourism domains (e.g. Bhate and Hannam, 2014; Jeong et al., 2009).

Thus, in the context of the context of customers' accommodations—i.e. hotel and Airbnb—experiences, we hypothesize:

H_{1a}. The four dimensions of the experience economy construct—entertainment, esthetics, education, and escapism—positively influence customers' feelings of pleasure and arousal in the context of the hotel experience.

H_{1b}. The four dimensions of the experience economy construct—entertainment, esthetics, education, and escapism—positively influence customers' feelings of pleasure and arousal in the context of the Airbnb experience.

2.4.2. Hospitability and emotions

In addition to the relationship between the original dimensions of the experience economy construct and emotions, the literature has also proposed the critical role of hospitality in eliciting desirable positive emotional responses (Ariffin, 2013; Ariffin and Maghzi, 2012; Ariffin et al., 2011; Ariffin et al., 2013; Hemmington, 2007; Lashley, 2008; Lugosi, 2008; Tasci and Semrad, 2016). Despite this, there is no empirical research that has tested these relationships. Lashley et al.'s (2005) study into the emotions of hospitality through special meal occasions, and Teng and Chang's (2013) examination of customer value in restaurant consumption come closest. However, while Lashley et al.'s (2005) study was qualitative, and heavily context-dependent (special meal occasions), Teng and Chang (2013) examined the moderating effect of employee hospitality on customer's affective responses (arousal). Similarly, Omar and Ariffin (2016) found that hospitality mediates the relationship between surprise and customer delight, alluding to its potential to elicit positive customer emotions such as pleasure and arousal. Thus, the testing of the following propositions, in the context of customers' accommodations i.e. hotel and Airbnb experiences, represents a significant contribution to the literature:

H_{2a}. Customers' favorable perceptions of the hospitality of their hotel staff positively influence their feelings of pleasure and arousal in the context of the hotel experience.

H_{2b}. Customers' favorable perceptions of the hospitality of their hosts positively influence their feelings of pleasure and arousal in the context of the Airbnb experience.

2.4.3. Hospitability: a comparison of hotels and airbnb

While the testing of these relationships between hospitality and emotions (H_{2a} and H_{2b}) makes a significant contribution to the literature, they must be developed further given the context of the present examination: the sharing economy's challenge to the hotel industry along experiential factors. Ritzer (2007) has argued that certain trends and tendencies are increasingly driving the hospitality industry, and hotels in particular, towards the inhospitable. The McDonaldization of the industry—the need for greater efficiency, predictability, calculability, and control—enabled by non-human technologies is increasingly limiting and replacing what human employees do. On the other hand, the experiential drivers fueling the growth of the sharing

economy include the customer's desire for more authentic, local experiences and more meaningful social interactions with locals—hosts and the community (Guttentag, 2015; Trivett, 2013; Tussyadiah, 2015). Thus, it has been suggested that the accommodation experience in the sharing economy can facilitate an intimacy of relationships that tourists cannot receive in other, "more professional" hospitality experiences (Dredge and Gyimóthy, 2015). For example, in a comparison of hotels and sharing economy accommodation rentals in Portland, Oregon, Tussyadiah and Zach (2015) found that reviews for sharing economy rentals put more emphasis on the hospitality of the host (i.e. the experience of being welcome in someone's home), while those for hotels emphasized conveniences (e.g. airport shuttle services, free parking, in-room services etc.). Thus, based on existing research and evidence from broader trends impacting the hotel industry and those supporting the growth of the sharing economy, the authors hypothesize:

H_{2c}. Customers' favorable perceptions of the hospitality of their hosts positively influence their feelings of pleasure and arousal to a greater degree in the context of the Airbnb experience than the extent to which customers' favorable perceptions of the hospitality of their hotel staff positively influence their feelings of pleasure and arousal in the context of the hotel experience.

Moreover, it has been suggested that Airbnb hosts are willing to go the extra mile for customers to provide them with unique hospitality experiences, which facilitate perceptibly more hospitable host–visitor relations not achievable within traditional tourism systems (Dredge and Gyimóthy, 2015; Tussyadiah and Pesonen, 2016). Such a proposition is also embedded within discussions of the philosophy of hospitality in the domestic/private domain as compared to commercial hospitality experiences (Hemmington, 2007; Lashley, 2008; Telfer, 2000). Lalicic and Weismayer (2017) surmise that Airbnb hosts feel the need to be more hospitable because it contributes to the perceived authenticity of the sharing economy experience that their guests desire. Thus, the authors present the following hypothesis pertaining to the concept of hospitality in the accommodations experience:

H_{2d}. Customers' perceptions of hospitality are higher for the Airbnb experience than for the hotel experience.

2.5. Emotions and memorability

Pine and Gilmore (1998) suggested that the generation of favorable customer emotions results in a more memorable consumption experience. Memorability thus represents a distinct economic value proposition to the experience-seeking customer, a finding that has been established in the hospitality and tourism literature. For example, in the context of rural tourism experiences, Loureiro (2014) found that pleasant arousal influenced the creation of positive memories, which subsequently resulted in favorable behavioral intentions.

The relationship between emotions and memorability is also well established in the marketing and branding literature. For example, Iglesias et al. (2011) found that while functional benefits are indispensable to avoid customer dissatisfaction, in today's competitive environment, brands must aspire "to differentiate and deliver a brilliant brand experience, as emotions elicited during consumption experiences seem to have a strong impact on consumers' memory" (p. 572). This relationship between emotions and memory has a foundation in the neuroscience, a field that has informed modern advertising practice. Using brain-imaging and experimental techniques, Ambler et al. (2000) found that the parts of the brain that are responsible for the registration and processing of emotional experiences are also involved in the pathways to and from long-term memory; thus, emotional stimuli are more likely to be remembered and lead to subsequent choice of the brands involved. Specifically, research in psychology has emphasized that events that are appraised as achieving their concerns—or in the present context, consumption experiences that effectively leverage the

various dimensions of the experiencescape in the accommodations industry—lead to the positive emotions of pleasure and enjoyment, which subsequently effect memory and learning (Bower, 1992). Thus, in the context of these and other studies in the branding and hospitality and tourism domains (Haneffors and Mossberg, 2003; Hosany and Gilbert, 2010; Voss et al., 2008), the authors hypothesize:

H_{3a}. Pleasure and arousal positively influence the memorability of the hotel experience.

H_{3b}. Pleasure and arousal positively influence the memorability of the Airbnb experience.

2.6. Memorability and brand loyalty

From a brand perspective, memorable consumption experiences emanating from favorable emotional responses should subsequently translate into brand loyalty, a hypothesis that has import in the branding literature (Pullman and Gross, 2004). For example, in their study of several experience-based business, including leisure or tourism experiences, Voss et al. (2008) found that consistent with the experiencescape paradigm, businesses that evoked customer emotions which engaged customers in memorable ways created significant customer value that subsequently resulted in strong, positive word-of-mouth and repeat visits. That brand choice, like any human decision, is driven by what we have in our heads i.e. our memory, is a finding supported by neuroscience (Ambler et al., 2000). While the link between memorability and *attitudinal loyalty*, conceptualized as behavioral intention, has been established in the hospitality and tourism literature (Ali et al., 2016; Loureiro, 2014; Oh et al., 2007), much of this research has examined attitudinal loyalty towards a specific destination or the experience itself. “Little attention has been devoted to brand-related outcomes in hospitality and tourism research” (Hwang & Seo, 2016, p. 2232). Given that the objective of a brand is to facilitate brand loyalty through memorable brand consumption experiences, the authors propose the following hypotheses:

H_{4a}. Higher memorability of the hotel experience positively influences customers' attitudinal loyalty towards the hotel brand.

H_{4b}. Higher memorability of the Airbnb experience positively influences customers' attitudinal loyalty towards the Airbnb brand.

Since the objective of the present study is to determine whether the concept of hospitability makes a valuable addition to the experiencescape in the accommodations industry, we test two alternative models. In model 1 (Fig. 1) presented earlier, and as explained above, we hypothesize that hospitability is a dimension that comprises an enhanced experiencescape in the accommodations industry, whereby it contributes to the positive customer emotions of pleasure and arousal. In model 2, we remove hospitability as an antecedent of pleasure and arousal, and thus exclude the relationships suggested by hypotheses 2a, 2b, 2c, and 2d in model 2 (Fig. 2). Comparing the results of these two models allows us to more conclusively establish whether hospitability is indeed a valuable *addition* to existing experiencescape in the accommodations industry, which comprises Pine and Gilmore's four dimensions.

3. Methodology

3.1. Data collection

The sample for the study was drawn from an extensive panel provided by the online research company Qualtrics. Since the purpose of the study was to compare and contrast customers' experiences of hotels and Airbnb, the authors separately surveyed individuals who had stayed at least one night at a hotel or an Airbnb for the purpose of leisure in the last three months, a timeframe selected to elicit more

recent memories and thus reduce errors and biases of recall (Kahneman et al., 2004). Following Hosany and Gilbert's (2010) use of the retrieval hypothesis, respondents were instructed to recall their most recent hotel or Airbnb experience and were provided cues to remember their experience as vividly as possible. A total of 630 usable responses were collected: 315 for the hotel sample and 315 for the Airbnb sample. The sample represents forty-five of the fifty states in the U.S.

3.2. Survey development

The items used to operationalize the various constructs in the model in Fig. 1 were measured on a 7-point Likert scale (1 = Strongly Disagree and 7 = Strongly Agree). The items pertaining to the original dimensions of the experience economy construct—entertainment, esthetics, education, and escapism—were adapted from Oh et al. (2007). Hospitability was measured as the manifestation of the nature of the host-guest interaction during the hotel/Airbnb experience (Hemmington, 2007; Lashley, 2008), adapting items from studies that have measured the construct. Specifically, overlapping items from Tasci and Semrad's (2016) *heartwarming* dimension and Ariffin's (2013) *personalization* and *warm welcoming* dimensions were adapted for the present examination; these studies found the items comprising these dimensions to be of highest importance to customers across different consumption contexts, including accommodation.

Measures of pleasure and arousal were adapted from the studies of Hosany and Gilbert (2010) and Oh et al. (2007) respectively. The memorability of the accommodation experience was measured using items adapted from Oh et al. (2007) and Tung and Ritchie (2011). Attitudinal loyalty, defined as “a deeply held psychological commitment to repurchase a product or repatronize a service in the future” (Oliver, 2010, p. 23), was measured using items from previous studies (Li and Petrick, 2008; Mody et al., 2014). However, given that the present study examines customers' attitudinal loyalty towards the brand, the measures were adapted to capture this critical brand-related outcome. Appendix A indicates the items used to measure the various constructs in the model.

3.3. Analysis

As the first step in analyzing the data, descriptive statistics and distributions were assessed. Second, *t*-tests were conducted to compare the mean scores on the various constructs in the model between hotels and Airbnb in order to assess their relative performances on these dimensions, including hospitability, thereby testing hypothesis 2d for model 1. Third, the authors conducted a confirmatory factor analysis (CFA) on the constructs used in models 1 and 2, using multiple-group analysis. While providing indications of fit for an overall model of the accommodation experience, multiple-group analysis provides separate estimates for the hotel and Airbnb samples, enabling the authors to test the various hypotheses of the present study. Given the study's objective—to examine the role and contribution of hospitability to the experiencescape in the accommodations industry and to the outcomes of brand consumption experiences—the four original dimensions of the experience economy construct were modeled as a second order construct, which is consistent with previous studies (Ali et al., 2016; Knoblock et al., 2017; Loureiro, 2014). Thus, methodologically, the dimension of hospitability serves as a latent covariate to Pine and Gilmore's original experience economy construct in predicting experiential and brand-related outcomes in the accommodations industry. CFA was also used to test for common method bias and convergent and discriminant validity.

This was followed by the fourth stage of analysis, in which the authors conducted multiple-group structural equation modeling (SEM) to test the two alternative models in Figs. 1 and 2, with and without hospitability, and thus the study's various hypotheses. SEM allowed the authors to understand the dynamics of customers' experiential

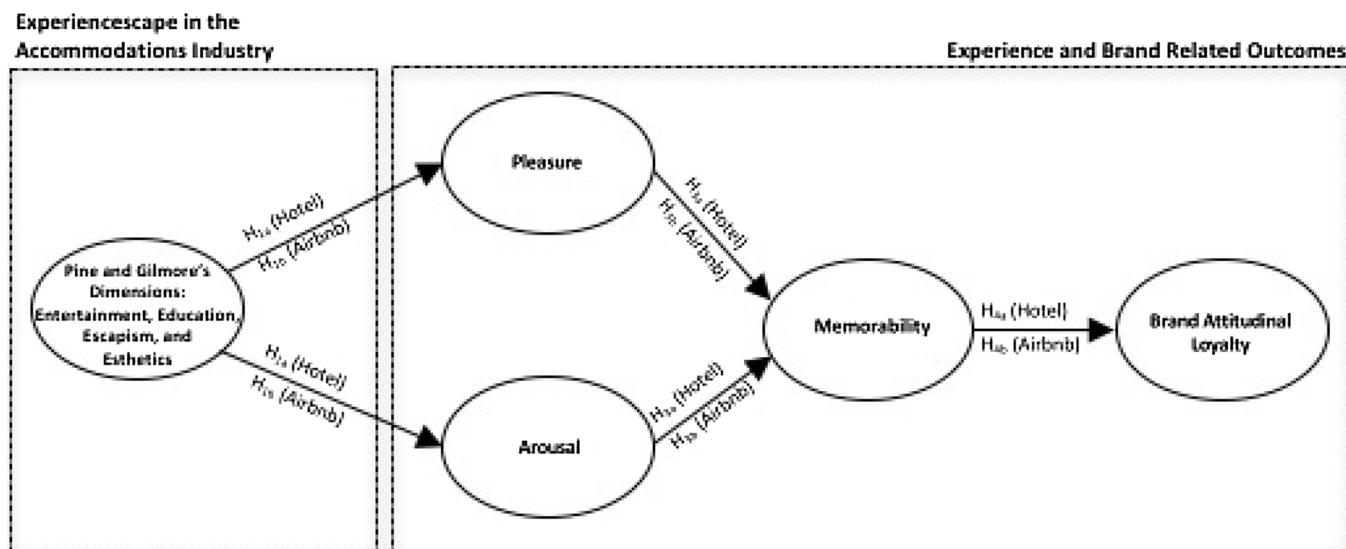


Fig. 2. Alternative model of experiential consumption in the accommodations industry: without hospitability (Model 2).

involvement with hotels and sharing economy providers. In the fifth and final stage of analysis, the authors used the pairwise parameter comparison test for hypothesis 2c for model 1. Prior to this test, the authors tested for the measurement invariance of the multiple-group model 1.

4. Results

The profile of the respondents in the hotel and Airbnb samples is presented in Table 1. Using a series of chi-square tests, the authors found that the hotel and Airbnb samples differed significantly ($p < .001$) in terms of respondents' age, education, household status, and income levels. Table 1 indicates that respondents in the Airbnb sample were younger, better educated, more likely to be married with children, and to have higher incomes than those in the hotel sample.

Appendix A presents the summary statistics for the items used to measure the various constructs of the model for both the hotel and Airbnb samples. One particularly noteworthy finding is that the means for all items were higher for the Airbnb sample than for the hotel sample.

4.1. Comparing construct means: hotels vs. airbnb

The authors used *t*-tests to compare the mean scores on the various constructs between the hotel and Airbnb samples. The mean scores were calculated as the average score of the items used to measure each construct. The results of this comparison are presented in Table 2. Consistent with the means presented in Appendix A, respondents in the Airbnb sample reported significantly higher mean scores on all constructs in the model, except the dimensions of hospitability and attitudinal loyalty. Thus, while Airbnb appears to be facilitating consumption experiences that leverage the four original dimensions of the experience economy construct to a greater degree, hotels appear to be doing as well as Airbnb in terms of providing hospitable experiences in which guests perceive a warm welcome, respect, and a kind hotel staff that displays a genuine desire to please. Thus, hypothesis 2d is not supported by the findings of the present study.

4.2. Common method bias

As the first step in CFA, the authors tested for common method bias using one of the latent variable approaches outlined in Podsakoff et al. (2003). The authors created a second CFA model by adding a single

Table 1
Respondent profile.

Demographic Category	Hotel Sample		Airbnb Sample		Chi-Square Value (df)
	Sample Size (n = 315)	%	Sample Size (n = 315)	%	
<i>Age</i>					71.059 ^a (4)
18–25	13	4.1	28	8.9	
26–34	66	21.0	132	41.9	
35–54	105	33.3	110	34.9	
55–64	69	21.9	29	9.2	
65 or over	62	19.7	16	5.1	
<i>Gender</i>					.229 (1)
Male	160	50.8	154	48.9	
Female	155	49.2	161	51.1	
<i>Education</i>					
Grade school	2	0.6	0	0	28.044 ^a (4)
High school	25	7.9	7	2.2	
Some college	74	23.5	42	13.3	
College	134	42.5	152	48.3	
Graduate school	80	25.4	114	36.2	
<i>Household Status</i>					18.081 ^a (6)
Single	54	17.1	56	17.8	
Married w/o children	55	17.5	53	16.8	
Married with children	149	47.3	175	55.6	
Divorced/Separated/ Widowed	41	13.0	13	4.1	
Living with partner	16	5.1	18	5.7	
<i>Income</i>					
Less than \$15,000	6	1.9	9	2.9	25.510 ^a (6)
\$15,000–\$29,999	23	7.3	10	3.2	
\$30,000–\$44,999	45	14.3	22	7	
\$45,000–\$59,999	47	14.9	31	9.8	
\$60,000–\$74,999	43	13.7	52	16.5	
\$75,000–\$90,000	56	17.8	89	28.3	
More than \$90,000	95	30.2	102	32.4	

^a significant at $p < .001$.

unmeasured first-order factor (common factor) with all of the measures as indicators to the researcher's theoretical model, and then compared the standardized regression weights for all loadings across the two models. The differences in regression weights between the two models ranged from 0.057 to 0.093; none of these differences were large enough to indicate common method bias.

Table 2
Performance on experience economy dimensions: hotels vs. Airbnb.

Experience Economy Dimensions	Mean: Hotel Sample	Mean: Airbnb Sample	Difference (Hotel-Airbnb)	t
Entertainment	5.59	5.86	-0.27	3.31 ***
Education	4.65	5.59	-0.94	9.12 ***
Escapism	4.86	5.45	-0.59	5.27 ***
Esthetics	5.39	5.60	-0.21	2.24 *
Hospitalitability	5.95	6.03	-0.08	1.00
Pleasure	5.54	5.80	-0.26	3.03 **
Arousal	5.50	5.88	-0.38	4.46 ***
Memorability	5.24	5.82	-0.58	6.53 ***
Attitudinal Brand Loyalty	6.02	6.18	-0.16	1.94

*** p < .001.

** p < .01.

* p < .05.

4.3. CFA results

The results of the CFA for models 1 and 2 indicated an acceptable fit of the models to the data (model 1 fit: $\chi^2/DF = 3.134$; CFI = 0.913; TLI = 0.900; RMSEA = 0.058; SRMR = 0.052; model 2 fit: $\chi^2/df = 3.303$, CFI = 0.920, TLI = 0.907, RMSEA = 0.061; SRMR = 0.049). CFA statistics for the constructs used in models 1 and 2 are presented in Table 3. The scales indicated high reliability—Cronbach's α ranged from 0.83 to 0.93 across the hotel and Airbnb samples, well above Nunnally and Bernstein's (1994) recommended threshold of 0.70. All items loaded on to their respective constructs with high and significant ($p < .001$) standardized factor loadings that ranged from 0.773 to 0.981 for the hotel sample and from 0.745 to 0.983 for the Airbnb sample (Table 3), indicating convergent validity. The AVEs for the constructs ranged from 0.773 to 0.923 for the hotel sample and from 0.640 to 0.908 for the Airbnb sample, all higher than 0.50, further indicating convergent validity, while the square root of the AVE for each construct was greater than inter-construct correlations, across both samples, demonstrating discriminant validity (Appendix B).

From a multivariate perspective, Mardia's normalized estimate of multivariate kurtosis was found to be 350.946 and 333.109 for the hotel and Airbnb samples respectively, indicating significant positive kurtosis and that the data are multivariate nonnormal. However, an examination of the univariate skewness [(hotel sample: between -1.966 and -0.280); (Airbnb sample: between -2.120 and -0.563)] and kurtosis [(hotel sample: between -0.938 and 4.243); (Airbnb sample: between -0.057 and 6.413)] indices for the variables in the overall model indicated that the data were moderately non-normal. While the maximum likelihood estimation technique has been shown to be fairly robust to these conditions, the authors used the bootstrapping procedure with maximum likelihood estimation to address the issue of nonnormality (Bryne, 2010).

4.4. SEM results: model 1 (with hospitalitability)

The structural model indicated an acceptable fit to the data ($\chi^2/df = 3.364$; CFI = 0.901; TLI = 0.899; RMSEA = 0.061; SRMR = 0.056). Given the use of the bootstrapping procedure to address nonnormality in the data, the authors used the bias-corrected percentile bootstrap intervals to test the significance of the estimates for the various structural relationships in the model; this procedure is considered to yield the most accurate confidence intervals to test for parameter significance (Bryne, 2010). The parameter estimates, presented in Table 4, indicated that all the structural relationships in the model were significant for the hotel sample ($p < .001$), thus confirming hypothesis 1a, 2a, 3a, and 4a in the context of model 1.

However, in the case of the Airbnb sample, the relationships between hospitalitability and the emotions of pleasure and arousal, and the subsequent relationships between these emotions and memorability were not significant. Thus, while hypotheses 1b and 4b were confirmed, hypothesis 2b and 3b were not supported in the context of model 1.

To test for hypothesis 2c i.e. whether hospitalitability elicits feelings of pleasure and arousal to a greater degree in the case of the Airbnb experience than in the case of the hotel experience, a two-step analysis was employed: an initial test for measurement invariance, followed by the pairwise parameter comparison test. While the results of the CFA indicated acceptable fit of the model to the data, establishing configural invariance, the authors found no substantial differences between the other fit indices ($\Delta\text{CFI} = 0.004$, $\Delta\text{TLI} = 0$, $\Delta\text{RMSEA} = 0$, and $\Delta\text{SRMR} = 0.007$) across the configural and metric-invariant models, establishing metric invariance and allowing for the next stage of testing for structural differences. The pairwise parameter comparison test indicated that the relationships between hospitalitability and the emotions of pleasure and arousal were significantly different across the hotel and Airbnb samples. Specifically, the estimates were significantly higher for the hotel sample than for the Airbnb sample [z (difference in parameter estimates) = 2.475 and 2.027 respectively]; results that are exactly the opposite of those hypothesized in H_{2c}. Thus, while hypothesis 2c was rejected, the results demonstrate the significant potential of the enhanced hotel experiencescape, including the dimension of hospitalitability, to elicit positive affect-laden and memorable consumption experiences that subsequent result in attitudinal brand loyalty.

4.5. SEM results: model 2 (without hospitalitability)

The structural model indicated an acceptable fit to the data ($\chi^2/df = 3.558$; CFI = 0.912; TLI = 0.900; RMSEA = 0.064; SRMR = 0.054). Given the use of the bootstrapping procedure to address nonnormality in the data, the authors used the bias-corrected percentile bootstrap intervals to test the significance of the estimates for the various structural relationships in the model; this procedure is considered to yield the most accurate confidence intervals to test for parameter significance (Bryne, 2010). The parameter estimates, presented in Table 5, indicated that all the structural relationships in the model were significant for the hotel sample ($p < .001$), thus confirming hypothesis 1a, 3a, and 4a in the context of model 2. However, in the case of the Airbnb sample, as in model 1, the two relationships between the emotions of pleasure and arousal and memorability were not significant. Thus, while hypotheses 1b and 4b were confirmed, hypothesis 3b was not supported in the context of model 2.

In addition to examining the parameter estimates of the two models with and without hospitalitability, we also conducted effect size testing to determine whether the addition of hospitalitability to model 1 contributed additional explanatory power to the model. To do this, we compared the amount of variance explained (squared multiple correlations) in the exogenous constructs predicted by hospitalitability—pleasure and arousal—using Cohen's f^2 , a measure of effect size, between models 1 and 2. The difference in squared multiple correlation statistics for these two constructs in model 1 vis-à-vis the alternative model without hospitalitability (model 2) indicated that the addition of hospitalitability, as in model 1, did add explanatory power to the model in explaining the two exogenous constructs, with medium and small effect sizes for pleasure and arousal respectively [(Pleasure: R^2 for model 1 = 0.837, R^2 for model 2 = 0.804, $f^2 = 0.203$, effect size = medium) (Arousal: R^2 for model 1 = 0.944, R^2 for model 2 = 0.922, $f^2 = 0.036$, effect size = small)].

The results of these alternative models indicate that if hotels can generate positive customer emotions such as pleasure and arousal—emotions that are enhanced by the provision of more hospitable experiences, as suggested by the experiencescape literature in both the branding and hospitality and tourism domains, they can create more memorable consumption experiences that subsequently facilitate

Table 3
CFA results.

Constructs and Measurement Items ^a	Hotel Sample			Airbnb Sample		
	Standardized Factor Loading ^{**}	AVE	Cronbach's α	Standardized Factor Loading ^{**}	AVE	Cronbach's α
Second Order Loadings						
<i>Pine and Gilmore's Dimensions</i>		.811			.858	
Entertainment	.914			.904		
Education	.773			.942		
Escapism	.922			.872		
Esthetics	.981			.983		
First Order Loadings						
<i>Entertainment</i>		.90			.86	
ENT_1	.869			.795		
ENT_2	.882			.845		
ENT_3	.833			.820		
<i>Education</i>		.92			.85	
EDU_1	.899			.806		
EDU_2	.873			.857		
EDU_3	.895			.745		
<i>Escapism</i>		.87			.86	
ESC_1	.843			.825		
ESC_2	.783			.843		
ESC_3	.841			.801		
<i>Esthetics</i>		.89			.87	
EST_1	.791			.814		
EST_2	.917			.842		
EST_3	.854			.833		
<i>Hospitalitess</i>		.773	.93		.640	.88
HOS_1	.886			.845		
HOS_2	.885			.824		
HOS_3	.866			.772		
HOS_4	.880			.756		
<i>Pleasure</i>		.843	.91		.843	.84
PLEA_1	.918			.946		
PLEA_2	.876			.943		
PLEA_3	.959			.863		
<i>Arousal</i>		.923	.91		.854	.84
ARO_1	.949			.927		
ARO_2	.972			.888		
ARO_3	.961			.956		
<i>Memorability</i>		.840	.85		.908	.83
MEM_1	.936			.847		
MEM_2	.855			.962		
MEM_3	.956			.952		
<i>Attitudinal Brand Loyalty</i>		.812	.93		.771	.91
ATT_1	.929			.827		
ATT_2	.852			.885		
ATT_3	.921			.919		

* See Appendix A for items associated with the labels presented in this table.

** All loadings significant at $p < .001$.

Table 4
Results of structural equation modeling.

Path	Hotel Sample		Airbnb Sample	
	Estimate ^a	p-value	Estimate ^a	p-value
Pine and Gilmore's Dimensions → Pleasure ($H_{1a/1b}$)	.758	.023	.922	.011
Pine and Gilmore's Dimensions → Arousal ($H_{1a/1b}$)	1.029	.016	.727	.021
Hospitalitess → Pleasure ($H_{2a/2b}$)	.322	.003	.107	.555
Hospitalitess → Arousal ($H_{2a/2b}$)	.250	.009	.102	.197
Pleasure → Memorability ($H_{3a/3b}$)	.186	.016	.092	.637
Arousal → Memorability ($H_{3a/3b}$)	.772	.010	.490	.323
Memorability → Brand Attitudinal Loyalty ($H_{4a/4b}$)	.649	.012	1.435	.011

^a unstandardized estimates.

attitudinal brand loyalty. On the other hand, our results suggest that Airbnb has potentially different pathways to memorability and attitudinal brand loyalty than hotels. The emotions → memorability pathway

Table 5
Results of structural equation modeling.

Path	Hotel Sample		Airbnb Sample	
	Estimate ^a	p-value	Estimate ^a	p-value
Pine and Gilmore's Dimensions → Pleasure ($H_{1a/1b}$)	.986	.001	1.105	.001
Pine and Gilmore's Dimensions → Arousal ($H_{1a/1b}$)	1.120	.001	.931	.001
Pleasure → Memorability ($H_{3a/3b}$)	.368	.012	.053	.907
Arousal → Memorability ($H_{3a/3b}$)	.603	.004	.528	.145
Memorability → Brand Attitudinal Loyalty ($H_{4a/4b}$)	.646	.001	1.432	.001

^a Unstandardized estimates.

did not hold for Airbnb in either model 1 or 2, suggesting that the Airbnb experience becomes memorable to customers through different mechanisms i.e. there are alternative determinants of memorability for Airbnb. Examples of such determinants may include outcomes such as well-being and meaningfulness, which Mody et al. (2017) found to be

Table 6

Summary of hypotheses testing.

Path	Hotel Sample			Airbnb Sample		
	Label	Model 1	Model 2	Label	Model 1	Model 2
Pine and Gilmore's Dimensions → Pleasure	H _{1a}	Supported	Supported	H _{1b}	Supported	Supported
Pine and Gilmore's Dimensions → Arousal						
Hospitalitability → Pleasure	H _{2a}	Supported	N/A	H _{2b}	Not supported	N/A
Hospitalitability → Arousal						
Pleasure → Memorability	H _{3a}	Supported	Supported	H _{3b}	Not supported	Not supported
Arousal → Memorability						
Memorability → Brand Attitudinal Loyalty	H _{4a}	Supported	Supported	H _{4b}	Supported	Supported
<i>Comparative Hypotheses: Hotels vs. Airbnb (relevant to Model 1)</i>						
H _{2c} : Hospitalitability → Pleasure and Hospitalitability → Arousal is greater in Airbnb experiences than hotel experiences			Not supported			
H _{2d} : Hospitalitability is greater in Airbnb experiences than hotel experiences			Not supported			

significant antecedents of memorability in the context of the Airbnb experience. These findings have significant theoretical and practical implications for the hotel industry.

Table 6 presents a summary of the results of the study's hypotheses tests.

5. Discussion

In view of the sharing economy's threat to the hotel industry along experiential factors and the scope for more experience-related research in the literature, the present study sought to enhance Pine and Gilmore's (1998) concept of the experience economy in the context of the accommodations industry. Given the importance of the human component in enabling positive consumption experiences, the authors added the concept of hospitalitability to the experiencescape in the accommodations industry and examined its role in effecting favorable experiential—affective and memorability—outcomes, which in turn facilitate customers' loyalty towards brands in the accommodations industry. Contrary to previous studies that have suggested and/or demonstrated the primacy of the sharing economy in providing more meaningful, authentic, and intimate host-guest interactions, the findings of this study, summarized in Table 6, present significant evidence for hotel operators to leverage the dimension of hospitalitability, which lies at the core of providing true hospitality in a commercial setting (Hemmington, 2007; Tasci and Semrad, 2016), to facilitate memorable consumption experiences. In addition to their practical implications for the hotel industry, the findings of the present study have important theoretical implications for experience-related research in hospitality and tourism.

5.1. Theoretical contribution

First, in developing the model of experiential consumption in the accommodations industry, the present study contributes to addressing the paucity of systematic, theory-driven research in CEM in hospitality and tourism by suggesting a conceptual framework that enables "a better understanding of the sequential and enduring aspect of customer experience and thereby sustain long-term customer loyalty and commitment" (Hwang and Seo, 2016, p. 2237). Relatedly, that the concept of experiencescape has an obvious parallel to the concept and underlying dynamics of the servicescape in the hospitality industry (Ariffin et al., 2013; Spielmann et al., 2012) extends this line of research to the broader realm of CEM in hospitality and tourism (Hwang and Seo, 2016).

Second, the study contributes to understanding the evolving nature and dynamics of the accommodations industry, particularly given how little is known about how customers using sharing economy accommodations evaluate their experiences versus those who use traditional tourism services (Heo, 2016). Thus, it makes a valuable contribution to

the pursuit of a more informed, evidence-based assessment of the sharing economy and the hospitality and tourism industry (Dredge and Gyimóthy, 2015). Third, while existing research has provided useful measures of the concept and dimensions of hospitalitability, its contribution to the dynamics of experiential consumption in the hospitality industry is unexplored. The present study illuminates the role of hospitalitability in facilitating positive affect-laden and memorable experiences and customers' loyalty towards brands in the accommodations industry, specifically in the hotel context. Thus, it also adds to the nascent literature on hospitalitability in hospitality and tourism experiences. Finally, by conceptualizing attitudinal brand loyalty as the outcome of memorable consumption experiences, the study addresses the lack of attention to brand-related outcomes in hospitality and tourism research (Hwang and Seo, 2016).

5.2. Practical implications

The findings of the study also have important implications for the hotel industry's strategic experience design initiatives. It highlights to hotel operators the role of customers' experiences of hospitalitability in facilitating brand loyalty. In addition to leveraging the dimensions of entertainment, esthetics, education, and escapism, hotels have more to gain than sharing economy providers by focusing on the human dimension of the guest experience; aspects of welcoming, kindness, respect, and a genuine desire to go above and beyond, which lie at the core of providing true hospitality in a commercial setting. Interestingly, hotel industry leaders have identified this as an important trend for the next few years in terms of enhancing the guest experience: the need for hospitality to rediscover its roots and to empower employees to be better at delivering genuine hospitality that emphasizes the basics of hospitalitability (Ting, 2017).

Consistent with the propositions in the branding literature, our findings suggest that hospitalitability can serve as the differentiator that elicit emotions that have a strong impact on customers' memory. In a crowded marketplace, this dimension can help create inimitable brand value that serves as an antecedent to the consumer's differential preference for a brand (Morrison and Crane, 2007; Zomerdijk and Voss, 2010). This does not mean that every brand try and emulate the Four Seasons or the Ritz Carlton's of the hotel industry, companies that are known to deliver memorable customer experiences based on exceptionally hospitable service. Rather, brands need to create their own version of true hospitality, by adding touches that facilitate hospitable encounters as a natural extension of the customer experience.

There are several strategies that brands can adopt to facilitate such hospitable customer experiences. First, they must devise practical ways of measuring natural hospitalitability that subsequently inform recruitment practices (O'Connor, 2005). While not an easy task, such recruitment would support the development of an organizational culture that is built around the idea of *hospitalitability excellence* (King, 1995),

one that goes beyond service-orientation and service excellence (Pizam, 2012). Second, brands can re-introduce frontline hospitality staff to the need to be hospitable through training and management practice. As in the case of recruitment, this would necessitate an emphasis on *hospitableness quality*, an idea that goes beyond service quality to emphasize “hospitable hosting behavior as an extension of the natural hospitable character of the hotel staff” (Ariffin, 2013p. 176). Third, hospitality businesses should design their guest experiences to include “lots of little surprises” or “sparkling moments” (Hemmington, 2007, p. 753). While this requires brands to use the ideas and creativity of their staff to stimulate and excite their guests over time, it must go beyond formulaic giveaways; rather these surprises must be delivered in the context of an organizational culture that rewards employees for creating customer experiences that bear greater resemblance to the more genuine forms of hospitality often experienced in the private domain (Hemmington, 2007; Lashley, 2008; Telfer, 2000).

Brands must also critically examine the role of technology in facilitating hospitable guest experiences. Technology must not be implemented for the sake of novelty and innovation; rather, it must add value to the guest experience by allowing employees to amplify their delivery of a more genuine hospitality experience (Finding the Balance Between Humans and Technology in Hospitality, 2017). In an age of digital overload, travelers are “prioritizing a stronger connection among themselves and with the people they meet” (Oates, 2016). Not only does this include the locals in the destinations they visit, but also the employees responsible for delivering memorable guest experiences. Consequently, brands must emphasize the human connection in their marketing; from a content marketing perspective, brands must find the balance between communicating the “doing things” part—experiences that leverage entertainment, education, escapism, and esthetics—and the hospitableness that evokes the affective and memory antecedents of loyalty (Oates, 2016). This requires hotel employees—genuine people and real stories—to be front and center in a brand’s content marketing efforts, with technology playing a supportive role to make the hotel “more human” (Finding the Balance Between Humans and Technology in Hospitality, 2017).

Appendix A

Measurement items and summary statistics.

Constructs and Measurement Items*	Hotel Sample		Airbnb Sample		Adapted from
	Mean **	SD	Mean **	SD	
<i>Entertainment</i>					
The hotel/Airbnb experience was fun (ENT_1)	5.63	1.23	5.96	1.08	
The hotel/Airbnb was entertaining (ENT_2)	5.34	1.41	5.71	1.18	
I really enjoyed this hotel/Airbnb experience (ENT_3)	5.74	1.29	5.91	1.14	
<i>Education</i>					
I learned a lot through my experience (EDU_1)	4.69	1.55	5.66	1.24	
The hotel/Airbnb experience stimulated my curiosity to learn new things (EDU_2)	4.71	1.59	5.52	1.31	
Staying at the hotel/Airbnb was a real learning experience (EDU_3)	4.56	1.59	5.57	1.12	
<i>Escapism</i>					
Staying at the hotel/Airbnb made me feel I was in a different world (ESC_1)	4.93	1.59	5.55	1.40	
Staying at the hotel/Airbnb made me feel I was living in a different time or place (ESC_2)	4.70	1.73	5.44	1.54	
I completely escaped from reality during the hotel/Airbnb experience (ESC_3)	4.96	1.66	5.36	1.50	
<i>Esthetics</i>					
It was pleasant just being at the hotel/Airbnb (EST_1)	5.62	1.22	5.73	1.19	
The setting of the hotel/Airbnb provided pleasure to my senses (EST_2)	5.26	1.42	5.52	1.32	

The setting of the hotel/Airbnb really showed attention to detail in terms of design (EST_3)	5.28	1.43	5.54	1.28	
<i>Hospitaliteness</i>	Ariffin (2013); Tasci and Semrad (2016)				
I felt welcome at the hotel/Airbnb (HOS_1)	6.11	1.05	6.12	1.05	
The hotel staff/Airbnb host was kind (HOS_2)	5.95	1.12	6.03	1.01	
The hotel staff/Airbnb host displayed a genuine desire to please (HOS_3)	5.72	1.12	5.90	1.11	
The hotel staff/Airbnb host treated me with respect (HOS_4)	6.01	1.11	6.07	1.08	
<i>Pleasure</i>	Hosany and Gilbert (2010)				
I felt a sense of cheerfulness (PLEA_1)	5.58	1.23	5.83	1.13	
I felt a sense of joy (PLEA_2)	5.37	1.29	5.75	1.09	
I felt a sense of pleasure (PLEA_3)	5.66	1.24	5.81	1.13	
<i>Arousal</i>	Oh et al. (2007)				
The hotel/Airbnb experience was interesting (ARO_1)	5.60	1.25	6.07	1.02	
The hotel/Airbnb experience was stimulating (ARO_2)	5.19	1.40	5.68	1.18	
The hotel/Airbnb experience was enjoyable (ARO_3)	5.72	1.20	5.89	1.08	
<i>Memorability</i>	Oh et al. (2007); Tung and Ritchie (2011)				
I won't forget my hotel/Airbnb experience (MEM_1)	5.43	1.35	5.94	1.02	
I tell stories about this hotel/Airbnb experience to people I know (MEM_2)	4.97	1.63	5.76	1.10	
I like going back and re-experiencing the trip in my mind (MEM_3)	5.31	1.49	5.77	1.19	
<i>Attitudinal Brand Loyalty</i>	Li and Petrick (2008); Mody et al. (2014)				
How likely is it that you will make another trip with the hotel brand/Airbnb? (ATT_1)	6.08	1.25	6.19	1.10	
I would recommend the hotel brand/Airbnb to other people/friends and relatives (ATT_2)	6.03	1.24	6.20	1.04	
I intend to continue using the hotel brand/Airbnb (ATT_3)	6.13	1.22	6.20	1.08	

* Respondents viewed the survey with the appropriate wording (hotel brand name/Airbnb) depending on the sample to which they belonged.

** All items were measured on a 7 point Likert scale, where 1 = Strongly Disagree and 7 = Strongly Agree

Appendix B

Discriminant validity tests.

Comparison of square root of AVE and inter-construct correlations—Hotel sample.

	Arousal	Hospitaliteness	Pine and Gilmore's Dimensions	Pleasure	Memorability	Behavioral Intentions
Arousal	.961					
Hospitaliteness	.747	.879				
Pine and Gilmore's Dimensions	.864	.702	.901			
Pleasure	.883	.775	.873	.918		
Memorability	.832	.618	.893	.853	.917	
Behavioral Intentions	.637	.665	.603	.637	.467	.901

Note: Square root of AVE is on the diagonal (in bold). Inter-construct correlations are on the off-diagonal.

Comparison of square root of AVE and inter-construct correlations—Airbnb sample.

	Arousal	Hospitaliteness	Pine and Gilmore's Dimensions.	Pleasure	Memorability	Behavioral Intentions
Arousal	.924.					
Hospitaliteness	.823.	.800.				
Pine and Gilmore's Dimensions	.789	.748	.926			
Pleasure	.818	.749	.918	.918		
Memorability	.700	.744	.847	.908	.953	
Behavioral Intentions	.810	.672	.636	.767	.770	.878

Note: Square root of AVE is on the diagonal (in bold). Inter-construct correlations are on the off-diagonal.

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TOP2VEC: DISTRIBUTED REPRESENTATIONS OF TOPICS

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ABSTRACT

Topic modeling is used for discovering latent semantic structure, usually referred to as topics, in a large collection of documents. The most widely used methods are Latent Dirichlet Allocation and Probabilistic Latent Semantic Analysis. Despite their popularity they have several weaknesses. In order to achieve optimal results they often require the number of topics to be known, custom stop-word lists, stemming, and lemmatization. Additionally these methods rely on bag-of-words representation of documents which ignore the ordering and semantics of words. Distributed representations of documents and words have gained popularity due to their ability to capture semantics of words and documents. We present `top2vec`, which leverages joint document and word semantic embedding to find *topic vectors*. This model does not require stop-word lists, stemming or lemmatization, and it automatically finds the number of topics. The resulting topic vectors are jointly embedded with the document and word vectors with distance between them representing semantic similarity. Our experiments demonstrate that `top2vec` finds topics which are significantly more informative and representative of the corpus trained on than probabilistic generative models.

1 Introduction

The ability to organize, search and summarize a large volume of text is a ubiquitous problem in natural language processing (NLP). Topic modeling is often used when a large collection of text cannot be reasonably read and sorted through by a person. Given a corpus comprised of many texts, referred to as documents, a topic model will discover the latent semantic structure, or topics, present in the documents. Topics can then be used to find high level summaries of a large collection of documents, search for documents of interest, and group similar documents together.

A topic is the theme, matter or subject of a text; it is thing being discussed. Topics are often thought of as discrete values, such as *politics*, *science*, and *religion*. However, this is not to the case since any of these topics can be further subdivided into many other sub-topics. Additionally, a topic like *politics* can overlap with other topics, such as the topic of *health*, as they can both share the sub-topic of *health care*. Any of these topics, their combinations or variations can be described by some unique set of weighted words. As such, we assume that topics are *continuous*, as there are infinitely many combinations of weighted words which can be used to represent a topic. Additionally, we assume that each document has its own topic with a value in that continuum. In this view, the document's topic is the set of weighted words that are most informative of its unique topic, which can be a combination of the colloquial discrete topics.

A useful topic model should find topics which represent a high-level summary of the information present in the documents. Each topic's set of words should represent information contained in the documents. For example, one can infer from a topic containing the words *warming*, *global*, *temperature*, and *environment*, that the topic is *global warming*. We define topic modeling to be the process of finding topics, as weighted sets of words, that best represent the information of the documents.

In the remainder of this section we discuss related work and introduce distributed representations of topics. In Section 2 we describe the `top2vec` model. Section 3 describes topic information gain and summarizes our experiments, and we conclude in Section 4.

1.1 Traditional Topic Modeling Methods

The most widely used topic modeling method is Latent Dirichlet Allocation (LDA) [1]. It is a generative probabilistic model which describes each document as a mixture of topics and each topic as a distribution of words. LDA generalizes

Probabilistic Latent Semantic Analysis (PLSA) [2] by adding a Dirichlet prior distribution over document-topic and topic-word distributions.

LDA and PLSA *discretize* the continuous topic space into t topics and model documents as mixtures of those t topics. These models assume the number of topics t to be known. The discretization of topics is *necessary* to model the relationship between documents and words. This is one of the greatest weakness of these models, as the number of topics t or the way to estimate it is rarely known, especially for very large or unfamiliar datasets [3, 4].

Each topic produced by these methods is a distribution of word probabilities. As such, the highest probability words in a topic are usually words such as *the*, *and*, *it* and other common words in the language [4]. These common words, also called stop-words, often need to be filtered out in order to make topics interpretable, and extract the informative topic words. Finding the set of stop-words that must be removed is not a trivial problem since it is both language and corpus specific [5]; a topic model trained on text about *dogs* will likely treat *dog* as a stop-word since it is not very informative.

LDA and PLSA use bag-of-words (BOW) representations of documents as input which ignore word semantics. In BOW representation the words *Canada* and *Canadian* would be treated as different words, despite their semantic similarity. Stemming and lemmatization techniques aim to address this problem but often make topics harder to understand. Moreover, stemming and lemmatization do not recognize the similarity of words like *big* and *large*, which do not share a word stem.

The authors of the LDA paper explicitly state: "We refer to the latent multinomial variables in the LDA model as topics, so as to exploit text-oriented intuitions, but we make no epistemological claims regarding these latent variables beyond their utility in representing probability distributions on sets of words." [1]. The objective of probabilistic generative models like LDA and PLSA is to find topics which can be used to recreate the original document word distributions with minimal error. However, a large proportion of all text contains uninformative words which may not be considered topical. These models do not differentiate between informative and uninformative words as their goal is to simply recreate the document word distributions. Therefore, the high probability words in topics they find do not necessarily correspond to what a user would intuitively think of as being topical.

1.2 Distributed Representations of Words and Documents

In neural networks, a *distributed representation* means each concept learned by the network is represented by many neurons. Each neuron therefore participates in the representation of many concepts. When a neural network's weights are changed to incorporate new knowledge about a concept, the changes affect the knowledge associated with other concepts that are represented by similar patterns [6]. Distributed representation has the advantage of leading to automatic generalization of the concepts learned. Distributed representations are often central to NLP machine learning techniques for learning vector representations of words and documents.

Another key idea behind learning vector representations of words and documents is the *distributional hypothesis*. The essence of the idea is captured by John Rupert Firth who famously said "You shall know a word by the company it keeps" [7]. This statement implies that words with similar meanings are used in similar contexts.

The continuous skip-gram and BOW models [8, 9] known as `word2vec`, introduced *distributed word representations* that capture syntactic and semantic word relationships. The `word2vec` neural network learns word similarity by predicting which adjacent words should be present to a given context word in a sliding window over each document. The learning task of `word2vec` embraces the idea of distributional semantics, as it learns similar word vectors for words used in similar contexts. It also learns distributed representation of words, in the form of vectors, which facilitates generalization of word representation. The `word2vec` model generated word vectors produced state-of-the-art results on many linguistics tasks compared to traditional methods [8, 9, 10, 11].

There has been interest in methods of finding distributed word vectors that do not rely on neural networks. It has been shown that the skip-gram version of `word2vec` is implicitly factorizing a word-context pointwise mutual information (PMI) matrix [12], based on this finding the authors proposed *Shifted Positive* PMI word-context representation of words. This has inspired other methods such as `GloVe` [13], which learn context and word vectors by factorizing a global word-word co-occurrence matrix. Although `word2vec` implicitly factorizes a word-context PMI matrix, what it *explicitly* does is maximize the dot product between word vectors for words which co-occur while minimizing dot product between words which do not co-occur. Additionally it uses a neural network which takes advantage of its learned distributed representation of words. This allows the model to learn about all words simultaneously from a single training step on a context word [14]. The ability of `word2vec` word vectors to capture syntactic and semantic regularities of language that other methods try to recreate is a result of the former points, as is its ability to scale to large corpora [8, 15]. As shown in [10], quantitative comparisons between neural and non-neural word vectors show that neural learned vectors consistently perform better. Results from [12, 16] show that at best non-neural methods achieve

results on certain tasks that are on-par with neural methods by replicating hyper-parameters of neural methods like word2vec. These methods, however, lack the ability to scale to large corpora.

With the goal of overcoming the weaknesses of BOW representations of documents, the *distributed paragraph vector* was proposed with doc2vec [17]. This model extends word2vec by adding a paragraph vector to the learning task of the neural network. In addition to the context window of words, a paragraph vector is also used to predict which adjacent words should be present. The paragraph vector acts as a memory of the topic of the document; it informs each context window of what information is missing [17]. The doc2vec model can learn distributed representations of varying lengths of text, from sentences to documents. The doc2vec model outperforms BOW models and produces state-of-the-art results on many linguistics tasks compared to traditional methods [17] [18]. The doc2vec model was followed by many works on general language models [19] [20] [21].

1.3 Distributed Representations of Topics

A *semantic space* is a spatial representation in which distance represents semantic association [22]. A lot of attention has been given to semantic embedding of words. Specifically, distributed word vectors generated by models like word2vec which have been shown to capture syntactic and semantic regularities of language [8] [23].

The doc2vec model is capable of learning document and word vectors that are jointly embedded in the same space. It has been observed that doing so, or using pre-trained word vectors, improves the quality of the learned document vectors [18]. These jointly embedded document and word vectors are learned such that document vectors are close to word vectors which are semantically similar. This property can be used for information retrieval as word vectors can be used to query for similar documents. It can also be used to find which words are most similar to a document, or most representative of a document. As mentioned in [17], the paragraph or document vector acts as a memory of the topic of the document. Thus the most similar word vectors to a document vector are likely the most representative of the document's topic. This joint document and word embedding is a *semantic embedding*, since distance in the embedded space measures semantic similarity between the documents and words.

In contrast to traditional BOW topic modeling methods, the semantic embedding has the advantage of learning the semantic association between words and documents. We argue that the semantic space itself is a *continuous representation of topics*, in which each point is a different topic best summarized by its nearest words. In the jointly embedded document and word semantic space, a dense area of documents can be interpreted as many documents that have a similar topic. We use this assumption to propose top2vec, a distributed topic vector which is calculated from dense areas of document vectors. The number of dense areas of documents found in the semantic space is assumed to be the number of prominent topics. The topic vectors are calculated as the centroids of each dense area of document vectors. A dense area is an area of very similar documents, and the centroid, or topic vector, can be thought of as the average document most representative of that area. We leverage the semantic embedding to find the words which are most representative of each topic vector by finding the closest word vectors to each topic vector.

The top2vec model produces jointly embedded topic, document, and word vectors such that distance between them represents semantic similarity. Removing stop-words, lemmatization, stemming, and a priori knowledge of the number of topics are not required for top2vec to learn good topic vectors. This gives top2vec a major advantage over traditional methods. The topic vector can be used to find similar documents and words can be used to find similar topics. The same vector algebra demonstrated with word2vec [8] [9] can be used between the word, document and topic vectors. The topic vectors allow for topic sizes to be calculated based on each document vector's nearest topic vector. Additionally topic reduction can be performed on the topic vectors to hierarchically group similar topics and reduce the number of topics discovered.

The greatest difference between top2vec and probabilistic generative models is how each models a topic. LDA and PLSA model topics as distributions of words, which are used to recreate the original document word distributions with minimal error. This often necessitates uninformative words which are not topical to have high probabilities in the topics since they make up a large proportion of all text. In contrast a top2vec topic vector in the semantic embedding represents a prominent topic shared among documents. The nearest words to a topic vector best describe the topic and its surrounding documents. This is due to the joint document and word embedding learning task, which is to predict which words are most indicative of a document, which necessitates documents, and therefore topic vectors, to be closest to their most informative words. Our results show that topics found by top2vec are significantly more informative and representative of the corpus trained on than those found by LDA and PLSA.

2 Model Description

2.1 Create Semantic Embedding

In order to be able to extract topics, jointly embedded document and word vectors with certain properties are required. Specifically, we need an embedding where the distance between document vectors and word vectors represents semantic association. Semantically similar documents should be placed close together in the embedding space, and dissimilar documents should be placed further from each other. Additionally words should be close to documents which they best describe. With jointly embedded document and word vectors with these properties, topic vectors can be calculated. This spatial representation of words and documents is called a semantic space [22]. We argue that a semantic space with the outlined properties is a *continuous representation of topics*. Figure 1 shows an example of a semantic space.

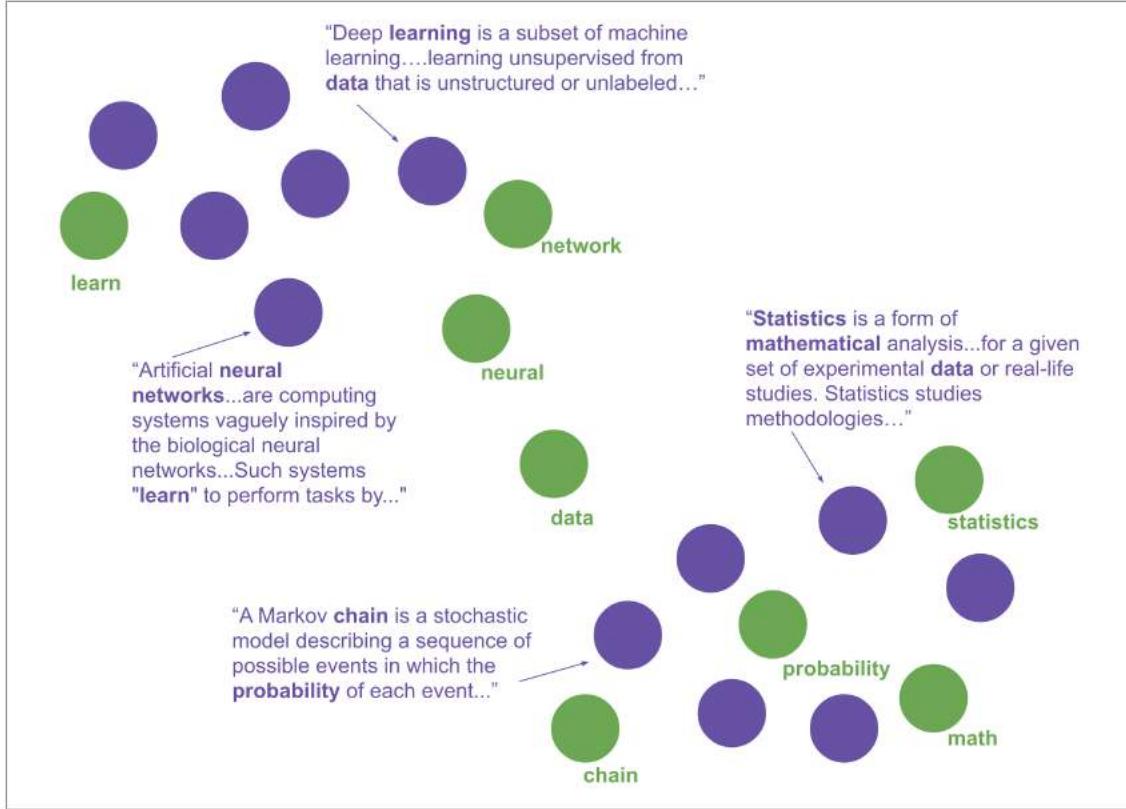


Figure 1: An example of a semantic space. The purple points are documents and the green points are words. Words are closest to documents they best represent and similar documents are close together.

To learn jointly embedded document and word vectors we use `doc2vec` [17, 24]. There are two versions of the model: the Paragraph Vector with Distributed Memory (DM) and Distributed Bag of Words (DBOW). The DM model uses context words and a document vector to predict the target word within context window. The DBOW model uses the document vector to predict words within a context window in the document. Despite DBOW being a simpler model it has been shown to perform better [18]. Our experiments confirm these results and consequently we use the DBOW version of `doc2vec`.

The `doc2vec` DBOW architecture is very similar to the `word2vec` skip-gram model which uses the context word to predict surrounding words in the context window. The only difference is that DBOW swaps the context word for the document vector, which is used to predict the surrounding words in the context window. This similarity allows for the training of the two to be interleaved, thus simultaneously learning document and word vectors which are jointly embedded.

The key insight into how `doc2vec` and `word2vec` learn these vectors is understanding how the prediction task works specifically for DBOW and skip-gram models. The `word2vec` skip-gram model learns an input word and context word vector for each word in the vocabulary. The `word2vec` model consists of a matrix $W_{n,d}$ for input word vectors

and $W'_{n,d}$ for context word vectors, where n is the size of the corpus vocabulary, and d is the size of the vectors to be learned for each word. Each row of $W_{n,d}$ contains a word vector $\vec{w} \in \mathbb{R}^d$ and each row of $W'_{n,d}$ contains a context word vector $\vec{w}_c \in \mathbb{R}^d$. For a given context window of size k , there will be k words to the left and k words to the right of the context word. For each of the $2k$ surrounding words w , their input word vector $\vec{w} \in W_{n,d}$ will be used to predict the context vector $\vec{w}_c \in W'_{n,d}$ of the context word w_c . For each surrounding word w the prediction is $\text{softmax}(\vec{w} \cdot W'_{n,d})$. This generates a probability distribution over the vocabulary, for *each* word being the context word w_c . The learning consists of using back propagation and stochastic gradient descent to update *each* context word vector in $W'_{n,d}$, and \vec{w} from $W_{n,d}$, such that the probability of the context vector given the surrounding word, $P(w_c|\vec{w})$, is greatest in the probability distribution over the vocabulary. This process is repeated for every context window for all n words. This learning process necessitates semantically similar words to have context word vectors which are close together while making dissimilar words have context word vectors which are distant. This is because in order to maximize the probability $P(w_c|\vec{w})$, the value of $\vec{w} \cdot \vec{w}_c$ must be the maximum value in $\vec{w} \cdot W'_{n,d}$. This value is maximized when \vec{w} is closest to \vec{w}_c from word all context vectors in $W'_{n,d}$. Therefore the learning process updates \vec{w} and $W'_{n,d}$ so that \vec{w} and \vec{w}_c are closer together. This can be interpreted as each context word pulling all similar context words towards it in the embedding space, while pushing away all dissimilar words. This results in a semantic space, represented by the context vectors W' , where all semantically similar words are close together and all dissimilar words are far apart.

The way the DBOW doc2vec model learns document vectors is similar to the word2vec skip-gram model. The model consists of a matrix $D_{c,d}$, where c is the number of documents in the corpus and d is the size of the vectors to be learned for each document. Each row of $D_{c,d}$ contains a document vector $\vec{d} \in \mathbb{R}^d$. The model also requires a context word matrix $W'_{n,d}$, which can be pre-trained, randomly initialized, or learned in parallel. For simplicity of the explanation, we will assume a scenario where matrix $W'_{n,d}$ has been pre-trained by a word2vec model on the same vocabulary of n words. For each document d in the corpus, the context vector $\vec{w}_c \in W'_{n,d}$ of each word in the document is used to predict the document's vector $\vec{d} \in D_{c,d}$. The prediction is $\text{softmax}(\vec{w}_c \cdot D_{c,d})$, which generates a probability distribution over the corpus for *each* document being the document the word is from. The learning consists of using back propagation and stochastic gradient descent to update *each* document vector in $D_{c,d}$ and \vec{w}_c from $W'_{n,d}$, such that the probability of the document given the word, $P(d|\vec{w})$, is greatest in the probability distribution over the corpus of documents. This learning process necessitates that document vectors be close to word vectors of words that occur in them and making them distant from word vectors of words that do not occur in them. This can be interpreted as each word attracting documents that are similar to them while repelling documents which are dissimilar to them. This results in a semantic space where documents are closest to the words that best describe them and far from words that are dissimilar to them. Similar documents will be close together in this space as they will be pulled into the same region by similar words. Dissimilar documents will be far apart as they will be attracted into different regions of the semantic space by different words.

We argue that the semantic space generated by word2vec and doc2vec is a *continuous representation of topics*. This claim can be justified by observing what the learned vector space generated by word2vec represents. This model learns a matrix $W'_{n,d}$, which contains context word vectors of dimension d for all n words it is trained on. Each word vector in this matrix alone has no meaning; it only gives relative similarity to other word vectors in the matrix. We argue that this d dimensional embedding space is a continuous representation of topics defined by the matrix $W'_{n,d}$. The matrix $W'_{n,d}$ can be seen as a linear transformation that when applied to a d dimensional vector from the embedding space generates an n dimensional vector. This vector itself is some measure of the strengths of each of the n words in the vocabulary corresponding to the point in the d dimensional space. However what this model has actually learned is how to transform points in the d dimensional space into probability distributions over the n words. Therefore any point \vec{p} , in the d dimensional space can be transformed into a probability distribution over the n word vocabulary using $\text{softmax}(\vec{p} \cdot W'_{n,d})$. Thus, any point in the d dimensional space represents a different topic. Each word vector, $\vec{w}_c \in W'_{n,d}$, corresponds to the topic in the d dimension space which has the greatest probability of word w_c . In general any point \vec{p} in the d dimensional space can be best described semantically by the nearest word vectors, since those are the words that would have the highest probability in its corresponding topic distribution over the n words in the vocabulary.

There are several hyper-parameters that have a large impact on the performance of doc2vec [18]. The *window size* is the number of words left and right of the context word. A *window size* size of 15 has been found to produce the best results [18], which our experiments support. The doc2vec model can use negative sampling or hierarchical softmax as its output layer. These are both meant to be efficient approximations of the full softmax [9]. We found that in our experiments the *hierarchical softmax* produces better document vectors. According to [18], the most important hyper-parameter is the *sub-sampling threshold*, which determines the probability of high frequency words being discarded from a given context window. The suggested *sub-sampling threshold* value is 10^5 . The smaller this

number is, the more likely it is for a high frequency word to be discarded from the context window [9, 18]. A related hyper-parameter is *minimum count*, which discards all words that have a total frequency that is less than that value from the model all together. This gets rid of extremely rare words which would not contribute to learning the document vectors. In our experiments we found a *minimum count* of 50 to work best, however this value largely depends on corpus size and its vocabulary. The *vector size* is the size of the document and word vectors that will be learned, the larger they are the more complex information they can encode. In general, the suggested *vector size* is 300 [18], with larger data sets larger values will lead to better results, at greater computational cost. The number of *training epochs* suggested by [18] is 20 to 400, with the higher values for smaller data sets. We found 40 to 400 *training epochs* to be a good range.

2.2 Find Number of Topics

The semantic embedding has the advantage of learning a continuous representation of topics. In the jointly embedded document and word vector space, with the properties outlined in 2.1, documents and words are represented as positions in the semantic space. In this space each document vector can be seen as representing the topic of the document [17]. The word vectors that are nearest to a document vector, are the most semantically descriptive of the document's topic.

In the semantic space, a dense area of documents can be interpreted as an area of highly similar documents. This dense area of documents is indicative of an underlying topic that is common to the documents. Since the document vectors represent the topics of the documents, the centroid or average of those vectors can be calculated. This centroid is the *topic vector* which is most representative of the the dense area of documents it was calculated from. The words that are closest to this topic vector are the words that best describe it semantically. The main assumption behind `top2vec` is that the number of dense areas of document vectors equals the number of prominent topics. This is a natural way to discretize topics, since a topic is found for each group of documents sharing a prominent topic.

In order find the dense areas of documents in the semantic space, density based clustering is used on the document vectors, specifically Hierarchical Density-Based Spatial Clustering of Applications with Noise (HDBSCAN) [25, 26, 27]. However, the "curse of dimensionality" which results from the high-dimensional document vectors introduces two main problems. In the high-dimensional semantic embedding space, regularly of 300 dimensions, the document vectors are very sparse. The document vector sparsity makes it difficult to find dense clusters and doing so comes at a high computational cost [28]. In order to alleviate these two problems, we perform dimension reduction on the document vectors with the algorithm Uniform Manifold Approximation and Projection for Dimension Reduction (UMAP) [29, 30]. In the dimension-reduced space, HDBSCAN can then be used to find dense clusters of documents.

2.2.1 Low Dimensional Document Embedding

Dimension reduction allows for dense clusters of documents to be found more efficiently and accurately in the reduced space. UMAP is a manifold learning technique for dimension reduction with strong theoretical foundations [29, 30]. t-distributed Stochastic Neighbor Embedding (t-SNE) [31] is another popular dimensional reduction technique. We found that t-SNE does not preserve global structure as well as UMAP and it does not scale well to large datasets. Hence, UMAP is chosen for dimension reduction in `top2vec`, as it preserves local and global structure, and is able to scale to very large datasets. Figure 2 shows UMAP-reduced document vectors; it can be seen that a lot of global and local structure is preserved in the embedding.

UMAP has several hyper-parameters that determine how it performs dimension reduction. Perhaps the most important parameter is the *number of nearest neighbours*, which controls the balance between preserving global structure versus local structure in the low dimensional embedding. Larger values put more emphasis on global over local structure preservation. Since the goal is to find dense areas of documents which would be close to each other in the high dimensional space, local structure is more important in this application. We find that setting *number of nearest neighbours* to 15 gives the best results, as this value gives more emphasis on local structure. Another related parameter is the *distance metric*, which is used to measure the distance between points in the high dimensional space. The often used *distance metric* for the document vectors is *cosine similarity* [8, 9], because it measures similarity of documents irrespective of their size. Lastly the *embedding dimension* must be chosen; we find 5 dimensions to give the best results for the downstream task of density based clustering.

2.2.2 Find Dense Clusters of Documents

The goal of density based clustering is to find areas of highly similar documents in the semantic space, which indicate an underlying topic. This is performed on the UMAP reduced document vectors. The challenge is that the document vectors will have varying density throughout the semantic space. Additionally there will be sparse areas where documents are highly dissimilar. This can be seen as noise, as there is no prominent underlying topic. In order to overcome these

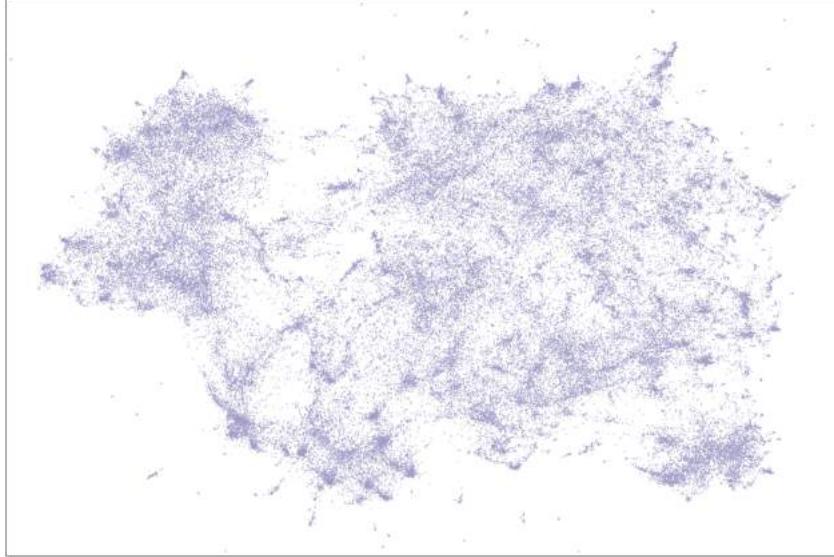


Figure 2: 300 dimensional document vectors from the *20 news groups* dataset that are embedded into 2 dimensions using UMAP.

challenges, HDBSCAN is used to find the dense areas of document vectors, as it was designed to handle both noise and variable density clusters [26]. HDBSCAN assigns a label to each dense cluster of document vectors and assigns a noise label to all document vectors that are not in a dense cluster. The dense areas of identified document vectors will be used to calculate the topic vectors. Documents that are classified as noise can be seen as not being descriptive of a prominent topic. Figure 3 shows an example of dense areas of documents identified by HDBSCAN.

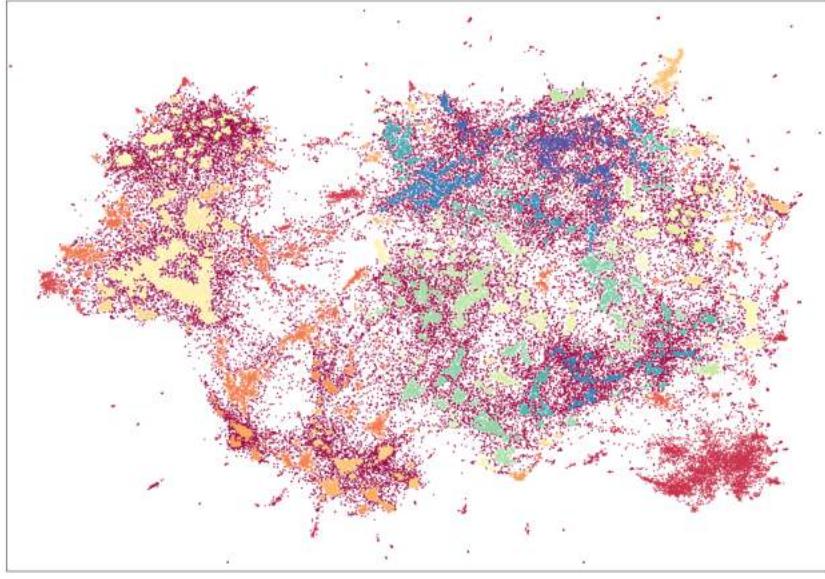


Figure 3: UMAP-reduced document vectors from the *20 news groups* dataset. Each colored area of points is a dense area of documents identified by HDBSCAN, red points are documents HDBSCAN has labeled as noise.

The main hyper-parameter that needs to be chosen for HDBSCAN is *minimum cluster size*; this parameter is at the core of how the algorithm finds clusters of varying density [26]. This parameter represents the smallest size that should be considered a cluster by the algorithm. We find that a *minimum cluster size* of 15 gives the best results in our experiments, as larger values have a higher chance of merging unrelated document clusters.

2.3 Calculate Topic Vectors

2.3.1 Calculate Centroids in Original Dimensional Space

The dense clusters of documents and noise documents identified by HDBSCAN in the UMAP-reduced dimension, correspond to locations in the original semantic embedding space. The use of UMAP and HDBSCAN can be seen as a process which labels each document in the semantic embedding space with either a noise label or a label for the dense cluster to which it belongs.

Given labels for each cluster of dense documents in the semantic embedding space, topic vectors can be calculated. There are a number of ways that the topic vector can be calculated from the document vectors. The simplest method is to calculate the centroid, i.e. the arithmetic mean of all the document vectors in the same dense cluster. There are other reasonable options such as the geometric mean or using probabilities from the confidence of clusters created by HDBSCAN. We experimented with these techniques and found that they resulted in very similar topic vectors, with almost identical nearest-neighbour word vectors. We speculate that this is mainly due to the sparsity of the high dimensional space. Therefore, we decided to use the simple method of calculating the centroid. Figure 4 shows a visual example of a topic vector being calculated from a dense area of documents.

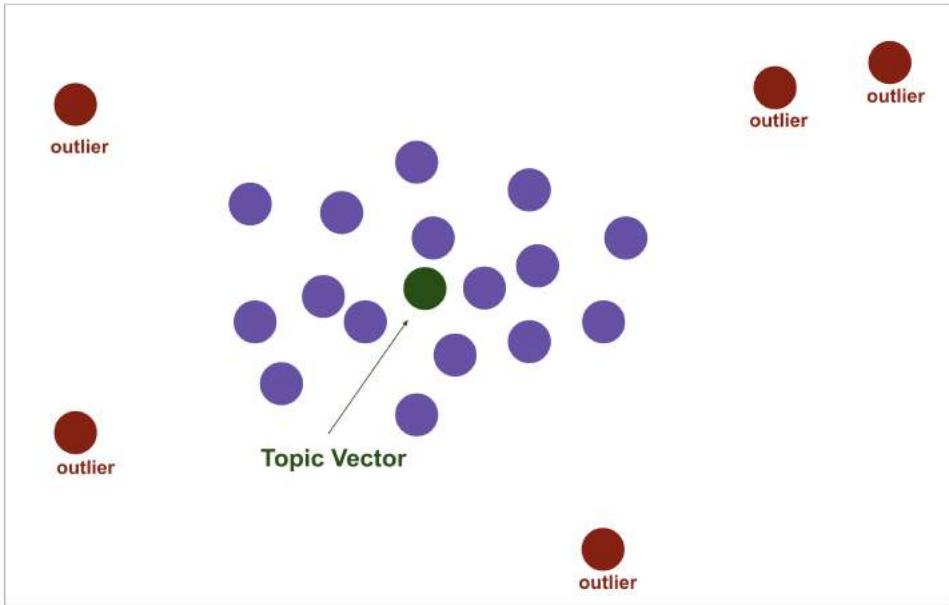


Figure 4: The topic vector is the centroid of the dense area of documents identified by HDBSCAN, which are the purple points. The outliers identified by HDBSCAN are not used to calculate the centroid.

The centroid is calculated for each set of document vectors that belong to a dense cluster, generating a topic vector for each set. The number of dense areas found is the number of prominent topics identified in the corpus.

2.3.2 Find Topic Words

In the semantic space, every point represents a topic that is best described semantically by its nearest word vectors. Therefore the word vectors that are closest to a topic vector are those that are most representative of it semantically. The distance of each word vector to the topic vector will indicate how semantically similar the word is to the topic. The words closest to the topic vector can be seen as the words that are most similar to all documents in the dense area, as the topic vector is the centroid of that area. These words can be used to summarize the common topic of the documents in the dense area. Figure 5 shows an example of a topic vector and the nearest words.

Common words appear in most documents and, as such, they are often in a region of the semantic space that is equally distant from all documents. As a result the words closest to a topic vector will rarely be stop-words, which has been confirmed in our experiments. Therefore there is no need for stop-word removal.

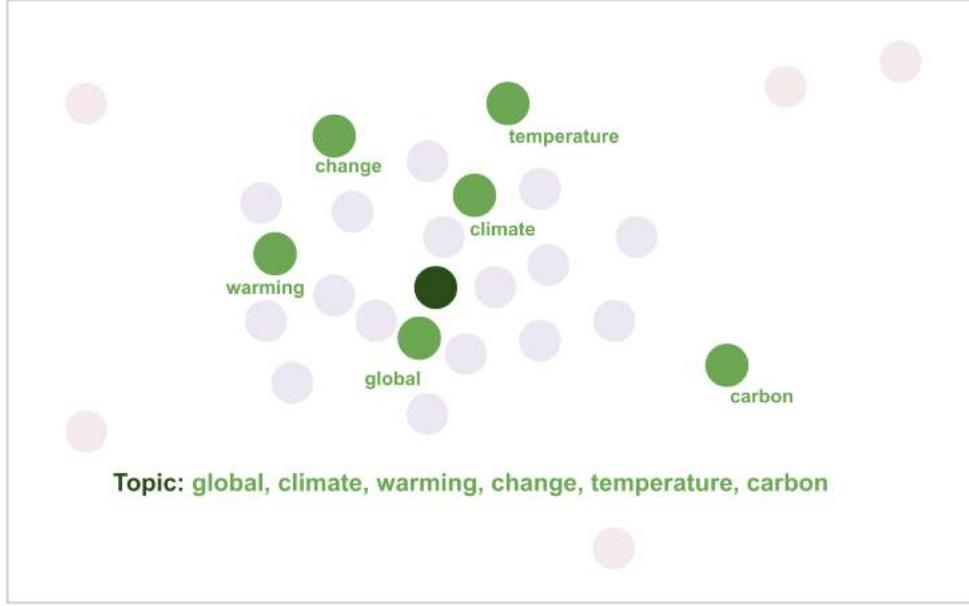


Figure 5: The topic words are the nearest word vectors to the topic vector.

2.4 Topic Size and Hierarchical Topic Reduction

The topic and document vectors allow for the size of topics to be calculated. The topic vectors can be used to partition the document vectors such that each document vector belongs to its nearest topic vector. This associates each document with exactly one topic, the one which is most semantically similar to the document. The size of each topic is measured as the number of documents that belong to it.

An advantage of the topic vectors and the continuous representation of topics in the semantic space is that the number of topics found by `top2vec` can be hierarchically reduced to any number of topics less than the number initially found. This is done by iteratively merging the smallest topic into its most semantically similar topic until the desired number of topics are reached. This is done by taking a weighted arithmetic mean of the topic vector of the smallest topic and its nearest topic vector, each weighted by their topic size. After each merge, the topic sizes are recalculated for each topic. This hierarchical topic reduction has the advantage of finding the topics which are most representative of the corpus, as it biases topics with greater size.

3 Results

3.1 Topic Information Gain

A natural way to evaluate topic models is to score how well the topics describe the documents. This evaluation measures how informative the topics are to a user. We propose using *mutual information* [32] to measure the information gained about the documents when described by their topic words.

Traditional topic modeling methods discretize topic space and describe documents as a mixture of those topics. In order to evaluate a set of these topics T generated from documents D , the total information gained is calculated for each document when described with the proportions of topics given by the topic model.

In contrast, `top2vec` learns a continuous representation of topics and places documents in that space corresponding to their topic. A topic vector found by `top2vec` represents the topic common to a group of documents, or the average of their individual topics. In order to evaluate a set of `top2vec` topics T generated from documents D , the documents are partitioned into sub-sets, with each sub-set corresponding to document vectors with the same nearest topic vector. Thus each document is assigned to exactly one topic. To evaluate these topics, the total information gained is measured for each of the sub-set of documents when described by the words nearest to their topic vector.

The total information gained, or mutual information, about all documents D when described by all words W , is given by:

$$I(D, W) = \sum_{d \in D} \sum_{w \in W} P(d, w) \log \left(\frac{P(d, w)}{P(d)P(w)} \right) \quad (1)$$

The contribution of each co-occurrence between a document d and word w to the information gain calculation can be seen as the *probability-weighted amount of information* (PWI) d and w contribute to the total amount of information [33], given by:

$$PWI(d, w) = P(d, w) \log \left(\frac{P(d, w)}{P(d)P(w)} \right) \quad (2)$$

Topics are distributions over the entire vocabulary W . However, in order to evaluate their usefulness to a user, we evaluate them using the top n words of the topic. For evaluation where each document is assigned to only one topic, each topic $t \in T$, will have a set of n words $W_t \subset W$ and documents $D_t \subset D$. The information gained about all documents when described by their corresponding topic is given by:

$$\begin{aligned} PWI(T) &= \sum_{t \in T} \sum_{d \in D_t} \sum_{w \in W_t} P(d, w) \log \left(\frac{P(d, w)}{P(d)P(w)} \right) \\ &= \sum_{t \in T} \sum_{d \in D_t} \sum_{w \in W_t} P(d|w)P'(w) \log \left(\frac{P(d, w)}{P(d)P(w)} \right) \end{aligned} \quad (3)$$

In equation 3, $P(w)$ is the marginal probability of the word w across all documents D . It is used to calculate the \log term, which is the *pointwise mutual information* [34] between w and d . $P'(w)$ is the probability of topic word w , which is used to calculate the *expected mutual information* [32], or the information gained about document d given topic word w . The quantity we are measuring is the information gained about each document given its corresponding topic words as a prior. Therefore $P'(w)$ is 1 and can be omitted [33], which gives rise to:

$$PWI(T) = \sum_{t \in T} \sum_{d \in D_t} \sum_{w \in W_t} P(d|w) \log \left(\frac{P(d, w)}{P(d)P(w)} \right) \quad (4)$$

Alternatively the equation can be generalized for the case that each document is represented by multiple topics. In this case we replace $P'(w)$ with $P(t)$, which is the proportion of words to be used to represent document d by topic t :

$$PWI(T) = \sum_{d \in D} \sum_{t \in T} \sum_{w \in W_t} P(d|w)P(t) \log \left(\frac{P(d, w)}{P(d)P(w)} \right) \quad (5)$$

Using Equations 4 and 5 different sets of topics can be compared. A greater quantity of information gain indicates that the topics $t \in T$ are more informative of their corresponding documents. If topics contain words such as *the*, *and*, and *it* or other intuitively uninformative words, they will receive lower information gain values. This is in large part due to the $P(d|w)$ term in the calculation, since the probability of any specific document given a very common word is very low. Therefore, the information gained is also low. Words that are mostly present in the subset of documents corresponding to the topic lead to higher information gain as they are informative of those documents. Additionally, low values of information gain will be obtained if the topic model assigns topics to the wrong documents. Topic information gain measures the quality of the words in the topic and their assignment to documents. Therefore, Equations 4 and 5 give values that correspond with what is intuitively more informative. We argue that due to its information theoretic derivation, topic information gain is a good measure for evaluating topic models.

3.2 LDA, PLSA and Top2Vec Topic Information Gain

In order to evaluate LDA, PLSA and `top2vec` topics we train all models on the same documents D and vocabulary W . Since `top2vec` automatically finds the number of topics, we compare LDA, PLSA and `top2vec` on increasing numbers of topics up to the amount discovered by `top2vec`.

For each comparison between a set of LDA-generated topics, T_{LDA} , PLSA-generated topics, T_{PLSA} and top2vec -generated topics, T_{top2vec} , we use the same number of top n topic words and the same number of topics. Thus, for each comparison between T_{LDA} , T_{PLSA} , and T_{top2vec} , we ensure the following:

- $|T_{LDA}| = |T_{PLSA}| = |T_{\text{top2vec}}| = \text{number of topics}$
- $|W_t| = n, \forall W_t \in T_{LDA}, T_{PLSA}, T_{\text{top2vec}} = \text{top } n \text{ topic words}$

3.2.1 20 News Groups Dataset

The *20 News Groups* dataset [35] contains 18,831 posts labelled with the news group they were posted in. We trained top2vec , LDA and PLSA models on this dataset using the same pre-processing steps. LDA and PLSA models were trained with 10 to 100 topics, with intervals of 10. Hierarchical topic reduction was used on the 103 topics discovered by top2vec .

To calculate $PWI(T_{LDA})$, $PWI(T_{PLSA})$, and $PWI(T_{\text{top2vec}})$, we use the same W and D . A comparison of the topic information gain for models trained on the *20 news groups* dataset can be shown in Figure 6. The results show that the top n topic words from top2vec consistently provide more information than PLSA and LDA, with varying topic sizes and up to the top 1000 topic words. Even when stop-words are filtered from LDA and PLSA. For most topic sizes the top 20 words from top2vec convey as much information as the top 100 from LDA and PLSA.

Tables 1 and 2 show the topics for top2vec and LDA models with topic size of 20. LDA was chosen over PLSA as it had higher topic information gain for 20 topics. Topics are ordered by increasing information gain. The topics shown for LDA have stop-words removed, whereas the top2vec topics are the exact words discovered by the model. Tables 1 and 2 demonstrate that the topic information gain score corresponds to what is intuitively more informative.

In Table 2 LDA topics 2, 3 and 5 appear to contain nonsensical tokens, yet they have a high information gain. The *20 news groups* data set contains messages that were sent encrypted or contain source code. When the *20 news groups* messages are tokenized, these tokens are treated as words by the models. Thus, LDA has actually found informative tokens for that set of messages. However, that set contains only 23 messages. Therefore, LDA has found 3 different topics out of the requested 20, which only represent 23 messages out of the 18831 total amount the LDA model is trained on. This highlights an advantage of top2vec when finding the number of topics.

Figure 7 shows the semantic embedding of the messages labeled by the news group each message was posted in. This figure shows that the semantic embedding has learned the similarity of messages by visually demonstrating the continuous representation of topics. Messages from similar newsgroups are in similar regions of the semantic space. The small red points on the very right of Figure 7 are the 23 messages which predominantly contain encrypted content or large quantities of source code. Due to the density of that set of messages, top2vec finds a topic for those messages. However, when hierarchical topic reduction is performed to reduce the topic size to 20, due to its small size, the topic of the encrypted and source code containing messages is merged into another topic that is most semantically similar to it. The semantic embedding of the messages labeled with the 20 top2vec topics from Table 1 that each belong to is shown in Figure 8. It demonstrates the assignment of the posts to the 20 topics correspond almost exactly to the 20 news groups and that each topic's top 3 words are very informative of the news group's actual topic. This visually demonstrates that top2vec finds topics which are more representative of the corpus as a whole, as confirmed by the topic information gain score in Figure 6.

Topic information gain measures how informative topic words are of documents. Therefore, low scores are achieved when uninformative topic words are chosen, as well as when topics are assigned either to wrong documents or with incorrect proportions. There are a number of LDA topics in Table 2 that appear to be very coherent and that correspond to specific news groups. However, they have low scores in comparison to similar top2vec topics in Table 1. This is explained, in part, by LDA's modeling of documents as a mixture of topics. It models each document with non-zero probabilities of all topics. Therefore each of the messages will have some non-zero proportion of the topics 2, 3 and 5 that were generated from encrypted or source code containing messages. Figure 9 shows the contribution of each LDA topic from Table 2 to all messages. It demonstrates that the most informative topics are highly localized and that the uninformative topics are spread out over many messages. Topic 15 and 17, which both have low information gain, make up a large proportion of most messages. These are topics with very generic words that are found in most documents.

The goal of LDA is to find topics such that their words recreate the original document word distributions with minimal error. This includes stop-words such as *the*, *and*, *it* and other generic words that would not be considered informative or topical by a user. This explains topic 15 and 17 which are just the generic words that occur in most documents. LDA's goal can also result in extremely specific topics, such as 2, 3, and 5, which necessitate other topics to be more general. Figure 9 visually demonstrates the reason that LDA topics produce lower information gain; it finds many unlocalized and therefore uninformative topics compared to top2vec .

Figure 6 shows that as the number of topics increases, the topic information gain for `top2vec` is consistently higher than for LDA and PLSA. This is because `top2vec` topics are more localized in the semantic space and therefore more informative. The number of topics found by `top2vec` on the *20 News Groups* data set is 103, and are even more localized than the 20 topics in Table I which were generated from hierarchical topic reduction. The original topics discovered in the region of topic 7 and 14 are shown in Figure IO and Figure II. These topics are even more localized than the reduced topics and therefore more informative as indicated by the information gain scores in Figure 6.

3.2.2 Yahoo Answers Dataset

The *Yahoo Answers* dataset [36, 37], contains 1.3 million labelled posts. The posts are from 10 different topics, with 130,000 posts per topic. The number of topics `top2vec` found in this dataset are 2,618. Due to the computational cost of training LDA and PLSA models, we were only able to train the models from 10 to 100 topics with intervals of 10. Hierarchical topic reduction was used on the topics discovered by `top2vec`.

To calculate $PWI(T_{LDA})$, $PWI(T_{PLSA})$, and $PWI(T_{top2vec})$, we use the same W and D . A comparison of the topic information gain for models trained on the *Yahoo Answers* dataset can be seen in Figure I2. These results are consistent with the results from the *20 News Groups* dataset. They show that the top n topic words from `top2vec` consistently provide more information than PLSA and LDA, with varying topic sizes and up to the top 1000 topic words. Even when stop-words are filtered from LDA and PLSA. For most topic sizes, the top 20 words from `top2vec` convey as much information as the top 100 from LDA and PLSA.

Tables 3 and 4 show the topics for `top2vec` and LDA models with a topic size of 10. The topics are ordered by increasing information gain. LDA was chosen over PLSA because it had higher topic information gain for 10 topics. The topics shown for LDA have stop-words removed, whereas the `top2vec` topics are the exact words discovered by the model. This comparison demonstrates the interpretability of the topics and their associated information gain score, showing that the more informative topics receive higher information gain.

Figure I3 shows the semantic embedding of *Yahoo Answers* posts with their true topic labels. This figure demonstrates that the semantic space has captured the similarity of posts that share a similar topic. Figure I4 shows the posts labelled with the `top2vec` topics from Table 3. It demonstrates that the assignment of the posts to the 10 topics correspond almost exactly to the 10 topic labels from the *Yahoo Answers* dataset and that the topic's top 3 words are very informative of the true topic. This visually demonstrates that `top2vec` finds topics that are representative of the corpus as a whole, as confirmed by the topic information gain score in Figure I2.

Figure I5 shows the strengths of each of the 10 LDA topics from Table 4 across all posts. This visually demonstrates that more informative topics are localized in the semantic space, and that LDA discovers topics that are less localized than `top2vec` topics. Additionally highly unlocalized LDA topics like 9 and 10, which contain the lowest information gain scores, also contain generic words that would not be considered topical or informative by a user. Figure I5 demonstrates visually that, apart from LDA topics containing less informative words, the reason LDA topics receive lower topic information gain is that they are less localized than `top2vec` topics and therefore less informative.

4 Discussion

We have described `top2vec`, an unsupervised learning algorithm that finds topic vectors in a semantic space of jointly embedded document and word vectors. We have shown that the semantic space is a continuous representation of topics that allows for the calculation of topic vectors from dense areas of highly similar documents, topic size, and for hierarchical topic reduction. The `top2vec` model also allows for comparing similarity between words, documents and topics based on distance in the semantic space.

We have proposed a novel method for evaluating topics that uses mutual information to calculate how informative topics are of documents. The topic information gain measures the amount of information gained about the documents when described by their topic words. This measures both the quality of topic words and the assignment of topics to the documents. Our results show that `top2vec` consistently finds topics that are more informative and representative of the corpus than LDA and PLSA, for varying sizes of topics and number of top topic words.

There are several advantages of `top2vec` over traditional topic modeling methods like LDA and PLSA. The primary advantages are that it automatically finds the number of topics and finds topics that are more informative and representative of the corpus. As demonstrated, stop-word lists are not required to find informative topic words, making it easy to use on a corpus of any domain or language. The use of distributed representations of words alleviates several challenges of traditional methods that use BOW representations of words, which ignore word semantics.

Traditional topic modeling techniques like LDA and PLSA are generative models; they seek to find topics that recreate the original documents word distributions with minimal loss. This necessitates these models to place uninformative words in topics with high probability, as they make up a large proportion of all documents. Additionally, there is no guarantee that they will find topics that are representative of the corpus. The results show they can find topics that are extremely specific or overly broad.

In contrast, the words closest to `top2vec` topic vectors are the words that are most *informative* of the documents the topic vectors are calculated from. This is due to the learning task that generates joint document and word vectors, which predicts the document a word came from. This learning task necessitates document vectors to be placed close to the words that are most informative of the documents. The continuous representation of topics in the semantic space allows topic vectors to be calculated from dense areas of those documents. Thus `top2vec` topics are the words that are most informative of a document, rather than the set of words that recreate the documents distribution of words with accurate proportions. We suggest that `top2vec` is more appropriate for finding informative and representative topics of a corpus than probabilistic generative models like LDA and PLSA.

The `top2vec` code is available as an open-source project¹.

¹<https://github.com/ddangelov/Top2Vec>

Table 1: Topic information gain for the top 10 words from `top2vec` topics trained on the *20 news groups* dataset with 20 topics.

Topic Number	Topic Words	PWI(T)
1	pitching, pitchers, pitcher, hitter, batting, hit, hitters, baseball, batters, inning	74.2
2	bike, ride, riding, bikes, motorcycle, bikers, helmet, riders, countersteering, passenger	71.9
3	circuit, voltage, circuits, resistor, signal, khz, impedance, analog, diode, resistors	69.1
4	centris, ram, mhz, quadra, nibus, vram, iisi, lciii, cpu, fpu	62.4
5	patient, symptoms, patients, doctor, disease, treatment, jxp, therapy, skepticism, physician	59.1
6	koresh, fbi, compound, batf, davidiens, atf, waco, raid, fire, bd	54.7
7	israel, arab, arabs, israeli, jews, palestinians, israelis, war, peace, occupied	54.3
8	orbit, space, launch, orbital, satellites, lunar, shuttle, spacecraft, moon, earth	53.7
9	clipper, nsa, encryption, encrypted, secure, keys, crypto, algorithm, escrow, scheme	51.6
10	controller, drives, drive, ide, scsi, floppy, bios, disk, jumpers, esdi	50.3
11	windows, drivers, ati, cica, driver, exe, card, autoexec, mode, ini	50.1
12	car, engine, cars, ford, brakes, honda, tires, valve, wheel, rear	49.7
13	hockey, playoffs, nhl, game, season, team, playoff, teams, scoring, play	48.0
14	gun, guns, firearms, laws, weapons, handgun, crime, amendment, handguns, firearm	46.6
15	window, application, xlib, manager, openwindows, motif, server, xview, client, clients	43.6
16	jesus, christ, god, bible, church, scripture, christians, scriptures, christian, heaven	38.9
17	postscript, format, printer, fonts, files, formats, font, truetype, bitmap, image	36.7
18	shipping, sale, offer, condition, asking, brand, sell, obo, price, selling	36.0
19	atheists, belief, religion, beliefs, god, christianity, truth, religions, believe, atheist	34.4
20	please, mail, post, email, posting, address, thanks, reply, interested, appreciate	11.3
		996.6

Table 2: Topic information gain for the top 10 words from LDA topics, *after* stop-word removal, trained on the *20 news groups* dataset with 20 topics.

Topic Number	Topic Words	PWI(T)
1	la, pit, gm, det, bos, tor, pts, chi, vs, min	49.9
2	hz, cx, ww, uw, qs, c_, pl, lk, ck, ah	47.0
3	ax, max, pl, di, tm, ei, giz, wm, bhj, ey	42.6
4	db, period, goal, play, pp, shots, st, power, mov, bh	27.9
5	mk, mm, mp, mh, mu, mr, mj, mo, mq, mx	27.7
6	health, medical, new, study, research, disease, cancer, use, patients, drug	19.0
7	armenian, people, said, one, armenians, turkish, went, us, children, turkey	17.3
8	dos, windows, drive, card, system, disk, mb, scsi, pc, mac	16.7
9	file, program, window, files, image, jpeg, use, windows, display, color	15.7
10	government, president, law, would, mr, israel, state, rights, fbi, states	13.4
11	god, jesus, bible, church, christian, christ, christians, faith, lord, man	12.2
12	game, team, games, hockey, season, teams, league, nhl, new, players	12.0
13	space, nasa, earth, launch, shuttle, orbit, moon, satellite, solar, mission	11.8
14	edu, ftp, graphics, available, pub, image, mail, com, version, also	9.7
15	would, know, anyone, get, thanks, like, one, please, help, could	8.5
16	key, use, data, system, one, information, may, encryption, used, number	7.5
17	people, would, one, think, know, like, say, even, see, way	7.3
18	one, car, would, like, get, time, much, also, back, power	7.1
19	edu, com, please, list, mail, sale, send, email, price, offer	4.0
20	think, year, would, good, time, last, well, get, one, got	3.6
		360.9

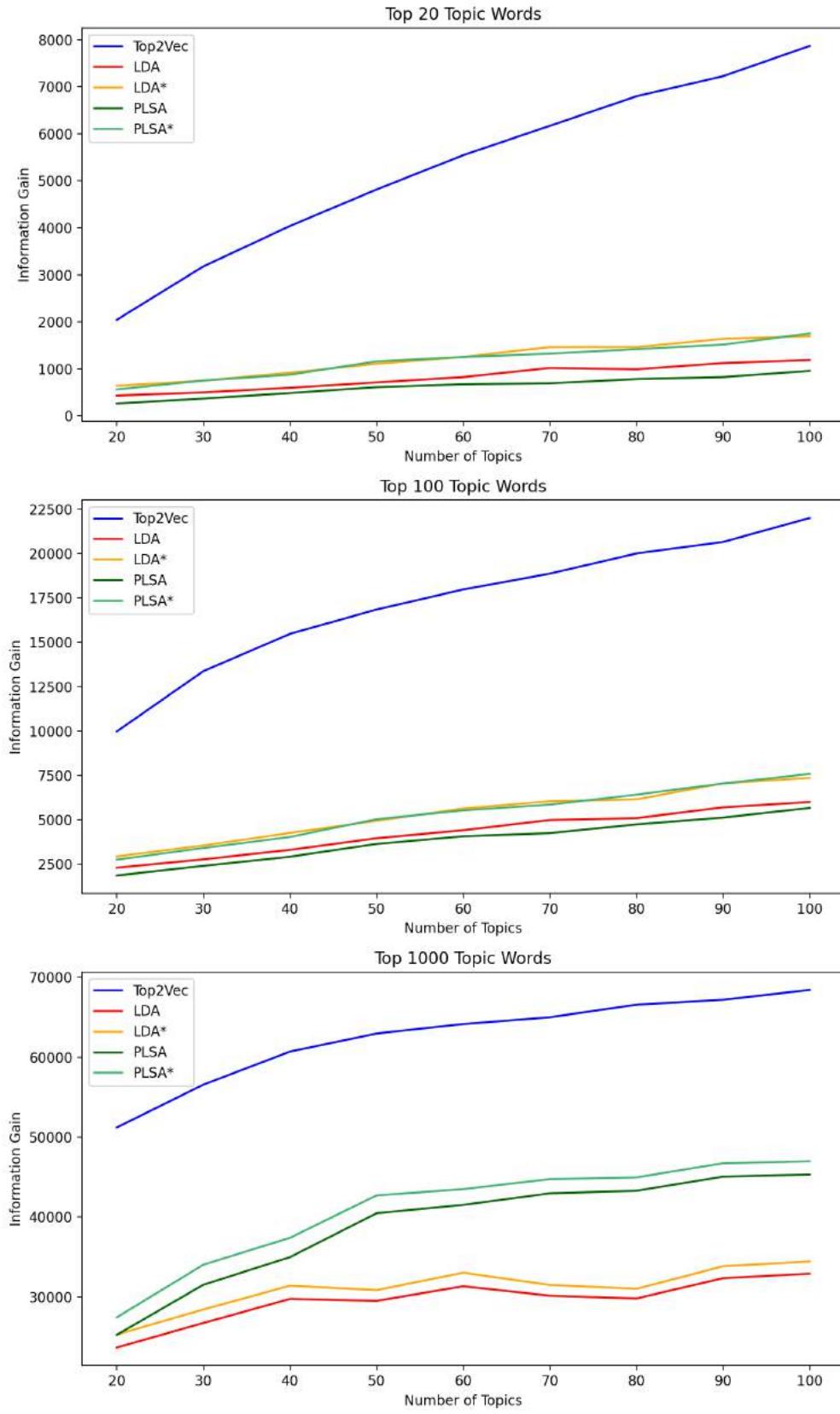


Figure 6: Topic information gain comparison between Top2Vec, PLSA, and LDA trained models on the 20 News Groups dataset. LDA* and PLSA* have stop-words removed.

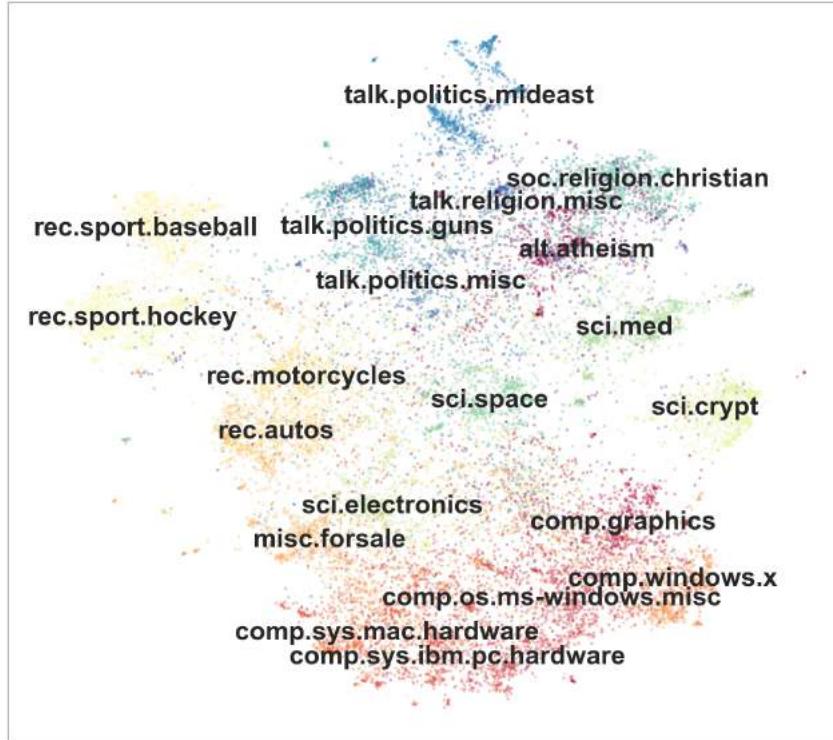


Figure 7: Semantic embedding of 20 news groups messages labeled by news group. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

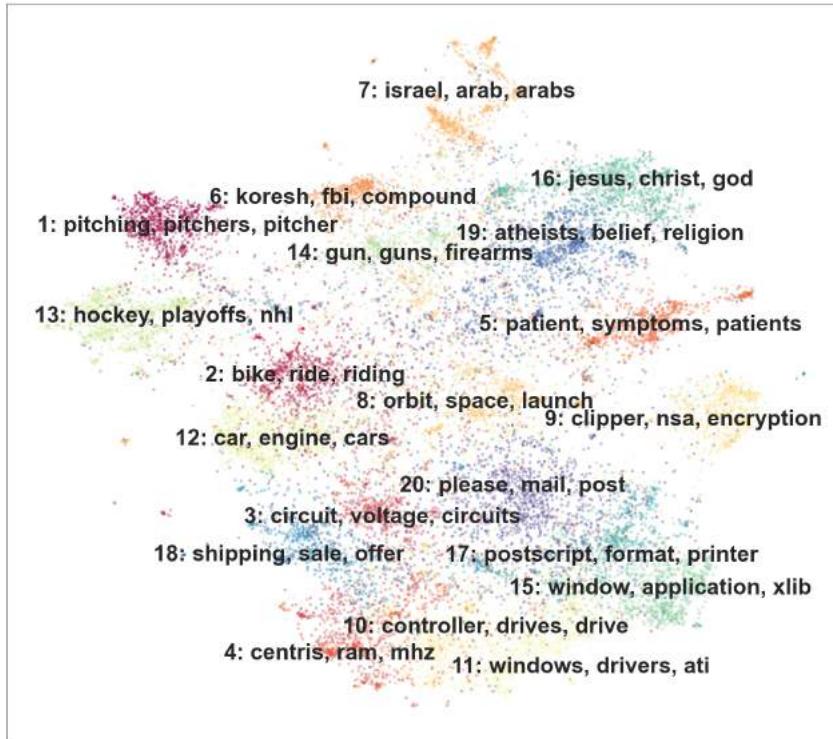


Figure 8: The 20 news groups messages labeled with the top2vec topics from Table I. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

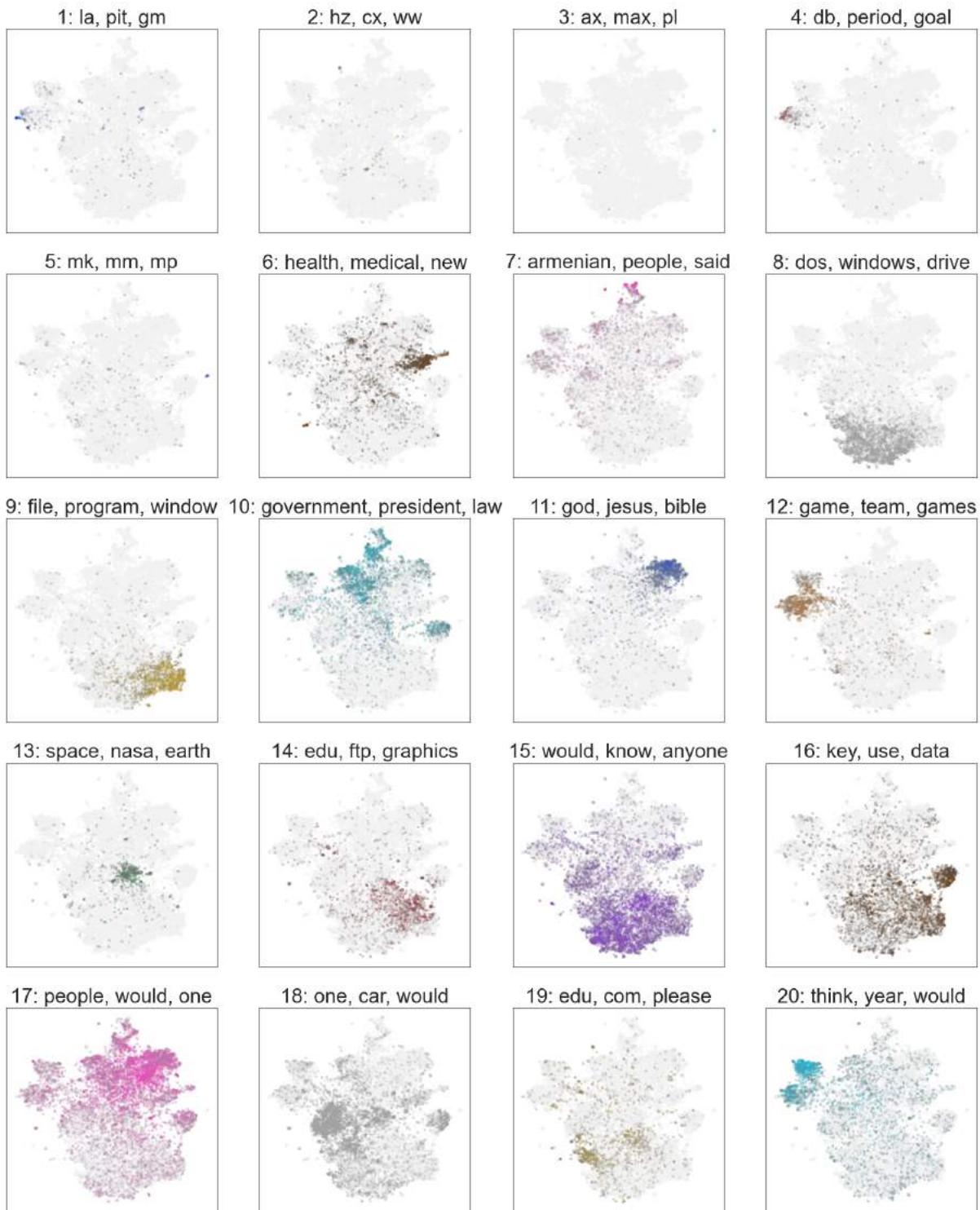


Figure 9: Topic proportion of each LDA topic from Table 2 across all 20 news groups messages in the semantic embedding. The topics are ordered by decreasing information gain. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

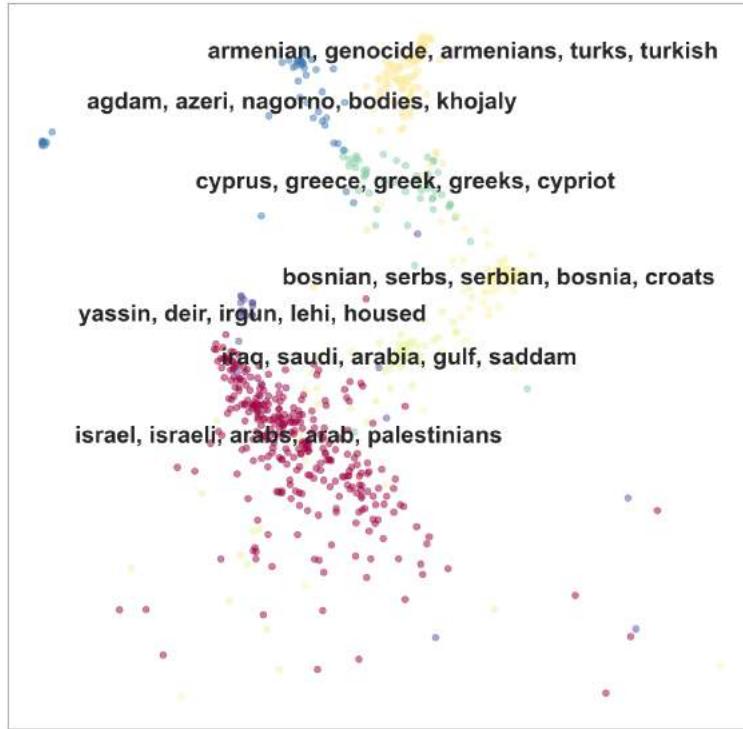


Figure 10: Zoom in of top2vec original topics found in region of topic 7 from Table I. This region of the semantic space corresponds to the *talk.politics.mideast* news group. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

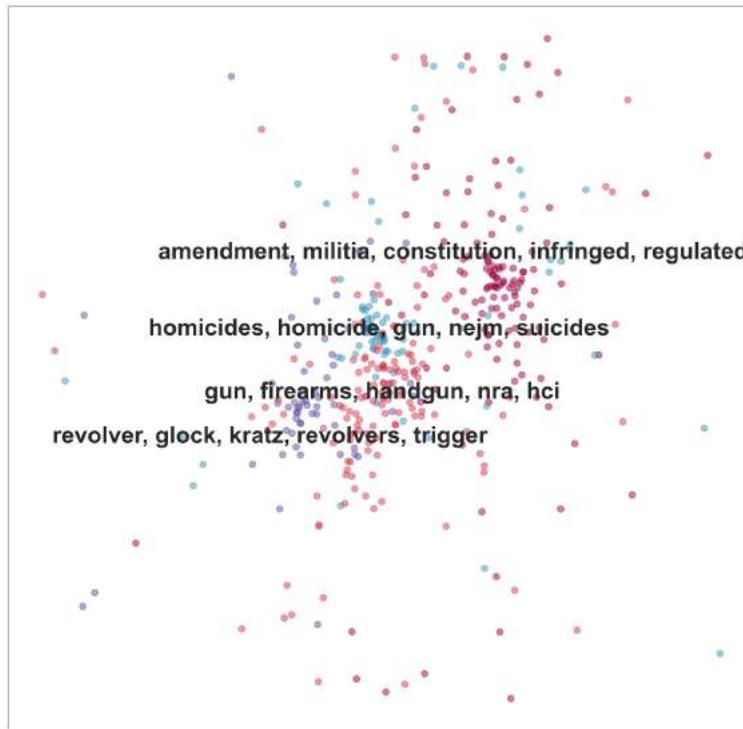


Figure 11: Zoom in of top2vec original topics found in region of topic 14 from Table I. This region of the semantic space corresponds to the *talk.politics.guns* news group. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

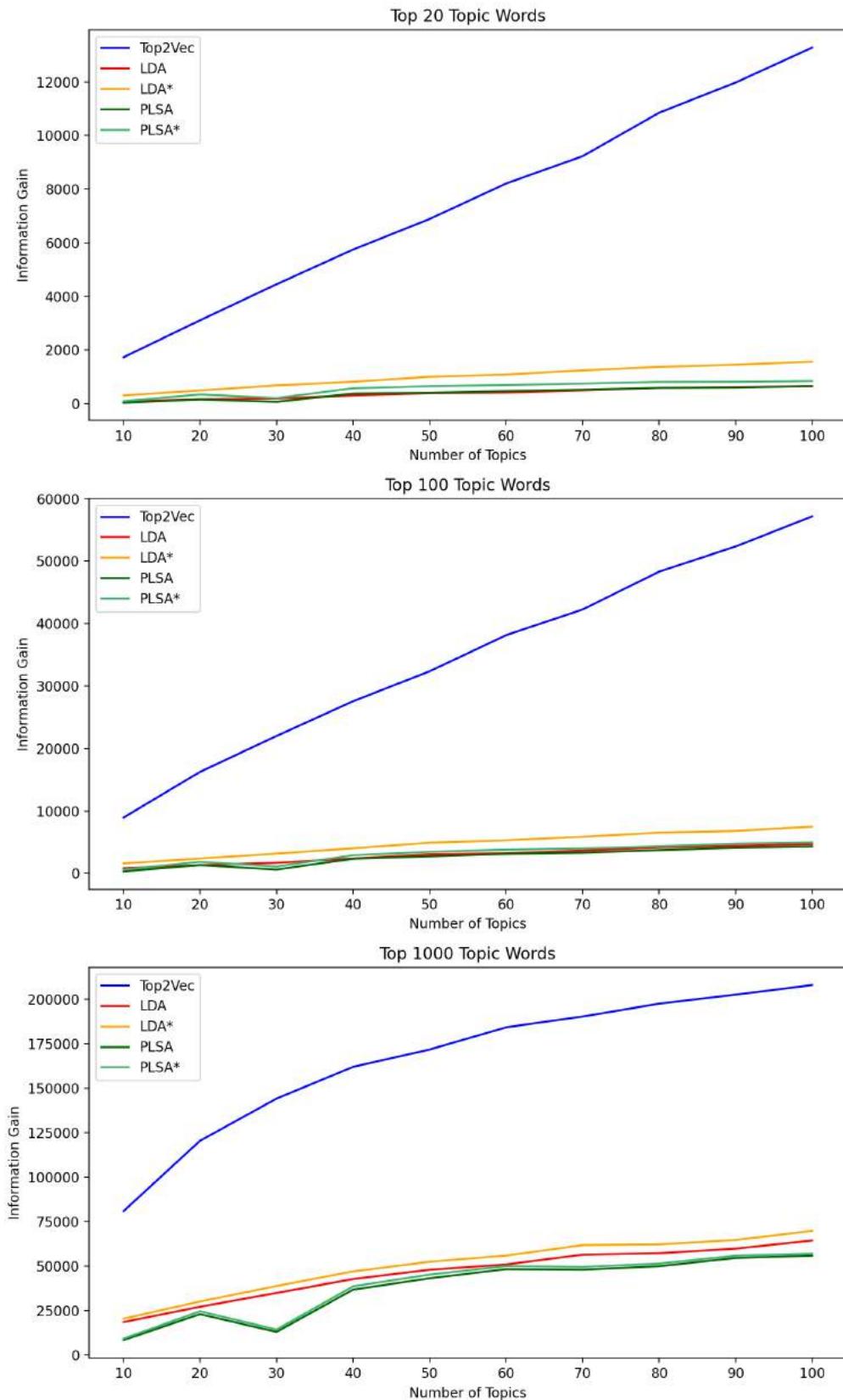


Figure 12: Topic information gain comparison between Top2Vec, PLSA, and LDA trained models on the *Yahoo Answers* dataset. LDA* and PLSA* have stop-words removed.

Table 3: Topic information gain for the top 10 words from `top2vec` topics trained on the *Yahoo Answers* dataset with 10 topics.

Topic Number	Topic Words	PWI(T)
1	overwrite, rebooting, debug, debugging, reboot, executable, compiler, winxp, xp, winnt	112.2
2	securities, unpaid, equity, purchaser, payment, broker, underwriting, issuer, payable, underwriter	104.4
3	regimen, discomfort, inflammation, swelling, psoriasis, puffiness, inflammatory, irritation, edema, hypertension	98.1
4	realationship, realationship, insecurities, confide, hurtful, inlove, clingy, friendship, bestfriend, friendships	92.5
5	song, sings, singer, sang, artist, duet, album, lyrics, ballad, vocalist	91.9
6	scripture, believers, righteousness, righteous, pious, spiritual, spirituality, sinful, worldly, discernment	82.2
7	team, players, game, teams, scoring, league, teammate, scorers, playoff, defensively	80.0
8	courses, subjects, curriculum, students, teaching, faculty, syllabus, academic, undergraduate, baccalaureate	78.6
9	war, leaders, politicians, government, democracy, political, terrorists, terrorism, partisan, policies	64.6
10	thus, constant, hence, surface, resulting, greater, therefore, becomes, occurs, larger	33.1
		837.6

Table 4: Topic information gain for the top 10 words from LDA topics, *after* stop-word removal, trained on the *Yahoo Answers* dataset with 10 topics.

Topic Number	Topic Words	PWI(T)
1	team, game, world, win, cup, play, de, football, best, player	23.2
2	computer, yahoo, use, get, click, internet, free, com, need, windows	22.3
3	people, us, country, war, world, would, american, bush, government, america	18.0
4	one, water, two, would, light, number, energy, used, earth, use	16.9
5	body, weight, also, doctor, eat, blood, may, day, get, pain	15.7
6	www, com, http, find, song, name, know, anyone, org, music	14.2
7	get, money, school, would, need, work, pay, good, business, job	13.1
8	god, people, one, life, believe, jesus, word, many, would, us	12.5
9	like, know, get, think, would, want, people, good, really, go	9.1
10	time, like, friend, said, guy, back, would, one, years, got	8.3
		153.3

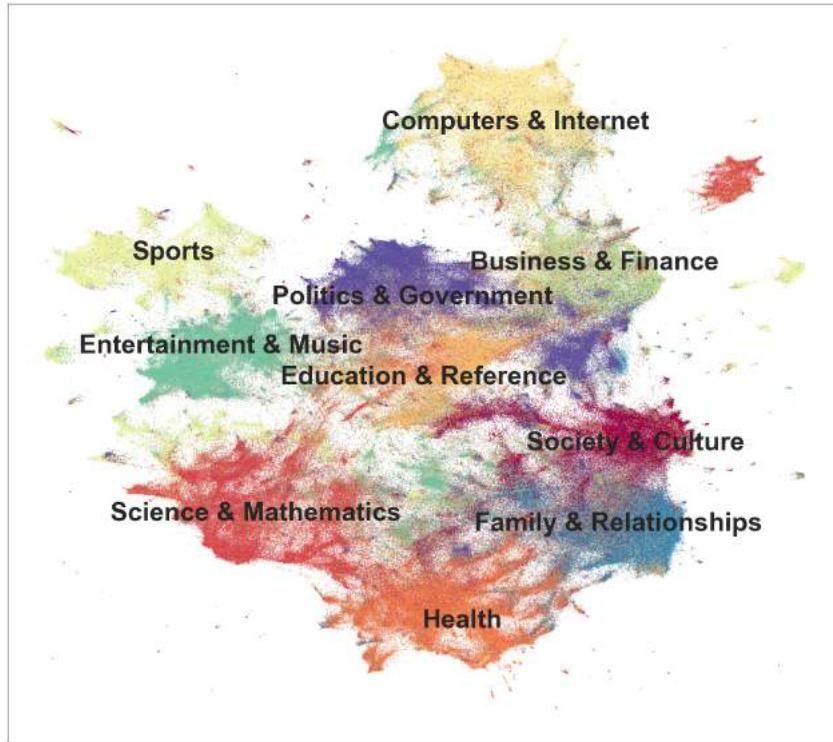


Figure 13: Semantic embedding of *Yahoo Answers* posts with true labels. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

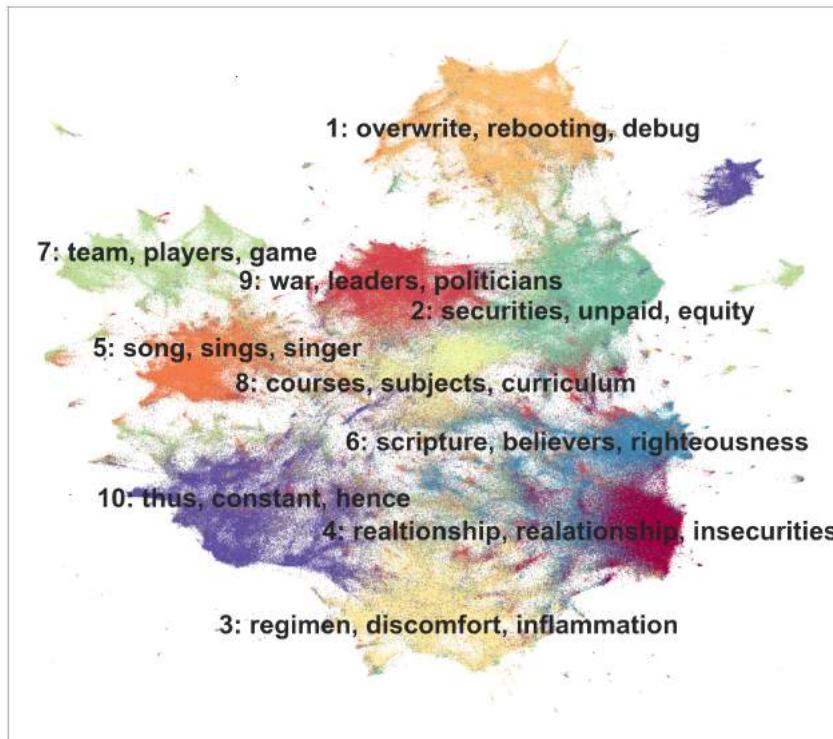


Figure 14: *Yahoo Answers* posts labeled with the top2vec topics from Table 3. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

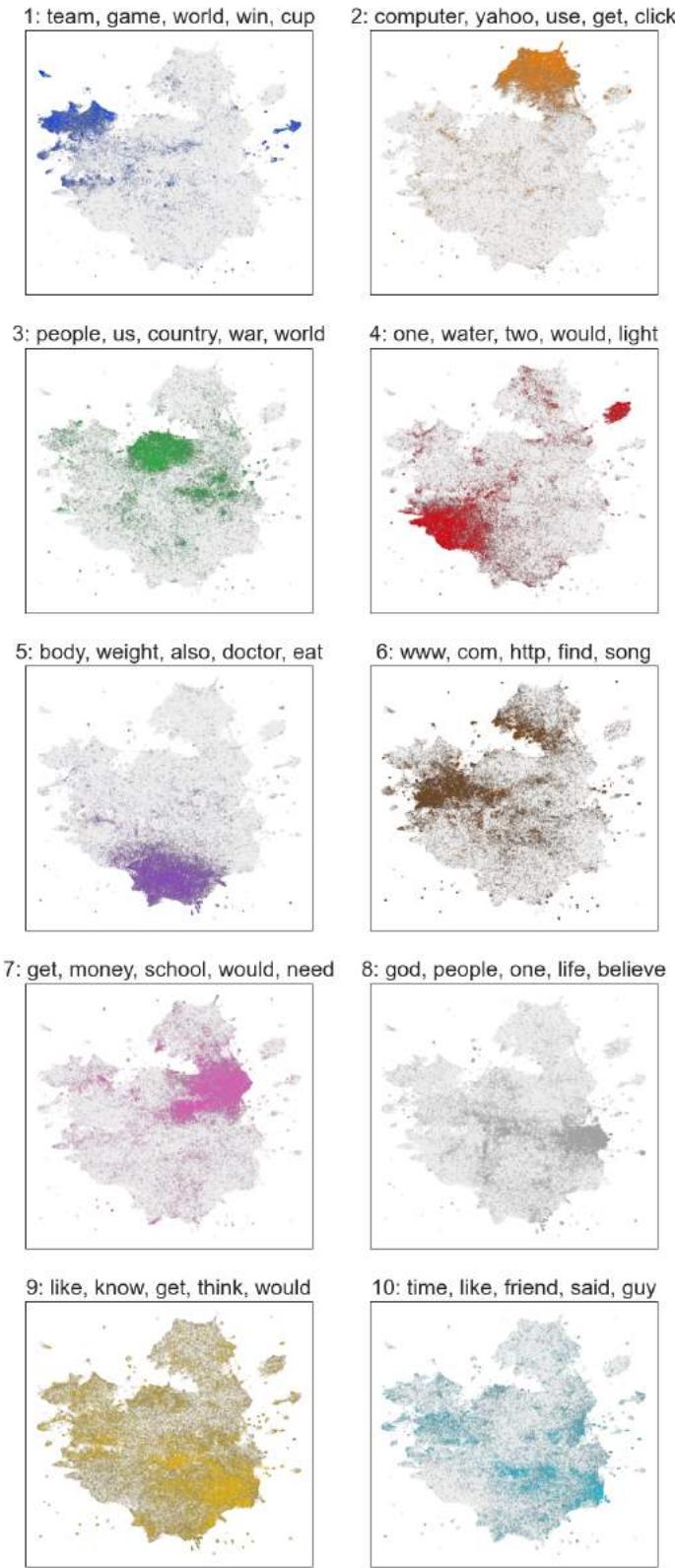


Figure 15: Topic proportion of each LDA topic from Table 4 across all *Yahoo Answers* posts in the semantic embedding. The topics are ordered by decreasing information gain. The 300 dimension document vectors are embedded into 2 dimensions using UMAP.

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Feeling and Thinking

Preferences Need No Inferences

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ABSTRACT: *Affect is considered by most contemporary theories to be postcognitive, that is, to occur only after considerable cognitive operations have been accomplished. Yet a number of experimental results on preferences, attitudes, impression formation, and decision making, as well as some clinical phenomena, suggest that affective judgments may be fairly independent of, and precede in time, the sorts of perceptual and cognitive operations commonly assumed to be the basis of these affective judgments. Affective reactions to stimuli are often the very first reactions of the organism, and for lower organisms they are the dominant reactions. Affective reactions can occur without extensive perceptual and cognitive encoding, are made with greater confidence than cognitive judgments, and can be made sooner. Experimental evidence is presented demonstrating that reliable affective discriminations (like-dislike ratings) can be made in the total absence of recognition memory (old-new judgments). Various differences between judgments based on affect and those based on perceptual and cognitive processes are examined. It is concluded that affect and cognition are under the control of separate and partially independent systems that can influence each other in a variety of ways, and that both constitute independent sources of effects in information processing.*

The intellectual contact between psychology and poetry is scarce and, when it takes place, often tends to be exploitative. If we happen to come across a poem that appears to support one of our favorite generalizations, we are tempted to cite it (not as evidence, of course, but more in the form of a testimonial). Or we might confer upon it the status of an epigraph in one of our forthcoming chapters (commonly, to the detriment of both the poem and the chapter). But when poetry disagrees with us we are apt to ignore the conflict altogether. Nevertheless, this paper begins with a poem by E. E. Cummings (1973), the first stanza of which affirms a premise tacitly rejected by psychology many decades ago:

since feeling is first
who pays any attention
to the syntax of things
will never wholly kiss you (p. 160)

In it, Cummings takes for granted that feelings are primary and, by implication, that they are fundamental. They are precedent to the intellectual qualities and elements of experience, and they are nearer to its essence: They are nearer to an inner "truth."

In contrast, contemporary psychology regards feelings as last. Affect is postcognitive. It is elicited only after considerable processing of information has been accomplished (see Figure 1). An affective reaction, such as liking, disliking, preference, evaluation, or the experience of pleasure or displeasure, is based on a prior cognitive process in which a variety of content discriminations are made and features are identified, examined for their value, and weighted for their contributions. Once this analytic task has been completed, a computation of the components can generate an overall affective judgment. Before I can like something I must have some knowledge about it, and in the very least, I must have identified some of its discriminant features. Objects must be cognized before they can be evaluated.

Most of us will not be deeply distressed by discovering that our current theories are in conflict

This article was the Distinguished Scientific Contribution Award address given at the meeting of the American Psychological Association, New York, New York, September 2, 1979. It was prepared with the support of a John Simon Guggenheim Fellowship.

I benefited greatly by discussing these ideas with several people, and I am very indebted to them. I am especially grateful to Hazel Markus, Phoebe Ellsworth, Allan Paivio, and Robyn Dawes, who all made extensive and helpful comments on an earlier draft.

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with a controversial poet of the 1920s. But contemporary psychology not only contradicts Cummings, it also contradicts one of its very own founding fathers. Thirty years before Cummings published his poem on feelings, Wundt (1907) wrote in a similar vein:

When any physical process rises above the threshold of consciousness, it is the affective elements which as soon as they are strong enough, first become noticeable. They begin to force themselves energetically into the fixation point of consciousness before anything is perceived of the ideational elements¹. . . . They are sometimes states of pleasurable or unpleasurable character, sometimes they are predominantly states of strained expectation. . . . Often there is vividly present . . . the special affective tone of the forgotten idea, although the idea itself still remains in the background of consciousness. . . . In a similar manner . . . the clear apperception of ideas in acts of cognition and recognition is always preceded by feelings. (pp. 243-244)

Whatever happened to Wundt's affective primacy idea? Is there compelling evidence to reject it?² Or to accept it, for that matter? Strictly speaking, we have no better evidence today than Wundt had in 1896. Perhaps a bit better.

In part, my concern in this paper is with Wundt's assertion. More specifically, building on the scanty evidence we now have, I have tried to develop some notions about the possible ways in which affect is processed as part of experience and have attempted to distinguish affect from processing of information that does not have affective qualities. This article is confined to those aspects of affect and feeling that are generally involved in

¹ The italics are mine. The original is even more to the point. "Affective elements" were "Gefühlselemente," and the italicized part of the citation was "ehe noch von den Vorstellungselementen irgend etwas wahrgenommen wird" (Wundt, 1905, p. 262).

² It is a fact that only 12 years after the first edition of Wundt's *Grundriss* was published, Nakashima (1909a; 1909b) tested Wundt's assertion by collecting reaction times of psychophysical (pitch, hue, temperature, etc.) and affective (preference) judgments made on the same sets of stimuli. He did not find shorter reaction times for judgments of preference than for judgments of pitch, hue, temperature, etc., and thus disagreed with Wundt with regard to the primacy of feelings. But his study alone could not have buried Wundt's idea. Actually, Nakashima's data were rather inconclusive, since he failed to control for levels of discriminability associated with the two types of judgments. Thus, for example, subjects can detect very small differences in hue yet feel quite indifferent in their preference for stimuli that differ so little. Since reaction times for comparisons vary with the size of the difference, these times can be compared meaningfully only if the stimuli are preselected so that difference thresholds for the two types of judgments are the same.

preferences. These aspects are reflected in the answers to such questions as "Do you like this person?" "How do you feel about capital punishment?" "Which do you prefer, Brie or Camembert?" "Are you pleased with the review your recent book received?" In short, I deal with some hot cognitions (as Abelson [1963] christened them) and try to distinguish them from the cold ones. The class of feelings considered here is that involved in the general quality of behavior that underlies the approach-avoidance distinction. Thus, for the present purposes, other emotions such as surprise, anger, guilt, or shame, which have been identified in the literature and extensively analyzed by Tomkins (1962, 1963), Izard (1977), and others, are ignored.

Unlike experimental psychologists,³ social psychologists are deeply concerned with affect and with hot cognitions. The extensive work on attitudes, research on cognitive dissonance and cog-

³ Contemporary cognitive psychology simply ignores affect. The words *affect*, *attitude*, *emotion*, *feeling*, and *sentiment* do not appear in the indexes of any of the major works on cognition (Anderson, 1975; Anderson & Bower, 1973; Bobrow & Collins, 1975; Crowder, 1976; Kintsch, 1974; Lachman, Lachman, & Butterfield, 1979; Norman & Rumelhart, 1975; Schank & Abelson, 1977; Tulving & Donaldson, 1972). Nor do these concepts appear in Neisser's (1967) original work that gave rise to the cognitive revolution in experimental psychology. And in the six volumes and the 2,133 pages of the *Handbook of Learning and Cognitive Processes* (Estes, 1975-1978), there is only one entry for *affect* and only one for *attitude*. It is worth noting that both of these entries are in Volume 3 in a contribution written by a social psychologist. In the last three volumes—those principally devoted to cognition—there are no references to affect whatsoever.

The notable exceptions are Mandler's (1975) work on thought and emotion, Neisser's 1976 essay, and Miller and Johnson-Laird's (1976) recent volume on language and perception from which the following revealing quotation is taken:

The information-processing system that emerges from these remarks is fearfully cognitive and dispassionate. It can collect information, remember it, and work toward objectives, but it would have no emotional reaction to what is collected, remembered, or achieved. Since in this respect it is a poor model of a person, we should add at least one more predicate to this list of those that take "person" as their first argument. We will use *Feel* (person, x) to indicate that people have feelings as well as perceptions, memories, and intentions. It might be possible to subsume *Feel* under *Perceive* on the grounds that our feelings are a special class of perception of inner states. Or we might discuss feelings under *Remember*; the recognition that some word or object is familiar, is after all, a matter of feeling a certain way about it. Or, since we have already recognized that there is a strong affective component to our intentions, we might link *Feel* to *Intend*. . . . All these

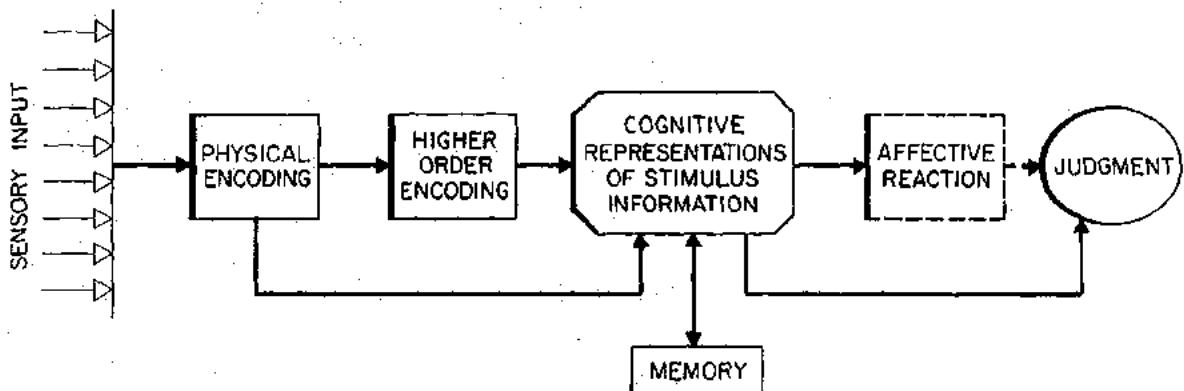


Figure 1. Typical information-processing model of affect.

nitive balance, the Schachter and Singer (1962) studies on emotion, and Heider's (1958) attempts to describe the cognitive representation of affect that characterizes interpersonal relationships are all clear manifestations of this concern.* There are practically no social phenomena that do not implicate affect in some important way. Affect dominates social interaction, and it is the major currency in which social intercourse is transacted. The vast majority of our daily conversations entail the exchange of information about our opinions, preferences, and evaluations. And affect in these conversations is transmitted not only by the verbal channel but by nonverbal cues as well—cues that may, in fact, carry the principal components of

information about affect. It is much less important for us to know whether someone has just said "You are a friend" or "You are a fiend" than to know whether it was spoken in contempt or with affection. Argyle and his colleagues (Argyle, Salter, Nicholson, Williams, & Burgess, 1970) found that 22 times more variance is accounted for by the tone of one's voice than by the content of the utterance when people are asked to interpret utterances. In fact, even when the content of recorded utterances is nearly completely obliterated by means of electronic masking, filtering, or random splicing of the tape, subjects still can encode the emotions expressed in these utterances quite reliably (Dawes & Kramer, 1966; Scherer, Koivumaki, & Rosenthal, 1972). And we have no difficulty in identifying emotions expressed by members of unknown cultures speaking unknown languages. In a recent volume on person perception, Schneider, Hastorf, and Ellsworth (1979) noted that "inferences based on nonverbal cues are primarily inferences about relationships and feelings, and thus are among the most important inferences we make" (p. 142). One cannot be introduced to a person without experiencing some immediate feeling of attraction or repulsion and without gauging such feelings on the part of the other. We evaluate each other constantly, we evaluate each others' behavior, and we evaluate the motives and the consequences of their behavior. And you have already made up your mind about this paper!

considerations testify to the systematic importance of this psychological predicate. Nevertheless, we will have little to say about *Feel* in the following pages. (pp. 111-112)

Thus, Miller and Johnson-Laird explicitly acknowledge the significance of feelings as part of experience, yet they decide to devote minimal attention to them. Their decision is noteworthy in the light of their belief that "*Feel* is an indispensable predicate for any complete psychology and that it probably lies much closer than *Perceive*, *Remember*, and *Intend* to the basic sources of energy that keep the whole system running" (p. 112).

Beyond these volumes there are some isolated theoretical attempts directed toward the understanding of the role of motivational and emotional factors in perception and cognition (Broadbent, 1977; Erdelyi, 1974; Posner & Snyder, 1975a).

*While such studies as those of Byrne (1961), Berscheid and Walster (1978), or Rubin (1973), which deal with interpersonal attraction, also have a concern with affect, they do not contain specific analyses of how affect is represented as part of experience. And in studies that compare the effects of conditions that differ on the affective dimension (such as self- vs. nonself-relevance, ego-involvement), it is generally not the affective quality per se in these conditions that is examined as the major source of variation.

Nor is the presence of affect confined to *social* perception. There are probably very few perceptions and cognitions in everyday life that do not have a significant affective component, that aren't hot, or in the very least tepid. And perhaps all

perceptions contain some affect. We do not just see "a house": we see "a *handsome* house," "an *ugly* house," or "a *pretentious* house." We do not just read an article on attitude change, on cognitive dissonance, or on herbicides. We read an "exciting" article on attitude change, an "important" article on cognitive dissonance, or a "trivial" article on herbicides. And the same goes for a sunset, a lightning flash, a flower, a dimple, a hangnail, a cockroach, the taste of quinine, Sauvignon, the color of earth in Umbria, the sound of traffic on 42nd Street, and equally for the sound of a 1000-Hz tone and the sight of the letter Q.⁵

Feeling and Thinking

According to the prevalent models for affect (e.g., Figure 1), preferences are formed and expressed only after and only as a result of considerable prior cognitive activity. How fully and completely must objects be cognized before they can be evaluated? I argue, along with Wundt and Cummings, that to arouse affect, objects need to be cognized very little—in fact, minimally.

In order to consider this possibility more specifically it is important to distinguish between thoughts and feelings. At the genotypic level, this distinction is not an easy one to make, for it hovers dangerously near the mind-body duality. Some conceptual elements of this distinction, however, may be identified for purposes of clarity. While feelings and thoughts both involve energy and information, the first class of experiences is heavier on energy, whereas the second is heavier on information (e.g., Inhelder & Piaget, 1958; pp. 347–348). In the pure case, the analysis of feelings attends primarily to energy transformations, for example, the transformation of chemical or physical energy at the sensory level into autonomic or motor output. In contrast, the analysis of thoughts focuses principally on information transformations. In nearly all cases, however,

feeling is not free of thought, nor is thought free of feelings. Considerable cognitive activity most often accompanies affect, and Schachter and Singer (1962) consider it a necessary factor of the emotional experience. Thoughts enter feelings at various stages of the affective sequence, and the converse is true for cognitions. Feelings may be aroused at any point of the cognitive process: registration, encoding, retrieval, inference, etc. But this converse relation is not totally symmetrical. I will later argue for Wundt's conjecture that affect is *always* present as a companion to thought, whereas the converse is not true for cognition. In fact, it is entirely possible that the very first stage of the organism's reaction to stimuli and the very first elements in retrieval are affective. It is further possible that we can like something or be afraid of it before we know precisely what it is and perhaps even *without* knowing what it is. And when we try to recall, recognize, or retrieve an episode, a person, a piece of music, a story, a name, in fact, anything at all, the affective quality of the original input is the first element to emerge. To be sure, the early affective reaction is gross and vague. Nevertheless, it is capable of influencing the ensuing cognitive process to a significant degree. Needless to say, after some cognitive activity has been executed, there may be new feeling to the stimulus. But the fact that cognitions *can* produce feelings—as in listening to a joke, for example, where affect comes at the end with a punch line or as a result of post-decision dissonance—need not imply that cognitions are necessary components of affect. What I want to argue is that the form of experience that we came to call feeling accompanies *all* cognitions, that it arises early in the process of registration and retrieval, albeit weakly and vaguely, and that it derives from a parallel, separate, and partly independent system in the organism.

At the phenotypic level, we can support Wundt's conjecture by spelling out in somewhat greater detail some of the ways in which affective judgments and reactions, or hot cognitions, differ from their cold cognitive counterparts, keeping in mind that the first category is represented by the prototype "I like Joe," and the second by "Joe is a boy."

Affective reactions are primary. Wundt and Cummings are joined by Bartlett and Osgood in the view that feelings come first. Bartlett (1932) observes in his book on remembering,

⁵This conjecture probably does not apply to incidental perceptions where the attentive processes are at minimum, although it is not inconceivable that the traces of these incidental perceptions still might recruit affect upon retrieval and thus become hot. In fact, Izard (1979) assumes that some emotion is *always* present in consciousness. Normally, it is the emotion of "interest" that dominates behavior. This emotion, which directs and sustains attention and exploration, is absent only when other emotions such as distress or anger "achieve consciousness" (p. 165).

Attitude names a complex psychological state or process which it is very hard to describe in more elementary psychological terms. It is, however, as I have often indicated, very largely a matter of feeling, or affect. . . . [When] a subject is being asked to remember, very often the first thing that emerges is something of the nature of attitude. The recall is then a construction, made largely on the basis of this attitude, and its general effect is that of a justification of the attitude. (pp. 206-207)

In his analysis of environments as perceptual targets, Ittelson (1973) asserts that "the first level of response to the environment is affective. The direct emotional impact of the situation, perhaps largely a global response to the ambiance, very generally governs the directions taken by subsequent relations with the environment. It sets the motivational tone and delimits the kinds of experiences one expects and seeks" (p. 16). Preferences influence language comprehension and language production as well (Premack, 1976). Osgood (1962) was impressed with the primacy of affect in a different way:

First, I must confess that, when we began this research over ten years ago, I had the expectation that the major factors of the semantic space would represent the ways in which our sensory apparatus divides up the world—e.g., would parallel Boring's "dimensions of consciousness." . . . The accumulating data have proved my expectation wrong . . . the dominant factors of *evaluation*, *potency* and *activity* that keep appearing certainly have a response-like character, reflecting the ways we can react to meaningful events rather than the ways we can receive them.

But these major factors also seem to have an *affective* as well as a response-like character. As a matter of fact, the similarity of our factors to Wundt's (1896) tridimensional theory of *feeling*—pleasantness-unpleasantness, strain-relaxation, and excitement-quiescence—has been pointed out to me." (pp. 19-20)

It is significant also that at least three social-psychological conceptions labeled "cognitive" consistency theories focus not on consistency of content but on the consistency of affect (Abelson & Rosenberg, 1958; Heider, 1958; Osgood & Tannenbaum, 1955).

Decisions are another area where thought and affect stand in tension to each other. It is generally believed that *all* decisions require some conscious or unconscious processing of pros and cons. Somehow we have come to believe, tautologically, to be sure, that if a decision has been made, then a cognitive process must have preceded it. Yet there is no evidence that this is indeed so. In fact, for most decisions, it is ex-

tremely difficult to demonstrate that there has actually been *any* prior cognitive process whatsoever. One might argue that these are cases in which one alternative so overwhelmingly dominates all the others that only a minimum of cognitive participation is required and that that is why the cognitive involvement preceding such decisions is so hard to detect. But this argument must confront the observation that if all decisions involve the evaluation of alternatives, then when choices appear quite lopsided to the decision maker, it is even more important to scrutinize the alternatives that appear inferior, for it is entirely possible that one of them possesses some hidden but overriding virtue. It is therefore not without merit to suppose that in many decisions affect plays a more important role than we are willing to admit. We sometimes delude ourselves that we proceed in a rational manner and weigh all the pros and cons of the various alternatives. But this is probably seldom the actual case. Quite often "I decided in favor of X" is no more than "I liked X." Most of the time, information collected about alternatives serves us less for making a decision than for justifying it afterward. Dissonance is prevalent just because complete and thorough computation is not performed before the decision (Festinger, 1964). We buy the cars we "like," choose the jobs and houses that we find "attractive," and then justify those choices by various reasons that might appear convincing to others who never fail to ask us, "Why this car?" or "Why this house?" We need not convince ourselves.⁶ We know what we like.

In a study of consumer behavior, Quandt (1956) found that buyers often do not attend to the features of the article that they consider criterial for their decisions and often base their choices on features that they previously dismissed as irrelevant. And Kahneman and Tversky (1979) have demonstrated that numerous axioms of decision theory that give decisions their rational flavor are blatantly contradicted by experimental results.

⁶ Phoebe Ellsworth (Note 1) illustrates the role of affect in her own recent decision experience. In trying to decide whether to accept a position at another university, she says, "I get half way through my Irv Janis balance sheet and say, 'Oh hell, it's not coming out right! Have to find a way to get some pluses over on the other side!'"

Affect is basic. In one of her last books, which bears the provocative title of *Mind: An Essay on Human Feeling*, Susan K. Langer (1967) tried to show "that the entire psychological field—including human conception, responsible action, rationality, knowledge—is a vast and branching development of feeling" (p. 23). Affect is the first link in the evolution of complex adaptive functions that eventually differentiated animals from plants. And unlike language or cognition, affective responsiveness is universal among the animal species. A rabbit confronted by a snake has no time to consider all the perceivable attributes of the snake in the hope that he might be able to infer from them the likelihood of the snake's attack, the timing of the attack, or its direction. The rabbit cannot stop to contemplate the length of the snake's fangs or the geometry of its markings. If the rabbit is to escape, the action must be undertaken long before the completion of even a simple cognitive process—before, in fact, the rabbit has fully established and verified that a nearby movement might reveal a snake in all its coiled glory. The decision to run must be made on the basis of minimal cognitive engagement.

It is thus significant that in categorizing facial expressions, about 50% of the variance is explained by the pleasant-unpleasant dimension (Abelson & Sermat, 1962; Hastorf, Osgood, & Ono, 1966), and the same value is obtained for the multidimensional scaling of similarities among photographs of faces (Milord, 1978). Similarly, it is a typical result in semantic differential studies that among the three factors Evaluation, Potency, and Activity, all of which Osgood considers to be affective components of meaning, it is the first that accounts for about 50% of the variance.⁷ And it is no accident, according to Osgood (1969), that these three factors of the semantic space are found repeatedly among diverse sets of concepts:

In my opinion, it is the innateness of the emotional reaction system of the human animal that underlies the universality of the affective E-P-A components of meaning. In other words, the "innateness" of E-P-A . . . is really the pan-humanities of emotional reactions, and these obviously have evolutionary significance for the survival of any species. Organisms without other specialized adaptive mechanisms (e.g., armor, coloration, poisons, etc.) which were unable to represent for themselves the good versus bad implications of things (antelope versus saber-toothed tiger), the strong versus weak of things (saber-toothed tiger versus mosquito), and the quick versus slow of things (saber-toothed tiger versus quicksand) would have little chance of survival. In the human species these "gut" reactions to things appear as the affective meaning system (the E-P-A components of total mean-

ing), and it is these components which provide us with what might most appropriately be called the "feelings-tones" of concepts as a part of their total meaning. (p. 195)

Affective reactions are inescapable. Unlike judgments of objective stimulus properties, affective reactions that often accompany these judgments cannot always be voluntarily controlled. Most often, these experiences occur whether one wants them to or not. One might be able to control the expression of emotion but not the experience of it itself. It is for this very reason that law, science, sports, education, and other institutions of society keep devising ever new means of making judgments "objective." We wish some decisions to be more independent of these virtually inescapable reactions.

We may completely fail to notice a person's hair color or may hardly remember what it was shortly after meeting the person. But we can seldom escape the reaction that the person impressed us as pleasant or unpleasant, agreeable or disagreeable, as someone to whom we were drawn or someone by whom we were repelled. And these affective reactions—and, more important, the retrieval of affect—occur without effort. In contrast, some cognitive judgments require substantial effort. Chess contestants typically lose several pounds of their weight in the course of a tournament.

Because affective judgments are inescapable, they cannot be focused as easily as perceptual and cognitive processes. They are much more influenced by the context of the surround, and they are generally holistic. Affective reactions are thus less subject to control by attentive processes.⁸

⁷ It is therefore something of a paradox that so little attention is paid to affect in information-processing studies. Most of the tasks in experiments on information processing are verbal. Most of them involve some forms of semantic memory. If the semantic space is primarily an affective space, as Osgood argues, then the affective components and qualities of information need to be given as much attention as their phonemic, graphemic, lexical, semantic, conceptual, or pictorial counterparts.

⁸ The existentialists (e.g., Sartre, 1947) ascribe a substantial voluntary component to emotion. "The existentialist does not believe in the power of passion. He will never agree that a sweeping passion is a ravaging torrent which fatally leads a man to certain acts and is therefore an excuse. He thinks that man is responsible for his passion" (pp. 27-28). Because of the participation of sensory, cognitive, and motor processes, the argument that emotions have some voluntary component is not without basis.

Affective judgments tend to be irrevocable. Once a cognitive judgment has been made—for example, that at the forthcoming social hour there will be more scotches drunk than bourbons—one can still be persuaded that it may turn out otherwise. It can be pointed out, say, that the distribution of ages of the guests is different than that we *really* like scotch better than bourbon, is greater than the supply of scotch. We can readily accept the fact that we can be wrong. But we are never wrong about what we like or dislike. Hot cognitions are seldom subjectively false. It would be much harder to persuade us that we *really* like scotch better than bourbon, given that we feel otherwise. Once formed, an evaluation is not readily revoked. Experiments on the perseverance effect, the strong primacy effects in impression formation, and the fact that attitudes are virtually impervious to persuasion by communication all attest to the robust strength and permanence of affect. Affect often persists after a complete invalidation of its original cognitive basis, as in the case of the perseverance phenomenon when a subject is told that an initial experience of success or failure has been totally fabricated by the experimenter (Ross, Lepper, & Hubbard, 1975).

The reason why affective judgments seem so irrevocable is that they "feel" valid. We are not easily moved to reverse our impression of a person or of a piece of music. We trust our reactions, we believe that they are "true" and that they accurately represent an internal state or condition. Perhaps the subjective validity of affective judgments and reactions and our confidence in these judgments derive from the Cartesian tradition⁹ that allows us to doubt everything except our own feelings, especially the feelings of doubt. Perhaps it reflects a basic reality.¹⁰

Affective judgments implicate the self. When we evaluate an object or an event, we are describing not so much what is in the object or in the event, but something that is in ourselves. Cognitive judgments deal with qualities that reside in the stimulus: "This cat is black," "Camembert and Brie are soft-ripened cheeses." These judgments are made on I-scales that are orders of stimuli (Coombs, 1964). Affective judgments, however, are made on J-scales, that is, scales on which are located jointly the various stimuli as well as the ideal preference point of the person. "I dislike this black cat" or "I prefer Cam-

embert to Brie" are judgments on J-scales. Thus, affective judgments are *always* about the self. They identify the state of the judge in relation to the object of judgment.

Affective reactions are difficult to verbalize. The remarkable aspect of first impressions of persons is their immediacy. When we meet a stranger, we know within a fraction of a second whether we like the person or not. The reaction is instantaneous and automatic. Perhaps the feeling is not always precise, perhaps we are not always aware of it, but the feeling is always there. If our later experience with the stranger conflicts with the first impression, we are terribly surprised. We consider it an exception. Paradoxically, this subjective validity of affective reaction, this certainty that we "know what we like," is often accompanied by our inability to verbalize the reasons for our attraction or repulsion to the person.¹¹ When asked why we like someone, we say that we like the person because he or she is "nice," "pleasant," or "interesting." But these adjectives describe our reactions to the person, not the person. There simply aren't very effective verbal means to communicate why we like people and objects or what it is that we like about them.

The communication of affect, therefore, relies much more on the nonverbal channels (Ekman & Friesen, 1969; Schneider, Hastorf, & Ellsworth, 1979). Yet it is remarkably efficient. And it is in the realm of nonverbal expression of feelings that their basic nature is again revealed. The universality of emotional expression strongly suggests our evolutionary continuity with other species and the fundamental nature of affect. The facial expressions of humans upon biting into a

⁹ Hume (1898), too, held that emotions (passions) cannot be false. "A passion must be accompanied with some false judgment, in order to its being unreasonable; and even then 'tis not the passion properly speaking, which is unreasonable, but the judgment" (p. 196).

¹⁰ Because nonverbal cues exchanged in social interaction are dominated by affect, they are perceived as having such properties as trustworthiness and freedom from voluntary control (Schneider, Hastorf, & Ellsworth, 1979, pp. 123-127).

¹¹ Mandler (1975), Neisser (1967), and Nisbett and Wilson (1977) pointed out that individuals have no access to the cognitions that occasion, mediate, or cause their actions, that are parts of their attitudes, or that determine their preferences. On the basis of an extensive review of the social psychological literature, Nisbett and Wilson (1977) concluded that introspective reports about influences on the subjects' evaluations, decisions, and actions were so unreliable as not to be trusted.

sour apple and their expressions of surprise, anger, delight, or serenity are remarkably similar across all cultures and are not far removed from the expressions of the great apes. Perhaps we have not developed an extensive and precise verbal representation of feeling just because in the pre-linguistic human this realm of experience had an adequate representation in the nonverbal channel.

The role of affective communication is particularly significant in the social interaction among animals. The effectiveness of communication of affect and the accuracy of recognition of affective expression are illustrated by the results of Pratt and Sackett (1967). They raised rhesus monkeys in conditions that allowed complete contact with peers, in conditions that allowed only visual and auditory access, and in complete isolation. The monkeys were then examined for the kinds of animals they preferred to approach. Those raised under the same conditions preferred each other twice as much as those raised under different conditions, even when the stimulus animals were total strangers to the test monkeys. While it could not be determined what sorts of cues allowed the animals to make these fine discriminations, it is very likely that the three groups developed during the course of their previous experience distinct patterns of emotional responding to new stimuli and to strange individuals, and that the animals raised under the same conditions found each other more attractive because of the familiarity of these emotional patterns.

The reliance of affect on nonverbal means of communication has, I believe, implications for the way it is processed. For if affect is not always transformed into semantic content but is instead often encoded in, for example, visceral or muscular symbols, we would expect information contained in feelings to be acquired, organized, categorized, represented, and retrieved somewhat differently than information having direct verbal referents. Recent electromyographic research provides strong evidence for the participation of muscular activity in the imagination, recall, and production of emotional states (Lang, 1979; Schwartz, Fair, Salt, Mandel, & Klerman, 1976). In light of these intuitions, it is not unreasonable to speculate that the processing of affect is closer to the acquisition and retention of motor skills than of word lists.

Affective reactions need not depend on cognition. At the turn of the century, Nakashima (1909a, 1909b) tried to find support for Wundt's affective-

primacy conjecture by comparing reaction times for psychophysical judgments and for preferences. He failed. But he did find evidence that judgments of pleasantness were independent of sensory qualities and that these judgments could not have been mediated by these qualities. Similar independence, based on multidimensional scaling, has been reported more recently, for example, in studying the perceptions of and preferences for soft drinks. Cooper (1973) found that similarity scaling yielded a space dominated by a "cola-ness" dimension, whereas preference scaling generated a space dominated by popularity of the drinks. Generally, it appears that similarity judgments predict preferences only when the similarity judgments are themselves highly evaluative, as in the case of admissions officers judging college candidates (Klahr, 1969) or art-trained students judging paintings (Berlyne, 1975; O'Hare, 1976). Osgood (1962) took it as a given that the affective reaction system "is independent of any particular sensory modality" (p. 21).

If there is indeed a separation between affect and cognition, then it is not surprising that research on preferences, attitudes, attractions, impressions, aesthetic judgments, and similar affective responses—research that commonly has invoked cognitive mediators—has not been terribly successful. If overall preferences were simply a matter of calculating the combination of weighted component preferences, and if component preferences were nothing more than cognitive representations of object features marked with affect, then the problems of predicting attitudes, decisions, aesthetic judgments, or first impressions would have been solved long ago. After all, these problems have been around for nearly a century. Yet except for trivial cases or cases in which the responses are highly cognitive (e.g., Yntema & Torgerson's [1961] study of judgments of ellipses), the cognition-based solutions to these problems have rarely predicted more than 20% of the total variance.

The dismal failure in achieving substantial attitude change through various forms of communication or persuasion is another indication that affect is fairly independent and often impervious to cognition. If attitudes consist of information units that have affect or utilities attached to them, then to change an individual's attitude, what could be simpler than providing the individual with alternative information units that have the same sort

of affect as that attached to the desired attitude? If a person believes that Candidate A is honest, we can simply give the person information proving that A is not honest. Or, we could change the centrality or the weight of honesty. Yet this approach has been the least successful in attitude change. Even the most convincing arguments on the merits of spinach won't reduce a child's aversion to this vegetable. Direct persuasion effects have been so weak that researchers have instead turned to more pernicious avenues of attitude change, such as insufficient justification, persuasion through distraction, the foot-in-the-door technique, or the bogus pipeline.

It is unlikely that calculations based on discriminable component features and their affective values will reliably predict our overall affective reactions to objects and events. These reactions do not seem to be composites of such elements. An affective reaction to a person we meet emerges long before any of these features can be identified, let alone evaluated. The assumption that component affect, utilities, or values attach themselves to the very same features that the subject attends to in a typical detection, recognition, discrimination, or categorization task is likely to be wrong.¹² The analysis of preferences is not simply an analysis of cold cognitive representations that have become hot, that is, cognitive representations that have some affect attached to them.¹³ The stimulus features that serve us so well in discriminating, recognizing, and categorizing objects and events may not be useful at all in evaluating these objects. If this is indeed the case, then there must exist a class of features that can combine more readily with affect and thereby allow us to make these evaluations, to experience attraction, repulsion, pleasure, conflict, and other forms of affect, and to allow us to have these affective reactions quite early after the onset of the sensory input. These features might be quite gross, vague, and global. Thus, they might be insufficient as a

basis for most cognitive judgments—judgments even as primitive as recognition, for example. In order to distinguish this class of features from simple discriminanda, I call them *preferenda* (Zajonc, Note 2).

I cannot be very specific about preferenda. If they exist they must be constituted of interactions between some gross object features and internal states of the individual—states that can be altered while the object remains unchanged, as, for example, when liking for a stimulus increases with repeated experience. Color preferences are a case in point. Similarity scaling of color yields three dimensions—brightness, hue, and saturation—that explain almost all of the variance in similarity judgments. But on the basis of Nakashima's (1909a) research and according to unpublished work of Premack and Kintsch (Note 3), the scaling of color for preference would not reveal these three factors. If we did not know from other sources that brightness, hue, and saturation exhaust the entire range of differences among colors, then we would not discover them by means of preference scaling. Abstract preferences for color and color preferences for classes of objects, such as hair, cars, or houses, are still more problematic if we insist on using brightness, hue, and saturation in quantifying them. And the same applies to face recognition: Physical features do not serve as discriminanda for faces (Milord, 1978; Patterson & Baddeley, 1977). It is therefore an interesting problem to discover what it is in color that "holds" affect if it isn't brightness, hue, and saturation and what it is in a face that "holds" affect if it isn't physical features. The answer to this problem is probably that *some* physical aspects, perhaps vague, gross, or configural, are involved, but not alone. Preferenda must consist of an interaction of these global features with some internal state or condition of the individual.

Affective reactions may become separated from content. It sometimes happens that we are reminded of a movie or of a book whose contents we are unable to recall. Yet the affect present when leaving the movie or our general impression of the book are readily accessible. Or we are reminded of an interpersonal conflict of long ago. The cause of the conflict, the positions taken, the matter at issue, who said what, may have all been forgotten, and yet the affect that was present during the incident may be readily retrieved. Such experiences, together with such clinical phenomena

¹²I did not have the slightest doubt of this assumption, however, when I wrote my dissertation (Zajonc, 1955), which employed it without question.

¹³The term *hot cognition* has been used fairly indiscriminately, although it generally refers to cases when affect *accompanies* or *qualifies* information. "I have a malignant tumor" is a hot cognition. However, the emotional experience of listening to one's favorite piece of music performed by one's favorite artist is less likely to receive the label of *hot cognition*. It is even less meaningful to speak of *hot cognitions* when affect becomes separated from the original cognitions.

as free-floating anxiety, hysteria, or posthypnotically induced moods, all point to the possibility that some aspects of affective processes might well be separate and partly independent of cold cognitions. Occasions when they are not include those when an affective experience has been communicated to someone else or when it has been thought of a great deal. On such occasions an elaborate cognitive representation of affect occurs that may be processed very much like any other type of information. It is important to observe, however, that not all affective experiences are accompanied by verbal or other cognitive representations and that when they are, such representations are imprecise and ambiguous.

Preferences Need No Inferences: Empirical Evidence

The prevalent approach to the study of preferences and related affective phenomena holds that affective reactions follow a prior cognitive process: Before I can like something I must first know what it is. According to this prevalent view, therefore, such cold cognitive processes as recognition or categorization are primary in aesthetic judgments, in attitudes, in impression formation, and in decision making: They come first. If we say, for example, that we like John because he is intelligent, rich, and compassionate, it follows that we must have gained some impression of John's intelligence, wealth, and compassion, and combined them, before we formed an attraction to him. This must be especially so in the case of judgments of novel stimuli before the component units become fused into an integrated structure. Thus, if the complexity of polygons is an important basis of their attractiveness, then polygons that are judged pleasing (or displeasing) must have previously been somehow examined for their complexity. Otherwise, the calculus of preferences makes little sense.¹⁴

The first indication that affect may not require extensive participation of cold cognitive processes appeared in studies of the exposure effect, that is, the phenomenon of increasing preference for ob-

jects that can be induced by virtue of mere repeated exposure (Harrison, 1977; Zajonc, 1968). While the empirical results that established the phenomenon were quite consistent, their explanation continued to be very elusive. Theories that attempted to account for the mere exposure effect, such as Harrison's (1968) response competition hypothesis or Berlyne's (1970) optimal arousal theory, treated affect as resulting from a prior cognitive process. Both theories contained the remnants of Titchener's (1910) thesis on familiarity. In explaining the preference for familiar objects, Titchener attributed a critical role to recognition, which he thought gave the individual a "glow of warmth, a sense of ownership, a feeling of intimacy" (p. 411). The majority of subsequent findings bearing on the explanation of the exposure effect, however, have revealed that recognition must play a relatively minor role, as must the subjective feeling of recognition.

Matlin (1971) was the first to discover that the role of recognition in the exposure effect may have been overstated. During an initial experimental session, she presented Turkish-like words either three times or six times. Subsequently, these words, together with others that were not shown at all, were rated for liking and also for familiarity. That is, for each word the subjects had to decide whether they saw it previously in the exposure series and to report how much they liked it. Table 1 shows Matlin's results. Liking is averaged as a function of objective familiarity and as a function of subjective familiarity. Note that there is an effect due to subjective familiarity, that is, when the subjects thought a stimulus was old they rated it more positively than when they thought it was new. However, the objective history of the individual's experience with the stimulus is just as effective in influencing liking. Stim-

TABLE 1
Average Stimulus Affect Ratings as a Function of Objective Familiarity (Old-New) and Subjective Familiarity ("Old"- "New")

Objective familiarity	Subjective familiarity		
	"Old"	"New"	M
Old	4.90	4.20	4.47
New	4.20	3.90	4.01
M	4.55	4.05	

Note. Data are from Matlin (1971).

¹⁴ Affective reactions to objects that have been encountered and evaluated many times may become automated, thus gaining some independence from the component processes (Shiffrin & Schneider, 1977). As such, they may have different properties than *first* reactions. It is those first affective reactions (that is, those elicited when individuals are asked to evaluate objects totally novel to them) that I wish to consider at this point.

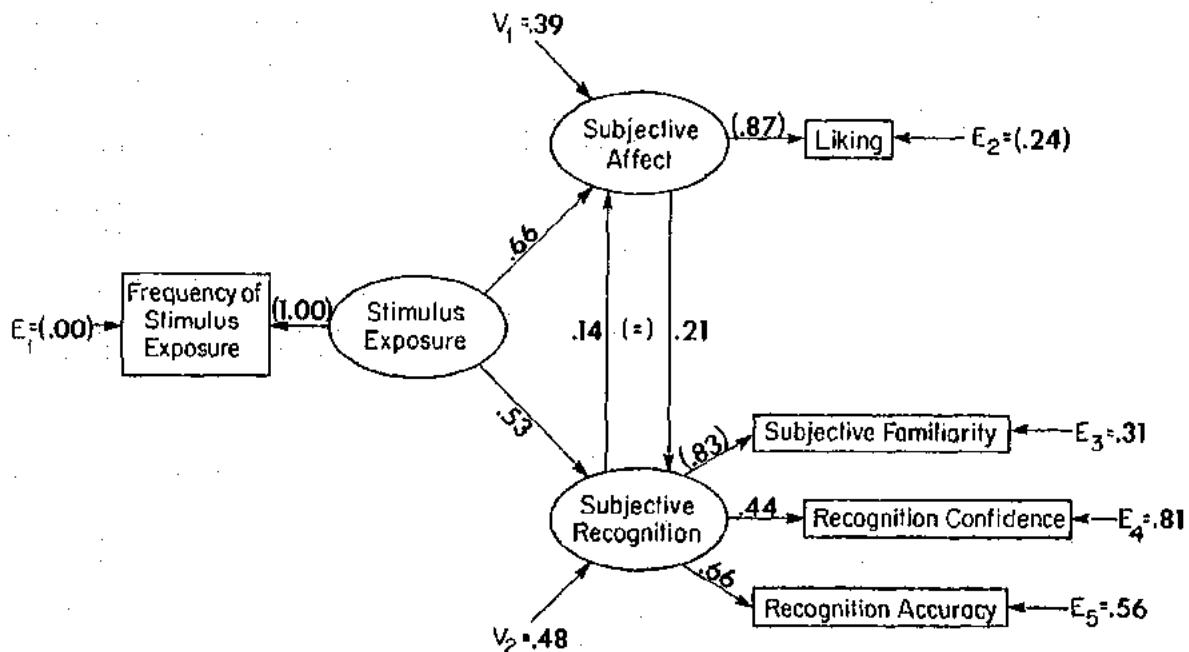


Figure 2. Causal model for independent affect; goodness of fit is $\chi^2(5) = 39.0$. V = variable; E = error. (From "Exposure Effects May Not Depend on Stimulus Recognition" by R. L. Moreland and R. B. Zajonc, *Journal of Personality and Social Psychology*, 1979, 37, 1085-1089. Copyright 1979 by the American Psychological Association. Reprinted by permission.)

uli that the subjects had actually seen were liked better than stimuli not seen, independently of whether the subjects thought of them as "old" or "new."

Similar results were obtained recently by Moreland and Zajonc (1977, 1979), using Japanese ideographs. Subjects were given 0, 1, 3, 9, and 27 prior exposures, counterbalanced, of course, with the stimuli. Following these exposures, the subjects made a variety of recognition and liking judgments. A number of findings are of interest. Many stimuli shown in the first series, some of them 27 times, were not recognized as familiar when shown later. Taking only those stimuli that were so judged, and relating the rated attractiveness of these stimuli to their actual number of exposures, we obtained correlations of .43 in one experiment and of .50 in another. An objective history of exposure influenced liking of stimuli for which the subjects could not have felt a "glow of warmth" or a "sense of ownership."

We also performed another type of analysis. Because we had a sufficient number of measures, we were able to use linear structural equation analyses to evaluate various causal models of our data. We used the LISREL-III program (see Jöreskog & Sörbom, 1977) to calculate maximum likelihood estimates for causal models that assign

different roles to the recognition factor. The program distinguishes between latent variables (constructs) and their observed indicators (measures). By estimating the unknown coefficients in a system of simultaneous equations for any particular model, the program describes the pattern of relations among the latent variables, distinguishing causal effects from unexplained variation in each case.

The results of this analysis are shown in Figure 2. Latent variables are shown in ellipses, while measures of those variables are shown in rectangles. The coefficients linking the ellipses with the boxes represent the validities with which particular latent variables were assessed by their measures. Path coefficients linking the latent variables to each other represent causal relations. Unexplained variation in the latent variables (V_1 and V_2) and error in the various measures (E_1 through E_5) are also shown. Some parameters (shown in parentheses) had to be set equal to some a priori value in the maximum likelihood solution so that variance in all of the latent variables could be identified.

The first model tested was one postulating that stimulus exposure has two mutually independent effects, one cognitive and one affective, or one cold and one hot. We supposed that under the

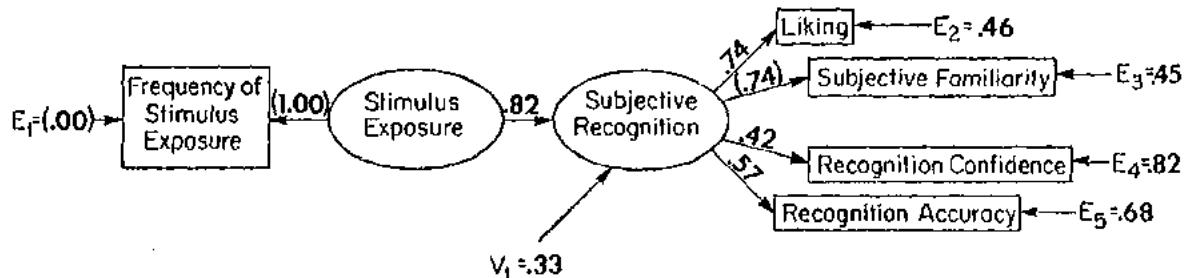


Figure 3. Causal model for mediated affect; goodness of fit is $\chi^2(6) = 83.6$. V = variable; E = error. (From "Exposure Effects May Not Depend on Stimulus Recognition" by R. L. Moreland and R. B. Zajonc, *Journal of Personality and Social Psychology*, 1979, 37, 1085-1089. Copyright 1979 by the American Psychological Association. Reprinted by permission.)

impact of repeated exposure, people gain an increasing ability to recognize the stimulus—They achieve a feeling of subjective familiarity and an awareness of recognition, which authors since Titchener have thought to be the necessary conditions for an increased positive affect toward the stimulus. This is the purely cold effect that is capable of generating the eventual "glow of warmth." However, we wanted to know as well whether, quite independently of this cold cognitive effect, there is also an affective change, or hot effect—that is, whether subjects acquire a more positive attitude toward the object as exposure increases, independently of recognition. They do. While the path coefficient from stimulus exposure to subjective recognition is substantial (.53), indicating that recognition improves with exposure, there also is a hot effect: There is a strong path from stimulus exposure to subjective affect that is *independent of recognition* (.66).

We can compare this model with one that is entirely cold, that is, with one that requires the entire process to be mediated by cognitive factors, by the discriminanda. This model, shown in Figure 3, says essentially that whatever affective changes take place as a result of exposure are entirely mediated by stimulus recognition. The result of requiring affect to be mediated by recognition is a substantial reduction in the efficiency of prediction. The χ^2 in the previous model was 39.0 ($df = 5$) and in this model is 83.6 ($df = 6$), generating a significant ($p < .01$) difference between the two models of $\chi^2(1) = 44.6$.

The experiments just described all involved presentation of stimuli under optimal conditions; that is, there was nothing to prevent the subjects from registering what was shown and from memorizing the information presented to them. Sub-

jective recognition and the likelihood of recognition were controlled by statistical techniques. And the results showing that stimulus recognition was not a necessary condition for the exposure effect were correlational.

Much firmer evidence, however, that hot cognition is quite short on cognition was collected by W. R. Wilson (1975), who controlled for recognition experimentally by means of an ingenious technique. He employed the method of dichotic listening in order to reduce recognition to a chance level. Random sequences of tones, such as those constructed by Vitz (1964), were presented to one ear, and a story was simultaneously presented to the other. Subjects were asked to track the story on a written page to verify whether what they heard corresponded to the printed text. The melodies were played five times each. The subjects were subsequently given a recognition memory test in which the earlier melodies and other melodies that they had never heard were played. But now there was no interference from the other channel, and no other task was required of the subject. The subjects also rated all the melodies for liking, some subjects giving their recognition memory judgments before, others after, the ratings for liking. The procedure succeeded in reducing recognition memory nearly to the chance level. The accuracy of recognition was 59% in one experiment and only 53% in another.

Table 2 shows the results of these experiments. Again, as in the case of previous results, liking varies with subjective recognition. But apart from this effect, liking also varies with the objective history of stimulus exposure. With recognition reduced nearly to the chance level, differential affective reaction to the stimuli is obtained as a consequence of mere repeated exposure. Random melodies

presented five times were liked better than melodies never heard, even though the subjects could not discriminate the former from the latter for familiarity.

In a follow-up of these studies, Kunst-Wilson (who is the same person as W. R. Wilson) and I tried to reproduce the effect in a visual mode (Kunst-Wilson & Zajonc, 1980). Random polygons were constructed and presented for an extremely brief time interval—in fact, only 1 millisecond. Subsequently, the subjects rated the polygons for liking and were tested for their recognition memory. Judgments were made in paired comparisons to avoid possible response bias. Again, recognition was at a chance level: 48%. However, of the stimuli that were liked, 60% were old and 40% were new. Sixteen of 24 subjects liked objectively old stimuli better than new stimuli, but only 5 of 24 recognized them as such at better than chance level. And of the 24 subjects, 17 showed better discrimination between objectively old and objectively new stimuli in their affective judgments than in their recognition responses, while only 4 showed such superiority of recognition over affective judgments. Thus, the subjects were able to distinguish between the old and new stimuli if they used liking as their response, but they were not able to distinguish between them if they had to identify them as "old" or "new." This result may be taken as evidence that a class of features (*preferenda*) exists that allows individuals to experience affect toward objects but does not allow them to accomplish cognitive tasks as simple as those in recognition memory tests.

TABLE 2

Average Stimulus Affect Ratings as a Function of Objective Familiarity (Old-New) and Subjective Familiarity ("Old"—"New")

Objective familiarity	Subjective familiarity		
	"Old"	"New"	M
<i>Old</i>			
Experiment I	4.20	4.03	4.12
Experiment II	3.51	3.85	3.66
<i>New</i>			
Experiment I	3.75	3.07	3.30
Experiment II	3.03	3.02	3.03
<i>M</i>			
Experiment I	4.02	3.52	
Experiment II	3.29	3.40	

Note. Data are from Wilson (1975).

These experiments establish, I believe, that affective reactions to a stimulus may be acquired by virtue of experience with that stimulus even if not accompanied by such an elementary cold cognitive process as conscious recognition. Thus, a theory that assumes that subjective experiences of novelty and familiarity mediate the affective response acquired during the course of exposures must contend with the results showing that with the subjective experience of novelty held constant, systematic variations in affect can be obtained just by means of an objective manipulation of exposure.

However, one should not assume that no form of recognition occurred. Obviously, some discrimination, however primitive or minimal, must have taken place, even though it must have been at a level not accessible to the subject's awareness. It is somewhat surprising that any effect at all was obtained with exposures as short as 1 millisecond, but it should be noted that the stimuli were high contrast (black on white) and that no mask was used. Detectable effects with 1-millisecond exposures were also obtained by Shevrin and Fritzler (1968) and by Shevrin, Smith, and Fritzler (1971). These authors reported differential evoked potentials and word associations to critical and control stimuli presented for 1 millisecond—stimuli that the subject could neither recognize nor identify. Even more pertinent is the work of Marcel (Note 4). He presented over a large number of trials either a single word or a blank always followed by a mask. The exposure duration of the word was varied. The subjects were then asked whether anything had been presented before the mask. If they answered yes, two words were then presented to them under optimal conditions. The subjects were then asked which of these two words was more *visually* similar to the one shown before the mask. Finally, they were asked which of these same two words was more *semantically* similar to the stimulus shown before the mask. With decreasing stimulus exposure, all three types of judgments tended to become less accurate, and eventually all three reached the chance level. But the first to become totally unreliable were judgments regarding the actual presence of the stimulus words. The second type of judgment to be reduced to a chance level by the decreasing exposures was that concerned with physical similarity. And when the subjects were totally unable to rise above chance in com-

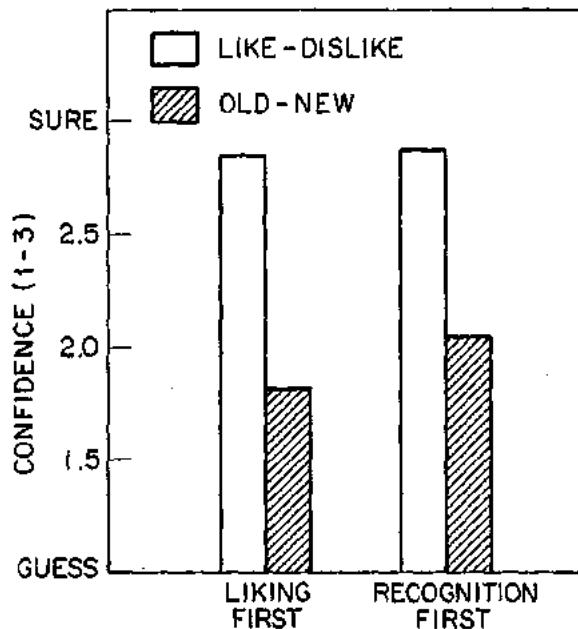


Figure 4. Confidence in liking and recognition judgments. (Drawn from data reported by Kunst-Wilson & Zajonc, 1980.)

paring physical similarities of the words, they were still judging their semantic similarities quite reliably.

Marcel's results are reminiscent of those reported by Broadbent and Gregory (1967), who found that unpleasant words (such as "blood") were more often misperceived as other unpleasant words (such as "death") than as equally probable neutral words. Marcel's results, moreover, are of particular interest if we consider the consistent findings from the semantic differential literature showing that meaning is very highly saturated with affect. If it is indeed affect that allows subjects to make a semantic match in the absence of conscious recognition, then deciding which of two given words is *emotionally* more similar to a stimulus word should be at least as easy as deciding which is semantically more similar. This experiment, in fact, is now being carried out by Moreland and myself.

Another consequence derives from the prevalent approach to affect and cognition. Prevalent theories, especially the one developed by the late Daniel Berlyne (1967), generally assume that the affective reaction occurs in response to the level of arousal, which in turn is mediated by collative variables such as complexity, novelty, or congruity. If complexity, congruity, and novelty medi-

ate liking, in that objects and events are liked just because they are optimally complex or simple, novel or familiar, then the judgments of objects along these dimensions should, in general, be more stable, more consistent, and made sooner than affective judgments. At the very least, these judgments should not be slower, more inconsistent, unstable, or inefficient than affective ratings. In particular, we would expect that recognition judgments, for example, which reflect the operation of the collative variable of novelty, should be made with greater confidence than liking judgments. Figure 4 shows the results from our previous study with Kunst-Wilson using 1-millisecond exposures. The results show that compared to liking judgments, recognition judgments are made with much less confidence. The differences are, in fact, huge—more than 6 times their standard errors. Even if we take only the recognition judgments on which the subject was correct, this effect remains true.¹⁵

One more bit of data. According to the prevalent view, attending to discriminanda alone should be easier and quicker than attending to discriminanda tagged with values. Since the latter involve more information, more detail must be attended to, and the subject would consequently

¹⁵ We suspected that these results may be due to the fact that the subjects knew they could be wrong on the old-new judgments, and awareness of this fact might have induced caution in them. But they could not be "wrong" on their liking judgments. These latter judgments express opinions, and people generally feel free to hold any opinions whatsoever. We tried, therefore, to "objectify" affective judgments and to "subjectify" recognition judgments in order to determine whether the confidence ratings would be reversed. To obtain "objectified" affective ratings, subsequent to stimulus exposures, we asked subjects in another experiment to rate the polygons for their "aesthetic value." We told them also in this connection that our polygons had all been rated for aesthetic value by art critics. To obtain "subjectified" recognition judgments, we told the subjects that one of the two polygons in each slide might appear more "familiar" than the other and asked the subjects to indicate which one did in fact appear more familiar. Thus, the subjects could now be "wrong" in their affective judgments, whereas recognition became much more a matter of subjective impression. The results did not change a great deal. Confidence was a little greater for subjective familiarity judgments than for the old-new judgments and a little weaker for aesthetic judgments than for judgments of outright liking. But these differences were quite small. The means were 2.01 and 2.41 for familiarity and aesthetic judgments, whereas they were 1.60 and 2.29 for recognition and liking.

require more processing time. If familiarity mediates the affective reaction generated as the result of repeated exposures, then judgments of familiarity should be made quicker than judgments of liking. If anything, however, our results showed the opposite. Although of only borderline significance, affective judgments of polygons were made faster than recognition judgments.

Feeling and Thought: Two Systems?

About 10 years ago, Hyde and Jenkins (1969) carried out an experiment in which subjects were tested for recall of word lists to which they were exposed under different conditions. Some subjects were simply exposed to the words with the instruction to pay close attention. Of three other groups, one was instructed to count the number of letters in each word, another to report the presence of the letter E, and a third to rate each word for pleasantness. In some groups the subjects were warned that they would be tested for recall; in others they were not warned. Hyde and Jenkins's results were quite strong. Among both the subjects who were warned about a future recall test and those who were not warned, those asked to rate pleasantness showed the best recall. Hyde and Jenkins took their data to mean that items are "arranged" differently in storage depending on the context prevailing during acquisition. The superior performance of subjects who rated the words for pleasantness was due to the fact that these subjects acquired the words as "units of meaning" and could therefore recruit for them supportive components of associative structures. When words are examined for number of letters or the presence of the letter E, such "structures are not activated and the recall is unorganized" (Hyde & Jenkins, 1969, p. 480).

Since, as we have seen earlier, the semantic content of verbal material is saturated with affect, the facilitation that occurred as a result of prior pleasantness ratings in the Hyde and Jenkins experiment could have strong affective components. Two conditions of a recent experiment by Rogers, Kuiper, and Kirker (1977) are of particular interest in this respect. In all conditions, their subjects were tested for recall of previously shown adjectives. In one condition, the subjects had to check the adjectives to see if they were printed in the same or different type as a sample print (structural), and in another whether they rhymed with comparison words (phonemic). But in two condi-

tions the subjects were required to engage in extensive semantic processing of the adjectives: In one they checked the adjectives to see if they meant the same as comparison words (semantic) and in another to see whether they described the subject (self-reference). Note that while these last two conditions both activate semantic structures within which the adjectives are imbedded, the self-reference condition brings the subject into a cognitive domain greatly charged with affect. Rogers, Kuiper, and Kirker's findings are especially significant in view of the virtual discontinuity of the self-reference effects. Of the 10 self-reference adjectives, 2.84 were correctly recalled. In contrast, only .34, .68, and 1.33 adjectives were correctly recalled in the structural, phonemic, and semantic treatments, respectively.

Another group of similar studies that used recognition memory rather than recall also suggests strong participation of affect in information processing. Formulating their experimental problem in depth-of-processing terms (Craik & Lockhart, 1972), Bower and Karlin (1974) showed photographs of faces to subjects with instructions to judge the photographs for gender, honesty, or likeability. Following exposures, subjects were tested for recognition memory in two experiments. The hit rate was higher when the subjects rated photographs for honesty or likeability than when they reported gender. Strnad and Mueller (1977) replicated Bower and Karlin's results in a between-subjects design, and Warrington and Ackroyd (1975) found parallel effects when comparing these effects for faces and words, also in a between-subjects design. According to Bower and Karlin (1974), deeper processing facilitates recognition because it forces the subject to attend to a greater variety of detail. "Judgment of honesty of face would appear to require comparison to an idiosyncratic set of vague prototype criteria regarding the patterning of features such as distance between the eyes, size of pupils, curvature of the mouth, thickness of lips, and so on" (p. 756). They went on to say that "if you want to remember a person's face, try to make a number of difficult personal judgments about his face when you are first meeting him" (pp. 756-757). Patterson and Baddeley (1977) asked subjects to do just that: In one condition their subjects rated photographs of faces for the length of nose, distance between the eyes, roundness of face, or fullness of lips. In another condition the ratings

were vague and less detailed but much more likely to recruit affect: nice-nasty, reliable-unreliable, intelligent-dull, and lively-stolid. Recognition memory, as reflected by d' and by hit- and false-alarm rates, was clearly superior for what Patterson and Baddeley called "personality" ratings. Patterson and Baddeley (1977) thus disagreed with Bower and Karlin and concluded that their own "results clearly did not implicate analysis of facial features as a critical or optimal basis for face recognition" (p. 411). Instead, they believed that should they "ever find an optimum strategy for encoding of faces, analysis of individual features is unlikely to be its focus" (p. 417).

There seems to be general agreement that when judgments of pleasantness are made of faces or of adjectives, individuals engage in forms of deeper information processing. What is not agreed upon is the type of content that is accessed at these deeper levels. Patterson and Baddeley (1977) doubt that face recognition is based on the sorts of discriminanda that we would intuitively suspect of serving recognition. But if these discriminanda are not the basis of face recognition, what is? Is face recognition, then, based on preferenda? Recall in this respect that the scaling of faces for similarity yields pleasantness as the major factor, explaining about 50% of the variance, whereas physical features play a relatively minor role. Clearly, the contribution of affect to face recognition has been underestimated. Early face discrimination is based primarily on affective reactions. Infants smile at an approaching face as early as 10 weeks of age, and at 12 weeks they smile differently at familiar and unfamiliar faces (Izard, 1978).

Curiously enough, none of the above studies mention the possible role of affect in processing face information. And none of the studies on recognition memory of faces collected reaction time data to verify whether the assumed deeper processing was accompanied by longer response latencies. However, in one recent study, Keenan and Bailett (1979) used methods similar to those of Rogers, Kuiper, and Kirker (1977) but instead administered recognition memory tests. They report results that have an important bearing on the form of information processing that may emerge when affect is involved. As in the previous studies, a number of adjectives were presented, and the subjects were required to check them against a number of criteria. For example, sub-

jects were asked whether the given adjective described themselves, a best friend, a parent, another friend, a teacher or boss, a favorite TV character, or Jimmy Carter. Also asked for some adjectives was a semantic encoding question: "Means the same as _____?" Following the initial series, subjects were given a recognition memory task in which the original adjectives were interspersed among an equal number of similar distractor items. Keenan and Bailett's results are very clear. Self-reference generated by far the highest recognition performance (over 90%), whereas reference to Jimmy Carter produced a recognition rate of less than 65%. The other recognition rates were arranged according to the social significance that the target had for the subject: best friend, parent, friend, and teacher.

If the superior recognition memory for the self-reference items was due to deeper processing, one would expect that response times for these items would be longer than response times for items processed at shallow levels. However, the results were quite the opposite and very strikingly so. Encoding times for self-reference items were by far the shortest. The longest reaction time was found for items referred to Jimmy Carter (note that the experiment was run in 1977 when Carter was not quite as well known as he is now). Moreover, the other targets had response times that varied directly with the proportion of correct recognitions.

Keenan and Bailett (1979) attempt a variety of cognitive interpretations, but at the conclusion of what is truly a valiant effort, they offer the possibility that in the course of processing self-referent information, "the crucial dimension underlying memory is not what the subject knows or the amount of knowledge that is used in encoding the item, but rather what the subject feels about what he knows" (p. 25). It is no longer clear that deeper processing necessarily requires more time. Structures that are highly integrated and that have been frequently "tuned in" may process information quite rapidly. The relation between reaction time and depth of processing cannot be predicted, therefore, for all tasks (Baddeley, 1978). Keenan and Bailett's study may be taken as evidence against the levels-of-processing approach. But it may also be taken as evidence that the participation of affect in processing information of some types may increase efficiency to a remarkable degree. The beneficial role of

affect in memory is dramatically illustrated in a paired-associates study in which Sadalla and Loftness (1972) asked subjects to form pleasant, unpleasant, and nonemotional images for each pair and found considerably poorer performance for the neutral pairs than for either the pleasant or the unpleasant pairs.

It is this type of result that suggests the possibility of some separation between affect and cognition. Consider the task in those experiments where the subject is asked to verify if a given adjective, say "honest," describes him or her. It is most unlikely that the process of this verification involves checking the item for its presence in a list, as some information-processing models would have it. For one thing, no evidence suggests even vaguely that the self is represented as a list of trait adjectives (Markus, 1977). For another, the question is probably not interpreted by the subject to mean "Is the trait 'honest' true of you?" but more likely to mean "Is the trait 'honest' consistent with your perception of yourself?" If this is indeed the interpretation that the subject imposes upon the task, then we must inquire what may be meant by "consistent with your perception of yourself?" To some extent this consistency may involve absence of content that is mutually contradictory; for example, the person could not be both tall and short. But more important, some form of affective consistency is probably involved. That is, the self as used in this task is probably some global and general impression suffused with affective quality. What is matched is primarily the affective quality of the item with the affective quality of the impression. Of course, the shorter processing times for self-referent items may be due to the fact that we have more integrated and better structured impressions of ourselves and of people who are important to us. But it is equally true that the self is a target charged with strong, widespread, and clear affect, and an emotional match would therefore be quite easy for the subject to verify. There is a need in these studies to separate the elaboration and integration of the cognitive structure from the affect that pervades it, but such a control procedure is difficult, for the two properties are highly correlated.

That the affective qualities in impression formation are processed differently and perhaps separately from the cognitive content that "carries" that impression is shown both by Anderson and

Hubert (1963) and by Posner and Snyder (1975b). In a typical impression formation task, the first authors found strong primacy effects for impressions (i.e., the overall affective rating of the person was influenced more by early trait adjectives in the list) and an equally strong recency effect for the recall of the adjectives. Anderson and Hubert (1963) suggested that "the impression response is based on a different memory system than that which underlies the verbal recall" (p. 388). They did not go on to specify how these two systems might differ except to say that "as each adjective is received, its meaning is extracted and combined with the current impression, thus yielding a changed impression. Once this is done, memory for the adjective *per se* is no longer necessary for the impression process" (pp. 390-391).

Dreben, Fiske, and Hastie (1979) found similar order effects for impressions, and Hamilton, Katz, and Leirer (in press) obtained better recall when subjects organized items into an impression of a person than when subjects regarded these items as discrete units. More important for the dual-process hypothesis, however, is the finding of Dreben, Fiske, and Hastie that the weights calculated for the adjectives did not predict their recall. That is, the adjectives assumed to be contributing the most to impression are not necessarily also the ones that are best recalled. Following his cognitive response theory, Greenwald (1980) suggested that cues effective in helping the individual retrieve content may not be the same ones that are effective in helping retrieve the evaluative aspects of the content. It is not unreasonable to suppose that the major difference between these two types of cues may be the difference between discriminanda and preferenda. And it is perhaps the difference between these cues that is also involved in the perseverance effect (Ross, Lepper, & Hubbard, 1975), in that details of initial information about success (or failure) are used only to construct an overall impression of one's own task competence and are soon discarded. Thus, in debriefing, when the experimenter tells the subjects that their success (or failure) was rigged, this new information may no longer be capable of making contact with the original input (which by then has been re-coded and discarded) and may therefore have little effect on its original affective consequences.

Posner and Snyder (1975b) also argue for a dual memory. In their experiments, subjects are shown a sentence such as "James is honest, loyal,

and mature," and in a subsequent display a probe word such as "foolish" is flashed. Two tasks are studied. In one the subject is asked to verify if the word itself was among those in the preceding sentence. In another, the required match is between the emotional tone of the word and that of the preceding sentence. The interesting result these authors obtain is that, as the length of the list increases, reaction times increase for word matching and decrease for emotional tone matching. Posner and Snyder (1975b) agree with Anderson and Hubert about the two memory systems for the component adjectives and for the overall impression, but they doubt that the "emotional information concerning impression is handled in any different way than other semantic dimensions in the memory system" (p. 80). Their doubts should be weakened by a recent impression-formation experiment in which the pattern of recall of individual adjectives was effectively manipulated in the hope of thereby affecting the primacy of impressions. Riskey (1979) was able to change the recall of adjectives, but the primacy of impressions nevertheless remained unchanged.

While these authors propose separate systems, it is always separate *cognitive* systems that they propose. In contrast, the separation being considered here is between an affective and a cognitive system—a separation that distinguishes between discriminanda and preferenda and that takes us back to Wundt and Bartlett, who speculated that the overall impression or attitude has an existence of its own, independent of the components that contributed to its emergence. The question that cannot be answered with the data thus far collected is whether the affect-content separation is simply a matter of separate storage (as Anderson and Hubert, on the one hand, and Posner and Snyder, on the other, have proposed) or whether there isn't some separation already at the point of registration and encoding. The rapid processing times of affect suggest a more complete separation of the two processes at several junctures.

One is necessarily reminded in this context of the dual coding hypothesis proposed by Paivio (1975) for the processing of pictures and words. Paivio (1978a) suggested a number of differences between the processing of these types of content, for example, that representations of pictures emerge as perceptual isomorphs or analogs (*imagens*), whereas parallel units in the verbal system

are linguistic components (*logogens*). He also proposed that pictorial information is organized in a synchronous and spatially parallel manner, whereas verbal information is discrete and sequential. Finally, he suggested that the processing of pictures is more likely to be the business of the right-brain hemisphere, whereas the processing of words is the business of the left. Paivio's proposal for a dual coding theory kindled a controversy of some vigor. While Anderson (1978) has recently argued that the controversy cannot be resolved with what we now know about these processes, it has nevertheless stimulated some exciting empirical and theoretical work (e.g., Banks & Flora, 1977; Kerst & Howard, 1977; Kosslyn & Pomerantz, 1977; Paivio, 1978b; Pylyshyn, 1973; Shepard, 1978).

Most relevant for my discussion, however, is Paivio's (1978c) finding that reaction times for pleasant-unpleasant ratings are faster for pictures than for words. Paivio takes this result to indicate that "the analog information involved in pleasantness and value judgments is more closely associated with the image system than with the verbal system" (p. 207). This

analog pleasantness information is "carried by" affective and motor processes that are closely associated with visual memory representations of things. Such processes presumably originate as reactions to things and persist as affective or motor memories that can be activated by pictures of the referent objects, or, more indirectly, by their names when accompanied by the appropriate contextual cues. More specifically, pleasantness and value judgments might be based on continuously variable interoceptive reactions and approach or avoidance tendencies that are activated jointly by the comparison stimuli and the task instructions. (p. 207)

However, the specific responses of the autonomic nervous system are not readily discriminable, since there are not many receptors to register the fine changes in autonomic processes (Averill, 1969; Mandler, Mandler, Kremen, & Sholiton, 1961). Moreover, interoceptive process and motor memories are slower than the affective responses they are presumed to activate.

It is a fact, of course, that *all* sorts of judgments are faster and more efficient for pictures than for words, and this may be so just because pictures are able to evoke an affective reaction more directly and faster than words. An affective reaction aroused early in the encoding process—earlier than it is possible for the interoceptive and motor memories to become effective—might facilitate a complex cognitive encoding sequence by an initial categorization along affective lines, which,

as we have seen, requires minimal stimulus information. Such facilitation through early affective sorting that relies not only on discriminanda but on preferenda as well may also induce a constructive process that can more readily recruit stored content by searching for congruent affective tags.¹⁶

This review suggests that a separation between affect and cognition may well have a psychological and a biological basis.¹⁷ Recall that in contrast with cold cognitions, affective responses are effortless, inescapable, irrevocable, holistic, more difficult to verbalize, yet easy to communicate and to understand. Consider also that the processing of affect is probably an even stronger candidate for the right hemisphere than the processing of pictures (Carmon & Nachson, 1973; Dimond, Farrington, & Johnson, 1976; Ley & Bryden, 1979; Milner, 1968; Safer & Leventhal, 1977; Schwartz, Davidson, & Maer, 1975). In the context of this review it is especially interesting (a) that face recognition is superior when the stimuli are pre-

sented in the left visual field (De Renzi & Spinnler, 1966; Moscovitch, Scullion, & Christie, 1976), and (b) that the recognition of emotional expressions shows the same right-brain superiority (Suberi & McKeever, 1977).

It has also been suggested to me by Richard J. Katz (Note 5) that there exists a network in the central nervous system, the *locus coeruleus*, which is ideally suited for the kind of partially independent processing of affect that I have suggested here. The potential sensitivity of the locus coeruleus to preferenda can be inferred from a number of interesting properties and features of this system. Above all, it is excited differently by novel and by familiar stimuli. Second, self-stimulation studies have demonstrated that the locus coeruleus is sensitive to incentives. It is further known that it is capable of innervating sensory areas (such as the colliculi and geniculate bodies), emotional areas (the amygdala and hypothalamus), mnemonic areas (the hippocampus), and the cerebral cortices. Most important, however, is the fact that the locus coeruleus is capable of very fast responding. Finally, Katz also noted that the enkephalergic system, which controls the action of enkephalins (naturally occurring opiates) and is situated at the locus coeruleus, is also involved in reinforcement and in different reactions to novelty and familiarity. All of this means, at the very least, that what I have proposed about the processing of affect is not inconsistent with recent knowledge about the relevant neurophysiological mechanisms. It means that the organism is equipped with a neurochemical apparatus capable of telling the new from the old and the good from the bad, of remembering the old, the good, and the bad, and of making all these decisions rapidly without having to wait for the slow feedback from the autonomic system.

¹⁶ Another area of research in which affect may be implicated (although it had not been so suspected) is the frequency-judgment paradigm. Typically, in these experiments subjects are shown stimuli in different frequencies, and two types of judgments are collected afterwards. In one condition, the subjects are shown the old stimuli interspersed among new ones and are asked to report for each item whether it is new or old. In the other condition, the subjects must say how often each stimulus occurred. It turns out that the frequency judgment generates greater accuracy than the binary recognition memory judgment (e.g., Proctor, 1977; Proctor & Ambler, 1975).

Two findings are of interest in the present context. First, subjects have remarkable confidence in their frequency judgments (Howell, 1971). Second, warning the subjects that they will be estimating frequencies of events (vs. simply recalling them) and varying the length of the list both influence free recall but have little if any effect on frequency estimation (Howell, 1973). It thus appears that frequency judgments behave like affective judgments. It is possible, therefore, that frequency estimation is more likely to invoke an underlying affective reaction (which accrues from repeated stimulus exposures) than the binary recognition memory task. It may be hotter. Since frequency judgment makes exposure effects salient and since it requires finer discrimination than recognition memory, it may recruit affect as an auxiliary source of information. In fact, it has been suggested that recognition memory responses and frequency estimation are not made from the same sources of information (Wells, 1974), although what these sources are and how they differ from each other is not altogether clear (Hintzman, 1976).

¹⁷ Multiple processing systems and multiple channel conceptions are today more the rule than the exception in the study of sensory processes (Graham & Nachmias, 1971; Trevarthen, 1968).

Affective reactions are primary in ontogeny. The infant knows to cry and to smile long before it acquires any semblance of verbal skills (Izard, 1978, 1979). Meltzoff and Moore (1977) report that human infants can imitate emotional expressions at 12 days of age, long before they acquire language. And good-bad is one of the very first discriminations that children learn.

More important, however, affect is clearly primary in phylogeny. Affect was there before we evolved language and our present form of thinking. The limbic system that controls emotional reactions was there before we evolved language and

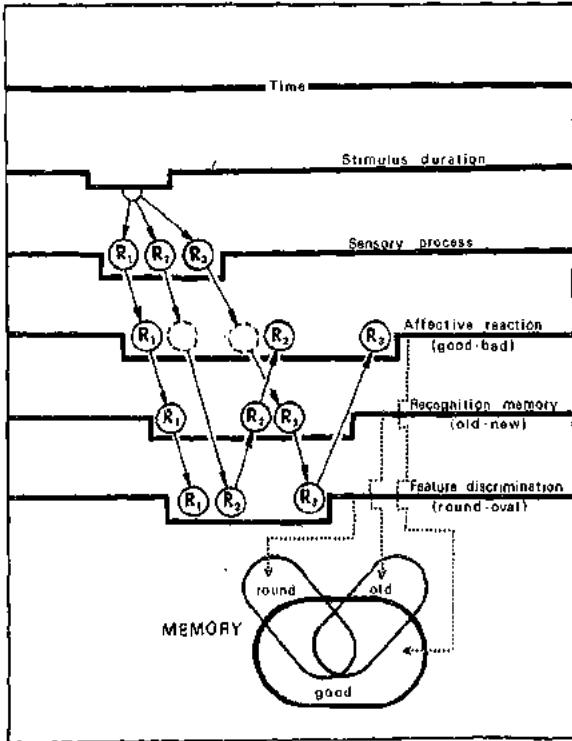


Figure 5. Time course of the stimulus, sensation, affect, and cold cognitions (R = response).

our present form of thinking. It was there before the neocortex, and it occupies a large proportion of the brain mass in lower animals. Before we evolved language and our cognitive capacities, which are so deeply dependent on language, it was the affective system alone upon which the organism relied for its adaptation. The organism's responses to the stimuli in its environment were selected according to their affective antecedents and according to their affective consequences. Thus, if the most recent version of homo sapiens specifies that affective reactions are mediated by prior cognitive processes—as contemporary cognitive views would have it—then at some point in the course of evolution, affect must have lost its autonomy and acquired an intermediary in the form of cold cognition. This scenario seems most unlikely. When nature has a direct and autonomous mechanism that functions efficiently—and there is no reason to suppose that the affective system was anything else—it does not make it indirect and entirely dependent on a newly evolved function. It is rather more likely that the affective system retained its autonomy, relinquishing its exclusive control over behavior slowly and grudgingly. At most, the formerly sovereign affective system may have accepted an alliance

with the newly evolved system to carry out some adaptive functions jointly. These conjectures make a two-system view more plausible than one that relegates affect to a secondary role mediated and dominated by cognition.

Because it is so heavily rooted in verbal skills, the cognitive system in humans has properties that are quite distinct from those of affect. Above all, the cognitive system is infinitely more diverse and flexible than the affective system. Anything at all can be said and thought with various degrees of precision, and these things can be said and thought in an infinite variety of ways. But there are only a handful of emotions and feelings that can be felt, and they can be felt only in some few, very constrained ways. And for reasons that must be rooted in the partial separation of the two systems, affect can be communicated much more efficiently and accurately than thought in spite of the fact that its vocabulary is quite limited. It was a wise designer who provided separately for each of these processes instead of presenting us with a multiple-purpose appliance that, like the rotisserie-broiler-oven-toaster, performs none of its functions well.

Conclusion

It is too early to write a model for affect and for the various ways that it interacts with cold cognitions. The important pieces of evidence are still missing. However, we can begin to specify the facts that such a model must accommodate. Figure 5 summarizes these facts by schematizing the time course of the stimulus together with the ensuing sensory process, the affective response, and some simple aspects of the cognitive process (recognition and feature identification). A stimulus is presented for a fixed time interval. The stimulus triggers a number of processes that can vary in their onset times and offset times. I have shown these processes as ranges of their onset times, ignoring the offset times altogether for the present purposes. (I have also ignored the fact that under some conditions, stimulus onset can be anticipated by the response process.) The onset times of these four processes are influenced by stimulus conditions and by subject states (e.g., previous experience with stimuli of the given class, exposure to immediately preceding stimuli that may generate contrast or assimilation, knowledge, mood states, priming, or expectation).

Note that a variety of temporal relations holds among affect, recognition, and feature identification. Of course, sensory process must have the earliest onset. Its onset times, too, differ depending on the stimulus, level of attention of the organism, the peripheral processes that are activated, context, etc. Also, an affective reaction always directly follows the sensory input. In R₁ this reaction is strong and salient, and it might dominate the ensuing cognitive process. In R₂ and R₃, affect (shown in broken circles) is also aroused immediately following the sensory process, but it is weak and does not significantly influence the subsequent stages of the cognitive process. But for affect, recognition, and feature discrimination, all combinations are possible. I have given examples of three of the six possible response patterns. In R₁, affect is first, recognition occurs later, and feature discrimination is last. The primacy of affect over recognition in R₁ reflects our own data (Kunst-Wilson & Zajonc, in press) and the results of typical subliminal perception experiments (e.g., Blum & Barbour, 1979; Shevrin & Fritzler, 1968). The difference between recognition and feature discrimination that favors the former reflects the results of Patterson and Baddeley (1977), who, it will be recalled, found that subjects could recognize photographs better when they judged them on "personality" characteristics than when they judged them on specific physical features. The results of Marcel (1976) and of Keenan and Bailett (1979) also suggest that recognition can precede feature identification.¹⁸

R₂ presents the case typically considered by information-processing models: The cognitive process begins with the individual first discriminating a critical feature that allows recognition. And finally it is recognition that gives rise to the affective response. In R₃, recognition precedes feature identification, as is the case when letters that form words are recognized better than letters that do not form words (Johnston & McClelland, 1974) or when meaning is apprehended while the word itself cannot be identified, as in the paralexic response of certain aphasic patients (Marshall & Newcombe, 1966).

Figure 5 shows the lower temporal limits of these reactions. Except for the sensory process, affect is assumed to be capable of the earliest onset. How can that be?

Perhaps the following analysis, speculative to be sure, may point to some possible answers. De-

cisions about affect require the least information and are often based on a different decision scheme than either recognition or feature identification. Each of the three, affect, recognition, and feature identification, is a form of categorization. Affective reactions of the type considered here are for the most part unidimensional and sometimes just binary: safe-dangerous, good-bad, or nice-nasty. Such binary decisions can under some circumstances be made quite reliably, even in the absence of reliable bases. Moore and Shannon (1956) have shown that reliable circuits can be constructed using arbitrarily unreliable relays, provided the relays form parallel circuits that are mutually redundant. Zajonc and Smoke (1959) applied this principle to group performance, and Smoke and Zajonc (1962) to group decisions. That is, given certain group decision processes, groups can make judgments much more reliably than the average group member. An analogous situation may well exist for affect where the stimulus triggers several parallel responses and the decision scheme can well be a minimal quorum.¹⁹ Recognition, however, even though it also constitutes a binary choice (old-new), does not have a similar advantage because the redundancy of the component criteria (e.g., features of configural properties) is seldom as high as in the case of affect. Moreover, minimal quorum is seldom a decision basis. In fact, in experimental work on recognition memory, great care is taken to assure that criterial features are fairly independent of each other. Just because a photograph shows the face of a male is not sufficient for calling it "old" or rejecting it as "new," unless previous exposures have shown only female faces.

Each of the responses in Figure 5 can facilitate the ones succeeding it. An affective reaction can thus act to precategorize the stimulus for the subject trying to decide whether it is "old" or "new." And recognition may facilitate feature identification by a similar prior selection process. Each operation reduces the universe of alternatives for the next choice. It is therefore entirely possible for stimuli that have a strong affective potential to evoke affective reactions rapidly, to be recognized sooner than neutral stimuli, and to be remembered better. Thus, Figure 5 also shows

¹⁸ Similar effects are obtained in vision (e.g., Graham & Nachmias, 1971).

¹⁹ In the case of decisions or parallel signalling circuits such as may be involved in affective reactions, the minimal quorum is equivalent to a veto decision or its inverse.

the representations in memory that are left by the three processes (affect, recognition, and feature identification). To the extent that these traces are redundant, the likelihood of a later retrieval would be facilitated.

I began this paper with a quotation from Wundt, and it must be apparent that another spirit has emerged as I have developed my arguments—that of Freud. The separation of affect and cognition, the dominance and primacy of affective reactions, and their ability to influence responses when ordinary perceptual recognition is at chance level are all very much in the spirit of Freud, the champion of the unconscious. In terms of my formulation, there seem to be at least two different forms of unconscious processes. One emerges where behavior, such as that occurring in discrimination among stimuli, is entirely under the influence of affective factors without the participation of cognitive processes. Included here are such phenomena as perceptual defense and vigilance, subliminal perception and discrimination, state dependent recall, and mood and context effects. Another form of unconscious process is implicated in highly overlearned, and thus automated, sequences of information processing; this form includes cognitive acts but has collapsed them into larger molar chunks that may conceal their original component links (cf. Shiffrin & Schneider, 1977). And there may be other forms of process in which the separation between affect and cognition prevents the individual from apprehending the potential connection between them.

Because the language of my paper has been stronger than can be justified by the logic of the argument or the weight of the evidence, I hasten to affirm that one of my purposes was to convince you that affect should not be treated as unalterably last and invariably postcognitive. The evolutionary origins of affective reactions that point to their survival value, their distinctive freedom from attentive control, their speed, the importance of affective discriminations for the individual, the extreme forms of action that affect can recruit—all of these suggest something special about affect. People do not get married or divorced, commit murder or suicide, or lay down their lives for freedom upon a detailed cognitive analysis of the pros and cons of their actions. If we stop to consider just how much variance in the course of our lives is controlled by cognitive processes and how much by affect, and how much the one and the other

influence the important outcomes in our lives, we cannot but agree that affective phenomena deserve far more attention than they have received from cognitive psychologists and a closer cognitive scrutiny from social psychologists.

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A First Look at Online Reputation on Airbnb, Where Every Stay is Above Average

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December 28, 2020

Abstract

Judging by the millions of reviews left by guests on the Airbnb platform, this trusted community marketplace for accommodations is fulfilling its mission of matching travelers with hosts having room to spare remarkably well. Based on our analysis of ratings we collected for millions of properties listed on Airbnb worldwide, we find that nearly 95% of Airbnb properties boast an average star-rating of either 4.5 or 5 stars (the maximum); virtually none have less than a 3.5 star-rating. We contrast this with the ratings of roughly 700,000 hotels, B&Bs, and vacation rentals worldwide that we collected from TripAdvisor. We find that hotel and B&B average ratings are much lower—3.8 and 4.1 stars, respectively—with much more variance across reviews. TripAdvisor vacation rental ratings are more similar to Airbnb ratings, but only about 85% of properties have an average rating of 4.5 or 5 stars. We then consider properties cross-listed on both platforms. For these properties, we find that even though the average ratings on Airbnb and TripAdvisor are more similar than hotels and B&Bs, proportionally more properties receive the highest ratings (4.5 stars and above) on Airbnb than on TripAdvisor. Moreover, there is only a weak correlation in the ratings of individual cross-listed properties across the two platforms. Finally, we show that these differences are consistent when considering data from two different time periods: 2015 and 2018.

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1 Introduction

Online reviews are a significant driver of consumer behavior, providing a convenient mechanism for consumers to discover, evaluate, and compare products and services on the Web. Yet, users of existing review platforms generate distributions of star-ratings that are unlikely to reflect true product quality. Most empirical papers that have analyzed the distributions of ratings arising on major review platforms have arrived at a similar conclusion: ratings tend to be overwhelmingly positive, mixed with a small but noticeable number of highly negative reviews, giving rise to what has been characterized as a J-shaped distribution (Hu et al. 2009).

Considerable effort has been dedicated to understanding how these distributions arise. The abundance of positive reviews on online platforms has been linked to at least four different underlying phenomena in the literature: herding behavior, underreporting of negative reviews, self-selection, and strategic manipulation of reviews. All of these are plausible contributing factors on Airbnb. In the scenario of herding behavior, prior reviews and ratings could subtly bias the evaluations of subsequent reviewers (Salganik et al. 2006, Muchnik et al. 2013), using a mechanism similar to anchoring bias. The phenomenon of underreporting of negative reviews occurs naturally on sites that encourage two-sided reviewing, where reviewers fear retaliatory negative reviews (Dellarocas and Wood 2008, Bolton et al. 2013, Fradkin et al. 2019). Self-selection bias arises when consumers who are *a priori* more likely to be satisfied with a product are also more likely to purchase and review it (Li and Hitt 2008). Finally, strategic review manipulation, typically undertaken by firms or providers who seek to artificially inflate their online reputations, is also operative (He et al. 2020, Luca and Zervas 2016, Mayzlin et al. 2014). Despite these concerns, over 70% of consumers report that they trust online reviews. The trust consumers place in online reviews is reflected in higher sales for businesses with better ratings, and lower sales for businesses with worse ratings (Chevalier and Mayzlin 2006, Luca 2016).

In this paper, we evaluate the reputation system of Airbnb, a peer-to-peer market-place for short-term rental accommodation that has now facilitated tens of millions of bookings and serves as a poster child for the so-called sharing economy. Being a peer-to-peer platform, Airbnb relies on ratings and reviews: not only do they build trust and facilitate trade among individuals, but they also serve to help determine how listings are ranked in response to user queries. We focus on Airbnb because it has several unique attributes. First, while most review platforms studied to date predominantly evaluate products, goods and services, and professional firms, Airbnb reviews are much more personal and typically rate an experience in another individuals home or apartment. Therefore, the social norms associated with these intimate Airbnb transactions may not be reflected in previously observed rating distributions or captured by previously proposed review generation models. Indeed, both Fradkin et al. (2019) and Proserpio et al. (2018) find that the social aspect of Airbnb transactions plays an important role in the way users rate each other. Second, trust can be especially difficult to build in peer-to-peer marketplaces comprising the sharing economy, where participants face information asymmetries regarding each others quality. Information asymmetries arise because buyers and sellers in the marketplace typically know little about each other; moreover, unlike firms with large marketing budgets, few of these individuals have an outside source of reputation or the means to build it, such as by investing in advertising or related

activities. Therefore, a distinguishing feature of reviews on peer-to-peer marketplaces like Airbnb is that for most marketplace participants, reviews on the platform are their only source of reputation.

We study Airbnbs reputation platform using a dataset we collected in 2015 and updated in March 2018, encompassing all reviews and ratings that are publicly available on the Airbnb Web site. Having Airbnb ratings and reviews for two periods gives us the opportunity to test the extent to which the findings obtained with early data continue to hold when using the more recent data. Overall, we find that our findings are consistent across periods.

Our first main finding is that property ratings on Airbnb are overwhelmingly positive. The average Airbnb property rating garners 4.7 stars, with 94% of all properties boasting a star-rating of either 4.5 stars or 5 stars in 2015, and 91% in 2018. While one can potentially dismiss such ratings as being highly inflated and therefore not carrying much information about the sellers true quality, we find that the picture is more nuanced. For example, we find significant and distinctive variability in rating distributions when we examine ratings by accommodation type and especially when we examine ratings across US markets.

We then consider Airbnb ratings contrasted against those at another large travel review platform, TripAdvisor, which we collected in 2015 and updated in March 2020. We chose TripAdvisor both for its worldwide scope and scale and for its accommodation diversity, as the TripAdvisor Website contains reviews for hotels, bed and breakfasts, and vacation rentals. We find that the average TripAdvisor hotel rating is 3.8 stars, which is much lower than the average Airbnb property rating. This suggests that while TripAdvisor ratings employ the same 5-star scale employed by Airbnb, TripAdvisor reviewers appear to have a greater willingness to use the full range of ratings than Airbnb reviewers. Considering reviews of TripAdvisor vacation rentals in isolation, however, we see that the distribution of ratings for those properties is much closer to (but still less skewed than) the distribution of ratings of all Airbnb properties. This comparison complicates the argument that Airbnb ratings are evidently more inflated than those on TripAdvisor: perhaps the texture and quality of Airbnb stays are in fact more comparable to vacation rental stays. Alternatively, perhaps sociological factors are at work, whereby individuals rate other individuals differently or more tactfully than they rate firms such as hotels, independent of the platform.

Our final set of findings compares properties rated on both Airbnb and TripAdvisor in an effort to quantify cross-platform effects while controlling for heterogeneity in the kinds of properties listed on each platform. Linking these properties is itself a technically difficult procedure, as we describe in Sect. 3.1, and results in linkages of several thousand properties, most of which TripAdvisor classifies as B&Bs or vacation rentals. We find that differences in ratings persist even when we consider this restricted set of properties that appear jointly on both platforms. Specifically, we observe that 14% more of these cross-listed properties have a 4.5-star or higher rating on Airbnb than on TripAdvisor. To explain these differences, we first consider a theory proposed in prior work, i.e., that bilateral reviewing systems, as used in Airbnb, inflate ratings by incentivizing hosts to provide positive feedback so they are positively judged in return (Dellarocas and Wood 2008, Bolton et al. 2013). In fact, using a different methodology from ours, a recent study (Fradkin et al. 2019) reports on experiments they conducted on Airbnb to investigate determinants of reviewing bias, in which they implicate various factors, including fear of retaliation and underreporting of negative experiences, to varying degrees. In our work, we contrast cross-listed properties

on Airbnb with TripAdvisor, which does not use a bilateral reviewing system and provides modest corroborating evidence for bias observed in this study. We then consider the extent to which ratings of linked properties on Airbnb and TripAdvisor are correlated and find only a weak (positive) correlation between the two sets of ratings. This suggests that TripAdvisor and Airbnb reviewers have distinctive preferences in ranking and rating accommodations.

Our observational analysis sheds more light on the reputation system used at Airbnb, and our collected datasets facilitate the further study of a root cause analysis to examine the managerial, marketing, and sociological implications of the high ratings seen in this sharing economy platform. Unlike most previous observational studies, which attempt to examine one review corpus in isolation, our linkage of datasets spans two competing platforms, from the sharing economy and the travel economy, respectively. This linkage affords a new opportunity to investigate questions regarding market structure within the travel review ecosystem as well as the future of the sharing economy more broadly.

2 Airbnb and TripAdvisor platforms

2.1 Airbnb and its reputation system

Airbnb, founded in 2008, describes itself as a trusted community marketplace for people to list, discover, and book unique accommodations around the world. Millions of properties in about 200 countries can now be booked through the Airbnb platform, which has quickly become the de facto worldwide standard for short-term apartment and room rentals. Airbnb hosts offer their properties for rent for days, weeks, or months, and Airbnb guests can search for and book any of these properties, subject to host approval.

Hosts, guests, and properties each have their own dedicated webpage on Airbnb publishing user-generated content. We specifically study the ratings of the reviews written by users that Airbnb publishes on these pages. Airbnbs bilateral reviewing system allows hosts and guests to review and rate each other at the conclusion of every trip, on a scale from one to five. The text of reviews written by guests is published both on their user page and on the page of the property they stayed at; reviews written by hosts appear on the user page of both the host and of the guest that stayed at one of the hosts properties.¹ Unlike most other major travel review platforms, such as TripAdvisor and Expedia, Airbnb does not publish the star-ratings associated with individual review. However, Airbnb does prominently display summary statistics for each property, including the total number of reviews it has accumulated and its average rating rounded to the nearest half-star (provided the property has at least three reviews). Finally, starting in 2017, hosts have the additional option to publicly respond to reviews; these responses are displayed below the reviews they address and, unlike reviews, are not associated with any star-rating.

Airbnbs reputation system went through a major iteration in the year prior to our initial collection efforts. Prior to July 2014, Airbnb published reviews immediately upon submission, which meant that for each transaction, the user to submit a review last could take into

¹We note that all reviews on Airbnb are solicited and published subsequent to a verified trip, so we believe that review fraud by users, a problem that plagues other review platforms (including TripAdvisor), is not a significant factor on Airbnb.

account their counterpartys previously submitted review. In July 2014, to limit strategic considerations in providing feedback (e.g., to limit retaliatory reviewing), Airbnb changed its reputation system to an embargo model, simultaneously revealing reviews only once both parties supplied a review for each other, or until 14 days had elapsed from the conclusion of the trip, whichever occurred first. After 14 days, no further reviewing of a completed trip is allowed. While we were not able to study the before-and-after effects of this change, evidence from a field experiment on Airbnb suggests that it did not have a major impact on rating scores (Fradkin et al. 2019).

2.2 TripAdvisor and its reputation system

Founded in 2000, TripAdvisor is one of the worlds largest Web sites for travel-related reviews. As of 2019, TripAdvisor contained 760 million reviews of 8.3 million accommodations (hotels, B&Bs, inns, vacation rentals), restaurants, experiences, airlines, and cruises.

TripAdvisors unilateral reputation system allows anyone² to write a review about any property listed on the platform, and it does not require its user to have a TripAdvisor account to do so.³ TripAdvisor displays both individual review ratings and average ratings rounded to the nearest half-star aggregated at the property level for any property with at least one review. Also, beginning in 2009, TripAdvisor began to allow firms and property owners to respond to reviews. In Table 1, we present the key similarities and differences between the reputation systems of Airbnb and TripAdvisor.

3 Datasets

In this study, we combine information that we collected from both Airbnb and TripAdvisor during two different time periods, 2015 and 2018 (2015 and 2020 for TripAdvisor). In so doing, we can compare the evolution of ratings on the two platforms over these two periods and test the extent to which the findings obtained with early data continue to hold when using the more recent data.

For Airbnb, we collected two datasets about Airbnb properties listed worldwide at airbnb.com. For each property, published reviews accumulate over time, even as the other details of the property (e.g., photographs, rental price, amenities) vary over time. Therefore, a snapshot of Airbnb at time t observes the current time-varying attributes at t and the cumulative review history up through time t . The first dataset collected in 2015 contains information about 381,297 listings available on the platform in 2015 and the reviews for those listings during the period 2008-2015. The second dataset collected between 2015 and 2018 (the last scrape being in March 2018) contains updated information and reviews about any of the 381,297 listings that continue to exist up to 2018, and information and reviews about over

²A proof of stay is not required by TripAdvisor for a user to write a review, unlike Airbnb.

³Reviews for users that decide not to create an account are listed anonymously as reviews written by “A TripAdvisor Member”.

2.6 M additional new listings.⁴

Table 1: Comparing Airbnb and TripAdvisor platforms and their reputation system

	Airbnb	TripAdvisor
Properties listed	Vacation rentals	Hotels, B&Bs, Vacation rentals
Reservations	On Airbnb	Anywhere
Reputation system	Bilateral	Unilateral
Who can write reviews	Users with a booking	Everyone
Sign-in required	Yes	No
Displays avg. ratings	After 3 reviews	Always
Displays Individual review ratings	No	Yes
Review responses	Starting 2017	Starting 2009

For every property, we store its unique ID, its location, the number of reviews, and the currently displayed average star rating. Since Airbnb does not display an average rating for properties with less than three reviews, we remove those properties from our study. This procedure leaves us with about 200,000 and 1 million Airbnb properties for the 2015 and 2018 datasets, respectively.

We collected similar information from TripAdvisor. The first dataset contains information about over 500,000 hotels and B&Bs, and over 170,000 vacation rentals listed worldwide on the platform in 2015. The second dataset contains information about the same properties in 2020 (92% of the hotels available in 2015 were still available in 2020; however, only 23% of the vacation rentals were still available in 2020). For every property, we store its unique ID, its location, the number of reviews, and the currently displayed average star rating. After removing properties with fewer than three reviews (to maintain consistency with the collected Airbnb properties), our dataset contains 412,223 hotels and 54,008 vacation rentals in 2015, and 427,747 hotels and 24,547 vacation rentals in 2020.⁵

Our units of analysis are (average) property ratings on Airbnb and TripAdvisor, rounded to the nearest half-star.

⁴In an earlier version of this paper, we only used data up to 2015. This dataset was then updated over the years (until March 2018) by searching for existing and new properties available for rent on Airbnb and replacing old records with new records. This data collection process makes it difficult to identify properties that are active, i.e., available for rent, after 2015. However, as we discuss in the Web Appendix, we rely on Airbnb reviews. Timestamps to identify active listings in a specific year and provide robustness checks that support the validity of our results.

⁵We are left with more hotels in 2020 than in 2015 because many properties accumulated reviews during the time period 2015-2020.

3.1 Discovering properties cross-listed on Airbnb and TripAdvisor

To link properties listed on both sites, we undertook the following heuristic procedures to perform matching in the absence of a consistent cross-platform identifier. We start with the approximate latitude and longitude provided for each TripAdvisor and Airbnb property. We then computed pairwise distances between TripAdvisor and Airbnb properties, discarding all pairs that exceeded a 500-m distance cutoff as non-matches.

Next, for every TripAdvisor property, we iterated through all Airbnb properties in a 500-m radius and computed a string similarity between the respective property names and descriptions on both sites. For vacation rentals on TripAdvisor, we additionally matched on the property manager name. If the resulting string similarity was above a high threshold, we kept this pair as a possible match.⁶ Finally, for each Airbnb property, if there existed a unique TripAdvisor property among the possible matches, we kept this pair.⁷ Using the 2015 datasets, this process generated 2234 matches between 1959 unique TripAdvisor properties and 2234 unique Airbnb properties with at least three reviews. Using the most recent datasets, we find 1843 matches between 1549 TripAdvisor properties and 1843 Airbnb properties with at least three reviews. Note that because we do not have updated information on some of the TripAdvisor vacation rental properties and because properties on each platform accumulated reviews in the past few years, the overlap between cross-listed properties in 2015 and 2018 is 1248 pairs.⁸

To evaluate the quality of our matches, we manually inspected a few hundred of them and were satisfied that only in a handful of cases were properties incorrectly associated.⁹ Moreover, these errors did not appear to be systematic in any way and therefore would not introduce bias in our analyses.

4 Distributions of ratings: Airbnb vs. TripAdvisor

We begin our empirical evaluation by presenting basic statistics about the distribution of ratings on Airbnb and TripAdvisor. The top panel of Figure 1 displays the distribution of Airbnb property ratings in our worldwide dataset. We find that these ratings are overwhelmingly positive, with over half of all Airbnb properties boasting a top 5-star rating, and 94% (91%) of properties rated at 4.5 stars or above in 2015 (2018). These ratings seem unusually positive, but are they truly? To the extent that Airbnb is an accommodation platform that directly competes with hotels (Zervas et al. 2017), a comparison between Airbnb and hotel ratings can be informative. The second panel of Figure 1 shows the distribution of all hotel ratings in our TripAdvisor dataset, computed using the same methodology as the Airbnb ratings. The distribution of TripAdvisor property ratings is clearly much less extreme, and

⁶Our results are not sensitive to the threshold used.

⁷This procedure links each Airbnb property to at most one TripAdvisor property, but it allows for multiple Airbnb properties to be linked to the same TripAdvisor property. This is quite common, as Airbnb listings are typically at the granularity of individual rooms, whereas TripAdvisor listings are at the granularity of the property (e.g., B&B).

⁸In the Web Appendix, we replicate our findings using this subset of listings and obtain similar results.

⁹Similar techniques based on heuristic and checks have been used in different settings, i.e., matching advertising spending and TripAdvisor hotel reviews (Hollenbeck et al. 2019).

this is independent of whether we use the 2015 or 2018-2020 dataset. In 2015, for example, only 4% of hotels carry the top 5-star rating, and only 26% are rated 4.5 stars or above. This difference is also reflected in the means of the two distributions: 4.7 stars for Airbnb and 3.8 stars for TripAdvisor.

Product heterogeneity is one potential explanation underlying these differences. To compare against a more similar baseline, we exploit the fact that TripAdvisor, which is best known as a hotel review platform, also contains reviews for B&Bs and short-term vacation rentals. The third and fourth panels of Figure 1 plot the rating distributions of these property types on TripAdvisor, which are arguably more similar to the stock of Airbnb properties than hotels. These distributions visually and statistically yield less extreme differences: the average TripAdvisor B&B rating is 4.2 stars in 2015 and 4.1 stars in 2020, while the average TripAdvisor vacation rental rating is 4.6 stars in 2015 and 4.7 stars in 2020. Yet, differences remain in the tails of these distributions, with only 56% (52%) of B&Bs and 84% (88%) of vacation rentals rated at or above 4.5 stars in 2015 (2018), compared to 94% (91%) for Airbnb. A basic observation we can draw from this analysis is that average ratings, even within a platform, are clearly influenced by product mix. A simple linear regression backing these findings confirms that these differences are statistically significant.

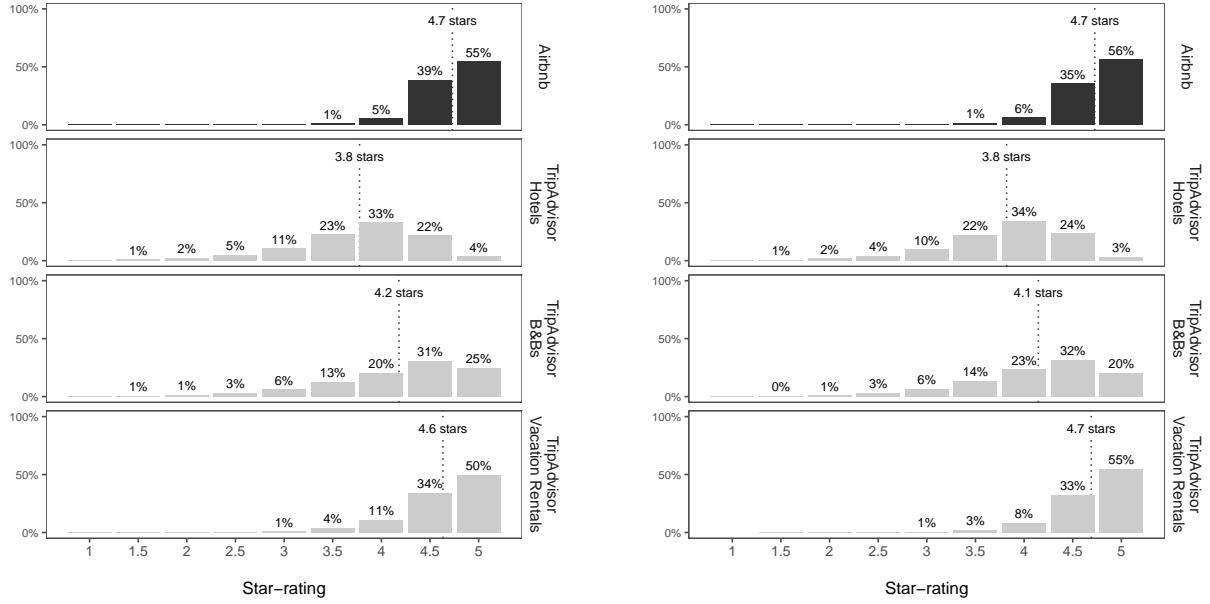


Figure 1: Distribution of property ratings on Airbnb and TripAdvisor in 2015 (left) and in 2018-2020 (right). The dotted lines show the distribution means

Next, we consider the possibility that while the overall distribution of Airbnb property ratings is highly positive, there exist specific market segments that have a less skewed distribution. To better understand potential heterogeneity underlying the distribution of property ratings, we segment properties by various attributes. First, in Figure 2, we plot the distribution of Airbnb ratings by accommodation type in 2015 and in 2018. We find evidence of limited variation in ratings: apartments and shared rooms have higher ratings than B&Bs

and small hotels, but in all cases, the fraction of ratings that are 4.5 stars or higher is at least 90%. Second, in Figure 3, we plot the distribution of property ratings by geographic market for six major US cities, analogous to the worldwide comparison between Airbnb properties and TripAdvisor hotels in the top two panels of Figure 1. For Airbnb, while we find evidence of considerable variation in the relative frequency of 4.5- and 5-star Airbnb ratings across cities, the fraction of ratings at or above 4.5 stars is consistently high. In contrast, while the distribution of TripAdvisor ratings by city also reveals considerable variation by city, TripAdvisor ratings continue to be less extreme than Airbnb ratings. Referring back to Figure 1, we found an overall difference of nearly 1 star between Airbnb ratings and TripAdvisor hotel ratings, and this is true independent of the observation period. Figure 3 shows that while this difference persists, there is considerable variation by city. For example, among the six cities we plot, the difference is highest in Los Angeles (1.2 stars) and considerably lower in cities like Boston and New York (0.6 to 0.7 stars). An interesting direction for future research is to conduct a root cause analysis of the differences between Airbnb and hotel ratings by city: are they due to differences in tourism demand? Are they due to differences in the supply of both Airbnb properties and hotels? Or, are they due to differences in travelers (demographics, taste, etc.)?

5 Comparing properties listed on both platforms

To better understand the source of these cross-platform differences in property ratings, we next consider those cross-listed properties that we linked using the methods described in Sect. 3.1. Recall that the use of cross-listed properties allows us to control for differences in ratings arising from property heterogeneity across Airbnb and TripAdvisor. In addition, the study of cross-listed properties opens up other research questions that we are just beginning to explore and outline here. We first provide descriptive evidence for how ratings of cross-listed properties differ across platforms, consider possible explanations for these differences, and close with future directions for exploration.

5.1 The distribution of ratings for cross-listed properties

Our analysis thus far considered properties listed on each platform individually. We now limit our analysis to cross-listed properties to address a possible confounding effect: that differences in ratings could systematically arise because distinct sets of properties are listed on the respective platforms. We present the distributions of ratings of cross-listed properties in Figure 4. Here, we find that the distributions of Airbnb and TripAdvisor ratings mirror the distributions shown in the top and bottom panels of Figure 1, with 14% more properties rated 4.5 stars or above on Airbnb, and a 0.1-star difference in the means of the distributions (these results apply to both 2015 and 2018). As was the case in our previous platform-wide analysis, we again observe that even cross-listed properties are rated higher on Airbnb than on TripAdvisor.

This comparison of cross-listed properties suggests that property heterogeneity alone is unlikely to fully explain the Airbnb-TripAdvisor rating gap. While a variety of factors could be causally responsible for this bias, one in particular from the platforms literature

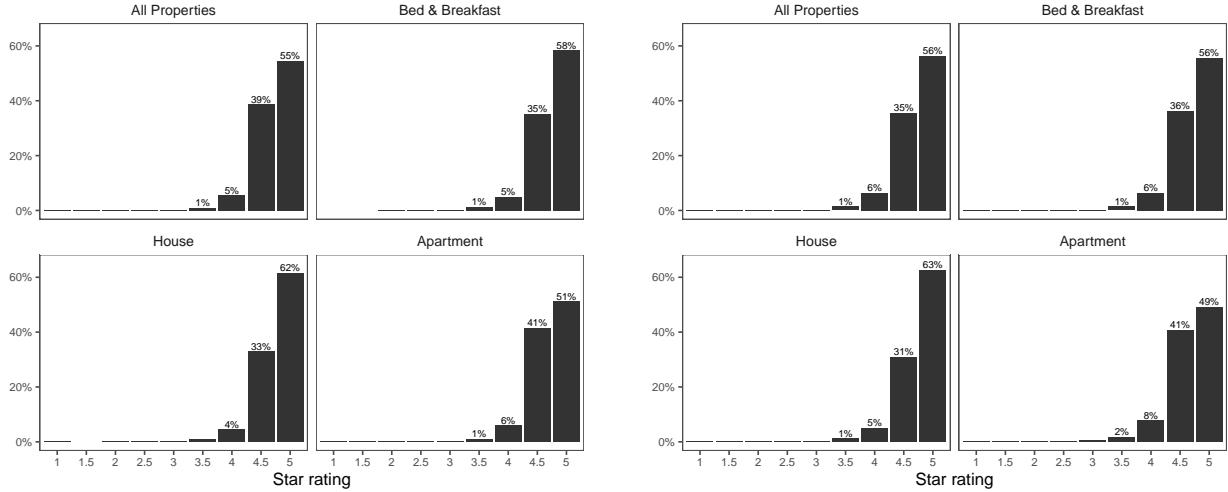


Figure 2: Distribution of Airbnb property ratings by accommodation type in 2015 (left) and 2018 (right)

stands out. Specifically, several empirical papers (Dellarocas and Wood 2008, Cabral and Hortacsu 2010, Bolton et al. 2013) find that bilateral reputation mechanisms create strategic considerations in feedback giving, which in turn cause underreporting of negative reviews due to fears of retaliation. As Airbnb uses a bilateral review system (guests can rate hosts and hosts can rate guests), whereas on TripAdvisor only guests rate host properties, this platform difference is operative in practice. Indeed, in a controlled experiment on Airbnb, Fradkin et al. (2019) observed bias arising from bilateral reviewing on Airbnb, although, interestingly, the size of this bias was rather small. While higher ratings on Airbnb are consistent with reciprocity bias, we should not rule out differences in ratings due to reviewer self-selection that is, a separation of reviewers across the platforms based on their distinct tastes. Indeed, recent theoretical work (Zhang and Sarvary 2014) has shown that in the presence of multiple review platforms, reviewers may split up according to their unique tastes. Future research can try to answer the following questions: can the higher ratings of Airbnb we observe be explained by differences in preference between Airbnb and hotel travelers? Or, can the higher ratings of Airbnb we observe be explained by differences in reviewing behavior between Airbnb and TripAdvisor travelers?

5.2 How well do Airbnb ratings predict TripAdvisor ratings?

Our analysis thus far has focused on understanding differences in the distributions of ratings across TripAdvisor and Airbnb. Beyond a comparative evaluation of the two platforms, there is also considerable interest in understanding why differences in the relative rankings of properties across the platforms occur (Sun et al. 2010, Shani and Gunawardana 2010). For example, consider two properties listed on both Airbnb and TripAdvisor. Suppose that on Airbnb, property A has a higher rating than property B. Is the same true on TripAdvisor? More broadly, to what extent do ratings on one platform predict ratings on the other? To

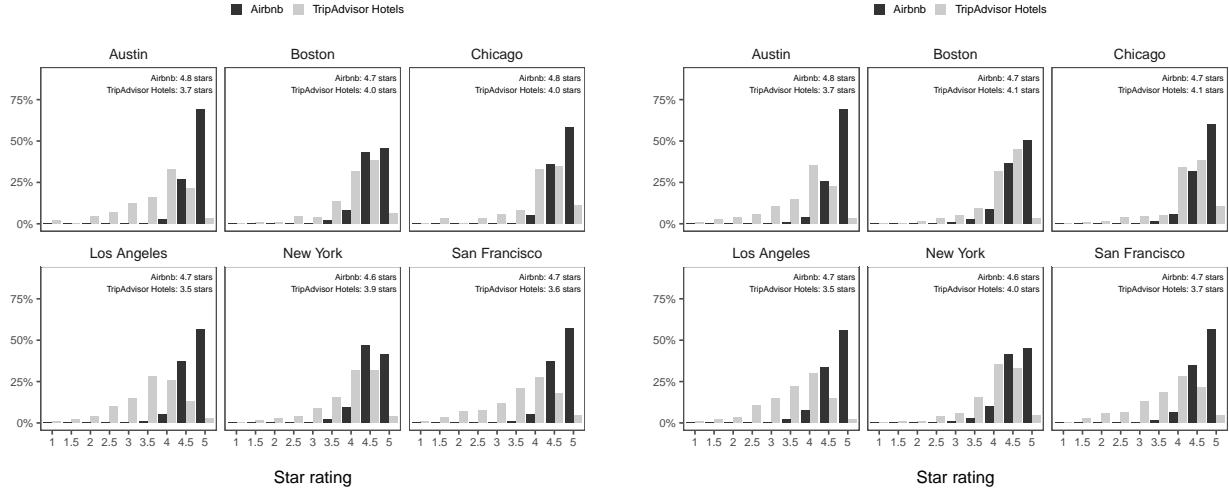


Figure 3: Distribution of Airbnb and TripAdvisor property ratings by US markets in 2015 (left) and in 2018-2020 (right)

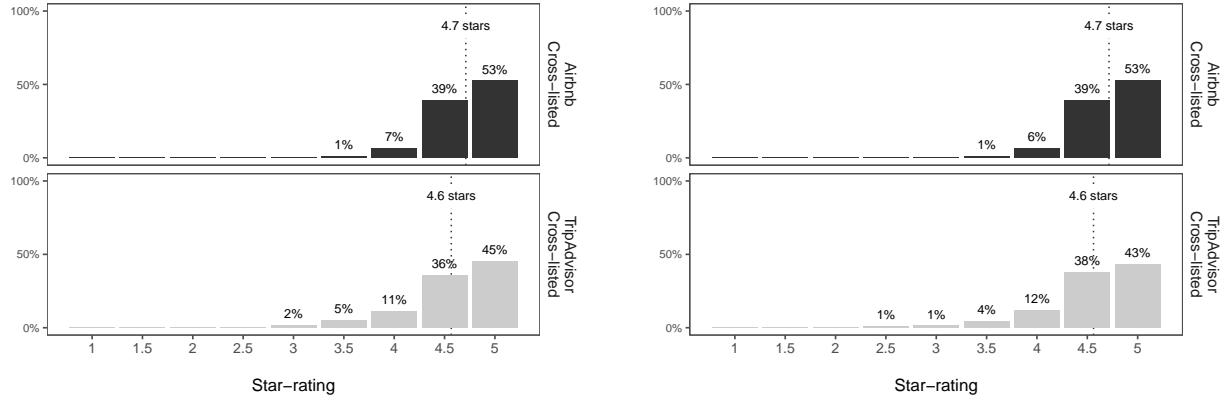


Figure 4: The distribution of ratings for properties cross-listed on both Airbnb and TripAdvisor in 2015 (left) and 2018-2020 (right). The dotted lines show the distribution means

answer this question, we focus on cross-listed properties and regress the Airbnb rating of each property on its TripAdvisor rating. Note that even though TripAdvisor ratings are on average lower, they could still in principle perfectly predict Airbnb ratings (and vice versa). For example, TripAdvisor and Airbnb users could have similar tastes but a different interpretation of the 5-star rating scale, with TripAdvisor reviewers grading on a stricter curve. Therefore, differences in the means of these distributions do not predetermine the outcome of this analysis. The results of this regression are shown in Table 2 and Table 3 for the 2015 and 2018-2020 datasets, respectively. While a significant positive association exists between the ratings of cross-listed properties across the two platforms, the adjusted R^2 of the model is low, suggesting that ratings on one platform explain only a small degree of variation in ratings on the other.

One concern with this analysis is that we are comparing properties across different geographic markets and price segments. However, most travelers limit their search for accommodation to a specific location within a target budget. Therefore, while ratings are not predictive overall, they could have more explanatory power within tightly defined market segments. For instance, it could be the case that TripAdvisor users prefer higher-priced accommodations, while Airbnb users are more price conscious. Yet, when comparing properties within each price segment, users relative preferences are the same. Motivated by this observation, we incorporate city and price-quantile dummy variables in the second and third columns of Tables 2 and 3. We see only a modest increase in the adjusted R². Overall, these results suggest that while on average better-rated properties on Airbnb are better-rated on TripAdvisor, there is a great deal of unexplained variation in the joint distribution of ratings across the two platforms, even within tightly defined market segments. Perhaps, differences in consumer behavior and preference between the two platforms can help explain the remaining variation.

Table 2: The relationship between Airbnb and TripAdvisor star-rating in 2015

	(1)	(2)	(3)
TripAdvisor Ratings	0.275*** (15.88)	0.244*** (13.45)	0.238*** (12.82)
City Dummies	No	Yes	Yes
Price Dummies	No	No	Yes
N	2234	2234	2234
R ²	0.18	0.55	0.55
Adj. R ²	0.17	0.22	0.22

Note: The dependent variable is the Airbnb star-rating of each linked property.

Significance levels: * p<0.1, ** p<0.05, *** p<0.01.

5.3 From ratings to rankings

We next turn our attention to analyzing the rankings of cross-listed properties on the two sites. This non-parametric comparison serves as a robustness check, since consumers could interpret ratings relatively rather than absolutely, preferring a 5-star property to 4-star property, but not necessarily ascribing much meaning to the magnitude of the star difference.

While different consumers will use different ranking heuristics, we focus on what we consider to be a reasonable, but far from universal, ranking algorithm. First, within each city, we rank properties by their star-rating. Then, among properties with the same star-rating, we break ties by using the number of reviews, which is typically prominently displayed on review platforms. This choice coincides with the intuition that a 5-star property with 100 reviews is likely to contain a smaller margin of error than a 5-star property with one review, making it a less risky choice for a consumer. Finally, we break ties among properties with

Table 3: The relationship between Airbnb and TripAdvisor star-rating in 2015-2020

	(1)	(2)	(3)
TripAdvisor Ratings	0.309*** (17.82)	0.227*** (9.78)	0.221*** (9.39)
City Dummies	No	Yes	Yes
Price Dummies	No	No	Yes
N	1843	1843	1843
R ²	0.21	0.63	0.63
Adj. R ²	0.21	0.24	0.24

Note: The dependent variable is the Airbnb star-rating of each linked property.

Significance levels: * p<0.1, ** p<0.05, *** p<0.01.

the same rating and number of reviews lexicograph-ically. This is a conservative approach, as it implies that properties tied by star-ratings and number of reviews will be ranked in the same way across the two platforms. We then compute the Kendall rank correlation for the four major cities (Los Angeles, Miami, New York, and San Diego). Such correlations are generally small, ranging from 0.05 (San Diego) to 0.33 (Los Angeles) in 2015, and they slightly increase in 2018-2020 (see Table 4). While there are some cross-city differences in terms of correlations in 2015, these are less pronounced in 2018-2020. Identifying the causes differences remains an interesting future research direction: Are they due to differences in city characteristics, differences in the travelers that visit these cities, or differences in the type of supply (Airbnb properties and hotels) offered in these cities?

Table 4: TripAdvisor vs. Airbnb ranks correlation for cross-listed properties in 2015 and 2018-2020

	2015	2018-2020
Los Angeles	0.33	0.38
Miami	0.23	0.33
New York	0.21	0.18
San Diego	0.05	0.25

Overall, these results support our regression analysis. Airbnb and TripAdvisor reviewers exhibit little agreement: TripAdvisor and Airbnb ratings are only weakly correlated, with the relative rankings of properties varying to a significant degree across the two sites.

One limitation of our work is that the cross-listed properties we have discovered constitute a small fraction of the inventory available on either site. That said, any cross-listed properties that our heuristics did not successfully match would not alter the relative order of the

properties we have discovered. However, the unlikely possibility remains that there is much higher correlation in the ranks and ratings of cross-listed properties we have not matched.

6 Managerial implications and future directions

Our findings have important implications for platforms and consumers. For platforms, our results show that the design of a reputation system and the nature of the transactions might have a strong impact on the reviews and ratings posted on the platform; moreover, these effects cannot be easily explained by previously studied phenomena such as retaliation, reciprocal ratings, or fake reviews. This is because starting in mid-2014, Airbnb made changes to its reputation system, making it harder for its users to game the reputation system and because fake reviews on Airbnb are very costly.¹⁰ Both Fradkin et al. (2019) and Proserpio et al. (2018) arrive at similar conclusions, providing additional evidence suggesting that the social interaction part of an Airbnb stay might play an important role in driving up user ratings.

More generally, while review and booking platforms strive to maintain unbiased ratings, our results provide strong evidence suggesting that achieving this goal is hard. Despite the fact that platform design has improved over the past decade or so, there are platform characteristics that can affect ratings and that cannot be easily changed (e.g., whether transactions involve a social component, or whether transactions are between peers or between a peer and a firm). This means that higher ratings like those observed on Airbnb might be an idiosyncratic feature of Airbnb and similar platforms. Indeed, similar rating distributions have been observed on other peer-to-peer platforms such as Uber.¹¹

The implications for consumers are less clear. Our findings suggest that consumers looking for a property are likely to be exposed to different ratings and rankings for the same properties on different platforms, which in turn might affect their final choices. Whether these final choices are sub-optimal and therefore welfare-reducing is an open question. It could also be the case that consumers with similar tastes in accommodations gravitate toward the same platform, in which case platform diversity can be welfare-enhancing.

Turning to future research directions, our work opens more questions than it can answer. First, while we show that ratings on Airbnb are more positive than those on TripAdvisor, we are not able to pin down a specific explanation for this finding, and more research is needed to better understand the causes behind our results. For example, researchers can investigate the following questions: are Airbnb travelers simply more positive than hotel travelers? And, if so, why? Or, is it easier to leave a negative review when the other party is a hotel as opposed to a person?

Second, our findings have the potential to be of consequence for platforms and consumers. Platforms like Airbnb and Uber continue to prosper and grow despite the distribution of ratings we observe, which seems to suggest that consumers are satisfied with their choices; so far, this seems to be a win-win situation. This leads to the following research questions: are

¹⁰Only guests with a past stay can write a review, and the minimum transaction cost on Airbnb is \$10 plus Airbnb service fees.

¹¹See, for example, <https://theatlas.com/charts/4y8zfUM9>

consumers harmed from the bias we document? Or, are ratings and reviews still informative and consumer choices optimal?

Finally, our work underscores the importance of platform design and the effect that different designs have on reviews and ratings: are higher Airbnb ratings due to a better platform design that facilitate better matches between hosts and guests? We expect to see more research looking at the effect of different designs on different outcomes such as consumer choices, platform utilization, and consumer reviews and ratings.

7 Conclusions

Reflecting on Airbnb in context, research in other online marketplaces indicates that positive ratings are critical to entrepreneurial and platform success when they play such a prominent role in ranking and user selection. One widely referenced experiment in online entry-level labor markets (Pallais 2014) demonstrates that a single detailed evaluation can substantially improve a workers future employment outcomes. At the platform level, recent work (Nosko and Tadelis 2015) shows that eBay buyers draw inferences about the eBay marketplace at large based on their experiences with specific sellers, and that buyers who have a poor experience with any one seller are less likely to return to eBay. The same has been found to be true on Airbnb (Jaffe et al. 2017). These studies suggest that attaining high ratings is likely essential to an individual entrepreneurs success on the Airbnb platform. As a result, hosts may take great pains to limit negative reviews. These include rejecting guests that they deem unsuitable or risky, or resetting a propertys reputation with a fresh property page once a property receives too many negative reviews. Airbnb itself may also seek to limit negative reviews, for example by adding frictions to make it harder for users to provide a low rating, or by removing negative reviews.¹² We look forward to exploring these and other possible expla-nations in our future work.

¹²See, for example, <https://qz.com/1333242/airbnb-reviews/>

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Web Appendix

In this Appendix, we test the robustness of our findings by reporting additional results using different subsets of our datasets.

In Figure 5, we replicate Figure 4 in the paper, using the 1,248 pairs of properties common across the 2015 and 2018-2020 datasets. Results are similar to those reported in the paper.

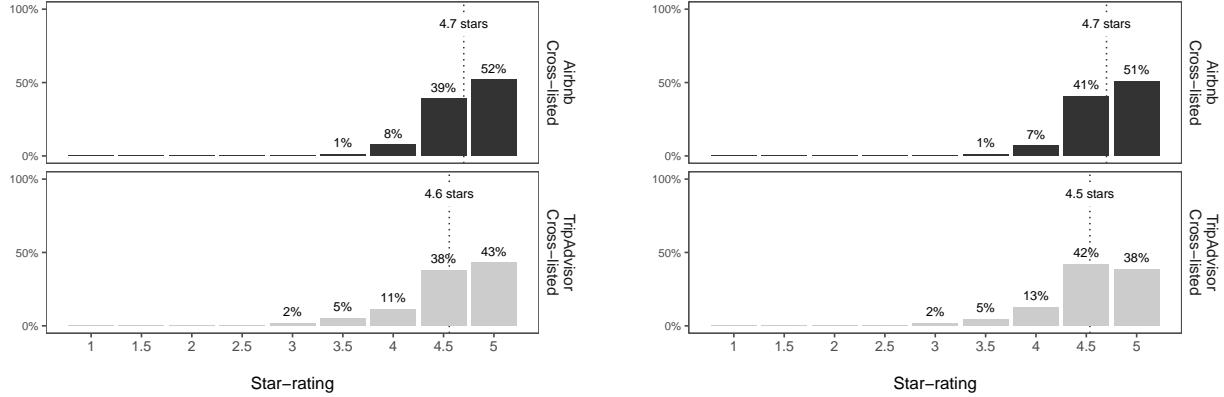


Figure 5: The distribution of ratings for properties cross-listed on both Airbnb and TripAdvisor in 2015 (left) and 2018-2020 (right) using cross-listed properties that exist both in the 2015 and 2018-2020 datasets. The dotted lines show the distribution means

To reduce concerns about whether Airbnb listings are indeed active and received reviews after 2015, in Figure 6 we replicate the right panel of Figure 5 above, using Airbnb listings that received at least one review in 2017 (which leaves us with 828 cross-listed pairs). Again, results continue to hold.

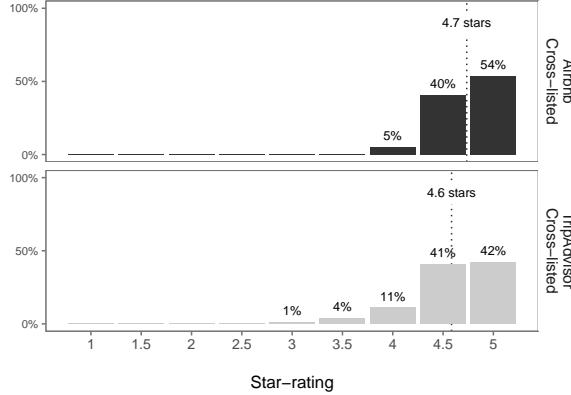


Figure 6: The distribution of ratings for properties cross-listed on both Airbnb and TripAdvisor in 2018 using only properties with at least a review in 2017. The dotted lines show the distribution means

Finally, in Figure 7 we replicate the top panel of Figure 1, using listings that received at least one review in 2016, 2017, and 2018. We find that results are similar to those reported

in the paper and that, if anything, Airbnb ratings seems to become slightly more positive over time.

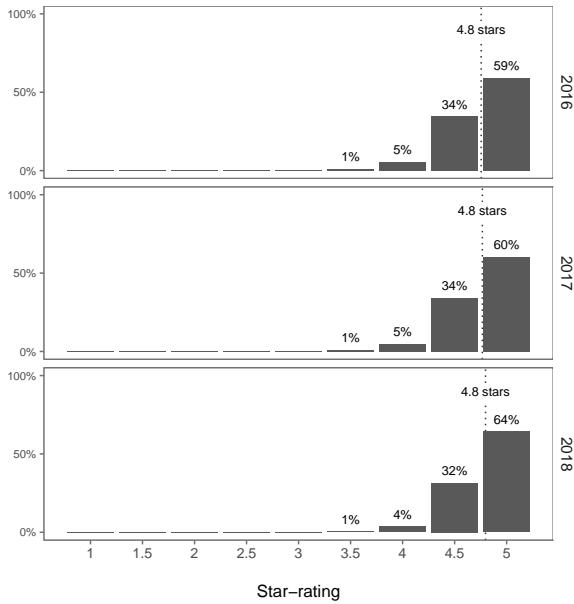
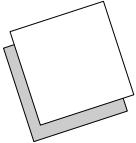


Figure 7: The distribution of ratings for properties cross-listed on both Airbnb and TripAdvisor in 2018 using only properties with at least a review in 2017. The dotted lines show the distribution means

An executive summary for managers and executive readers can be found at the end of this article



Transaction-specific satisfaction and overall satisfaction: an empirical analysis

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Keywords Services marketing, Customer satisfaction, Customer loyalty

Abstract The distinction between transaction-specific satisfaction and overall satisfaction has received little empirical attention in the satisfaction and services literature. Furthermore, a review of the extant literature provides mixed conceptual evidence concerning the relationships among transaction-specific satisfaction, overall satisfaction, and repurchase intentions. This study empirically investigates transaction-specific satisfaction, overall satisfaction and repurchase intentions, and finds that the two types of satisfaction can be distinguished from one another. Furthermore, the findings from this study suggest that overall satisfaction has a direct influence on repurchase intentions as well as a moderating influence on the transaction-specific satisfaction/repurchase intentions relationship. When overall satisfaction is high, transaction-specific satisfaction has little impact on repurchase intentions, but when overall satisfaction is low, transaction-specific satisfaction has a positive influence on repurchase intentions.

Importance of customer satisfaction

Since the 1970s both academicians and practitioners have recognized the importance of customer satisfaction. Customer satisfaction and related constructs are expected to receive even more attention during the next decade due to increased competition and the advent of relationship marketing (e.g. Babin and Griffin, 1998; Walker, 1995; Woodruff and Gardial, 1996). In fact, Babin and Griffin (1998, p. 127) state, "the era of relationship marketing has emphasized customer satisfaction as a key measuring stick indicating overall marketing performance. Clearly, satisfaction is one of only a few key building blocks in marketing philosophy, theory, and practice." In this light, it is no surprise to see the proliferation of hundreds of articles conceptualizing and measuring satisfaction as well as modeling its antecedents and consequences (for an excellent review see Yi, 1991).

Tremendous advances

While the theory and practice of customer satisfaction measurement have made tremendous advances during the past three decades, debate continues concerning the "best" way to conceptualize and measure customer satisfaction (e.g. Babin and Griffin, 1998; Westbrook and Oliver, 1981; Woodruff and Gardial, 1996; Yi, 1991). The empirical investigation of both transaction-specific satisfaction and overall satisfaction is one issue that has received relatively little attention in the literature (Anderson and Fornell, 1994; Bitner and Hubbert, 1994; Parasuraman *et al.*, 1994). It is important

The authors wish to thank Diane Halstead for her helpful comments on this manuscript.

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that academic researchers as well as practitioners understand the distinction between transaction-specific satisfaction and overall satisfaction and their relative influence on repurchase intentions. Furthermore, the relationships among overall satisfaction, transaction-specific satisfaction, and repurchase intentions are not clear (e.g. Parasuraman *et al.*, 1994; Teas, 1993). Given these important issues that need to be addressed, the purpose of this study was:

- to test the discriminant validity between transaction-specific satisfaction and overall satisfaction when measured using the same established scale;
- to compare the predictive ability of transaction-specific satisfaction and overall satisfaction on repurchase intentions; and
- to empirically test three alternative models demonstrating the relationships among transaction-specific satisfaction, overall satisfaction, and repurchase intentions.

Measurement issues

In general, the purpose of this study focused on measurement issues associated with customer satisfaction and a further understanding of two different conceptualizations of customer satisfaction, as opposed to an emphasis on the importance of a relationship marketing strategy, which has received considerable attention in the services literature.

Literature review

Transaction-specific satisfaction and overall satisfaction

Transaction-specific satisfaction refers to “the consumer’s dis/satisfaction with a discrete service encounter”, and overall satisfaction refers to “the consumer’s overall dis/satisfaction with the organization based on all encounters and experiences with that particular organization” (Bitner and Hubbert, 1994, pp. 76-7). Previous qualitative research reveals that consumers view these two conceptualizations of satisfaction differently (Bitner and Hubbert, 1994). Consumers are likely to comment on particular events of a service transaction (e.g. specific employee actions) when asked about transaction-specific satisfaction. Conversely, when asked about overall satisfaction, consumers are likely to comment on global impressions and general experiences with the firm (e.g. honesty of the firm).

Overall satisfaction

Since overall satisfaction is based on information from all previous experiences with the service provider, overall satisfaction can be viewed as a function of all previous transaction-specific satisfactions (Parasuraman *et al.*, 1994; Teas, 1993). Overall satisfaction may be based on many transactions or just a few, depending on the number of times the consumer has used a particular provider. In essence, overall satisfaction is an aggregation of all previous transaction-specific evaluations and is updated after each specific transaction much like expectations of overall service quality are updated after each transaction (Boulding *et al.*, 1993). It should be noted that although overall satisfaction at time $t-1$ will have an impact on the expectations which produce transaction-specific satisfaction at time t , this transaction-specific satisfaction will only be influenced indirectly by overall satisfaction (through expectations) and not completely reflect or subsume the overall satisfaction construct. Overall satisfaction at time t will then be based on overall satisfaction at time $t-1$ (which reflects all previous transaction-specific satisfactions), as well as the transaction-specific satisfaction that resulted from the information collected from the most recent service transaction produced at time t (Boulding *et al.*, 1993)[1].

In general, transaction-specific satisfaction may not be perfectly correlated with overall satisfaction since service quality is likely to vary from experience to experience, causing varying levels of transaction-specific satisfaction. Overall satisfaction, on the other hand, can be viewed as a moving average that is relatively stable and more similar to an overall attitude (Parasuraman *et al.*, 1994). For example, a consumer may have a dissatisfying experience because of lost baggage on a single airline flight (i.e. low transaction-specific satisfaction) yet still be satisfied with the airline (i.e. overall satisfaction) due to multiple previous satisfactory encounters.

Previous research

Previous research has tended to measure satisfaction either on a transaction-specific level (e.g. Bitner, 1990; Gotlieb *et al.*, 1994; Oliver and Swan, 1989) or on an overall level (e.g. Anderson and Fornell, 1994; Cronin and Taylor, 1992; Taylor and Baker, 1994), but not in both ways. Thus, it is not clear whether the two types of satisfaction can be empirically distinguished from one another when measured at the same time using the same scale. Furthermore, previous research provides little empirical support concerning which type of satisfaction is a better predictor of future intentions.

The relationships among overall satisfaction, transaction-specific satisfaction, and repurchase intentions are another critical issue that has received little empirical attention. Three competing models depicting possible relationships among these important variables are presented in Figure 1. Common to all three models is the relationship between transaction-specific satisfaction and overall satisfaction. Since overall satisfaction is a global evaluation based on all previous service encounters, it is believed that the satisfaction with the last transaction (and all others before that) will have a direct influence on the overall evaluation (Parasuraman *et al.*, 1994). In terms of transaction-specific satisfaction, only the satisfaction with the last transaction is presented in the proposed models.

Model 1

Previous literature

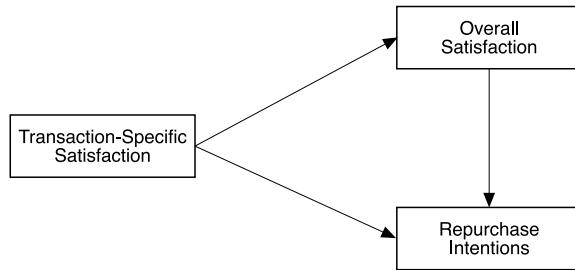
Model 1, presented in Figure 1a, has been discussed conceptually in previous literature and suggests that overall satisfaction completely mediates the relationship between transaction-specific satisfaction and repurchase intentions (e.g. Parasuraman *et al.*, 1994)[2]. In this model, transaction-specific satisfaction is directly integrated into the consumer's global evaluation or overall satisfaction with the service provider and it is this global evaluation that influences repurchase intentions (e.g. Anderson *et al.*, 1994; Bitner, 1990; Oliver, 1997; Parasuraman *et al.*, 1994). It is believed that overall satisfaction, as opposed to transaction-specific satisfaction, will influence repurchase intentions since overall satisfaction is more closely related to a general attitude, which is likely to predict future behavior (Anderson *et al.*, 1994). Again, in this model, the satisfaction with the last service encounter does not directly influence behavioral intentions.

Model 2

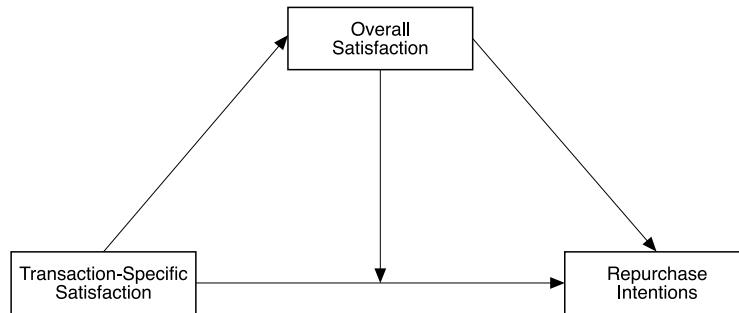
Model 2, presented in Figure 1b, assumes partial mediation. This model hypothesizes that transaction-specific satisfaction is an antecedent of both overall satisfaction and repurchase intentions. In addition, overall satisfaction directly influences repurchase intentions, partially mediating the relationship between transaction-specific satisfaction and repurchase intentions. This model provides for the possibility that a recency effect occurs such that the most recent service encounter influences both the overall evaluation as well as behavioral intentions. Previous research using transaction-specific satisfaction supports the relationship between



a. Model 1: Full Mediation Model



b. Model 2: Partial Mediation Model



c. Model 3: Partial Mediation and Moderation Model

Figure 1. Alternative models

transaction-specific satisfaction and repurchase intentions (Gotlieb *et al.*, 1994; Hoffman *et al.*, 1995; Oliver and Swan, 1989; Spreng *et al.*, 1995).

Model 3

Complex model

Model 3, in Figure 1c, presents a more complex model of the relationships among the three key variables. In this model, overall satisfaction acts as both a partial mediator and moderator of the relationship between transaction-specific satisfaction and repurchase intentions. Consistent with Model 2, transaction-specific satisfaction has a main effect on overall satisfaction, and overall satisfaction directly affects repurchase intentions. In addition, the model hypothesizes that the relationship between transaction-specific satisfaction and repurchase intentions is moderated by overall satisfaction. This proposed moderating influence is a possible explanation as to why previous studies investigating service failures (which focus on transaction-specific satisfaction) have sometimes found that customer repurchase intentions remain high even after dissatisfying encounters (e.g. Hoffman *et al.*, 1995). The moderating influence indicates that when overall satisfaction is high, the relationship between transaction-specific satisfaction and repurchase intentions is weaker. In this instance, regardless of whether a consumer is dissatisfied with a particular service experience, they will return to the service provider due to the high level of overall satisfaction based on previous experiences (Bitner and Hubbert, 1994; Bolton, 1998). In other words, the impact of transaction-specific satisfaction on repurchase intentions will be moderated by overall satisfaction. The moderating influence also reflects that the relationship between transaction-specific

satisfaction and repurchase intentions will be stronger when overall satisfaction is low. In this instance, the consumer is most likely using the service provider in sort of a “trial” manner such that any additional dissatisfying (or satisfying) experiences will result in low (or high) repurchase intentions.

Research questions

Based on the previous discussion, the goal of the current study was to answer the following research questions:

- (1) Can transaction-specific satisfaction and overall satisfaction be measured using the same established scale and still provide evidence of discriminant validity?
- (2) Is transaction-specific satisfaction or overall satisfaction a better predictor of repurchase intentions?
- (3) Which model (Model 1, 2, or 3) best depicts the relationships among transaction-specific satisfaction, overall satisfaction, and repurchase intentions?

Method

Data collection

Consumer research studies

The sample was collected in undergraduate classes at a major southern university in the USA. A total of 114 student respondents participated in the study; 53 percent of respondents were male and the average age was 21.3 years. It is not uncommon to use students in consumer research studies and is appropriate when testing theoretical frameworks when the goal is not to generalize to a specific population (cf. Arora and Stoner, 1996; Calder *et al.*, 1981). The service context chosen to answer the proposed research questions was hairstylists/barbers. This service provider seemed highly relevant to the student sample used in this study and represents a service with which customers can form both a transaction-specific evaluation as well as an overall evaluation. In general, the sample represented wide variations in terms of the length of time respondents had used a particular hairstylist/barber (from one encounter to 22 years). The average length was approximately 4.5 years, and approximately 75 percent of the respondents had used their current hairstylist/barber for at least one year.

Construct measurement

Developing new items

Rather than developing new items for the present study, one of the goals was to measure both transaction-specific and overall satisfaction using the same established scale, changing only the directions to respondents. This strategy has been successfully applied to the measurement of satisfaction with (Crosby and Stephens, 1987) and commitment to (Hunt and Morgan, 1994) different constituencies. In addition, it seemed unnecessary to develop new scales given the number of acceptable scales that exist in the satisfaction literature. Therefore, satisfaction was measured using three semantic differential items commonly used to measure customer satisfaction (e.g. Crosby and Stevens, 1987; Oliver and Swan, 1989). The items included satisfied/dissatisfied, pleased/displeased, and favorable/unfavorable, and were measured using a seven-point scale. The directions for the overall satisfaction scale instructed respondents to evaluate their hairstylist/barber based on *all* of the experiences that they have had with this individual, while the directions for the transaction-specific satisfaction scale instructed respondents to evaluate their hairstylist/barber based only on the *last* experience that they had with this individual. Although some overlap (or

halo effect) is expected between the two types of satisfaction since overall satisfaction is based in part on the satisfaction with the last encounter, previous research suggests that consumers view these two types of satisfaction differently and provide quite different responses when asked about both types (Bitner and Hubbert, 1994).

Repurchase intentions

Repurchase intentions was measured using three commonly used semantic differential items (e.g. Gotlieb *et al.*, 1994; Oliver and Swan, 1989). The directions asked respondents to rate the probability that they would use the hairstylist/barber again in the future and the items included likely/unlikely, probable/unprobable, and possible/impossible. The semantic differential utilized a seven-point scale.

Results

The adequacy of the measures was first tested before conducting any additional analyses. Exploratory factor analysis supported the unidimensionality of all three scales as all items loaded highly on their respective construct (greater than 0.80) and no item cross-loaded (loadings greater than 0.40 on two different constructs) (Nunnally and Bernstein, 1994).

Confirmatory factor analysis

The reliability and validity of the scales were assessed using confirmatory factor analysis (LISREL). Although the chi-square statistic was significant ($\chi^2 = 87.64$, df = 24, $p < 0.005$), other fit indices indicated that the measurement model provided an acceptable fit (RMR = 0.037, GFI = 0.87, NFI = 0.94, and CFI = 0.96). Table I presents the mean, standard deviation, and composite reliability for each scale as well as the correlations among constructs. Composite reliability is a LISREL-generated measure of internal consistency and is analogous to coefficient alpha (Fornell and Larcker, 1981). Composite reliability was extremely high (greater than 0.90) for each scale, clearly exceeding the 0.80 threshold (Fornell and Larcker, 1981). Within each construct, factor loadings were uniformly high and significant, providing evidence of convergent validity for each construct (Anderson and Gerbing, 1988). Furthermore, each squared multiple correlation (SMC) exceeded 0.50 (Fornell and Larcker, 1981). The CFA results also provided evidence of discriminant validity since none of the confidence intervals of the phi estimates included 1.00 (Anderson and Gerbing, 1988). Thus, the results support the distinction between overall satisfaction and transaction-specific satisfaction even when measured using the same scale.

Prediction of repurchase intentions

Predictive ability

The next step was to compare the predictive ability of both types of satisfaction. To accomplish this goal, the correlations between overall satisfaction, transaction-specific satisfaction, and repurchase intentions were

Variable	OS	TS	RI
Overall satisfaction (OS)	1.00		
Transaction-specific satisfaction (TS)	0.75*	1.00	
Repurchase intentions (RI)	0.70*	0.68*	1.00
Mean	5.94	4.94	6.31
SD	0.87	1.20	1.16
Composite reliability	0.95	0.97	0.98

Note: * Correlation is significant ($p < 0.01$)

Table I. Correlation matrix, descriptive statistics, and reliability of scales

examined. As indicated in Table I, both satisfactions were significantly correlated ($p < 0.01$) with repurchase intentions, but the correlation between overall satisfaction and repurchase intentions ($r = 0.70$) was slightly higher than the correlation between transaction-specific satisfaction and repurchase intentions ($r = 0.68$).

Testing of proposed models

The final goal of the study was to determine the relationships among overall satisfaction, transaction-specific satisfaction, and repurchase intentions. The proposed models were tested using a series of regression (see Table II) analyses as suggested by Baron and Kenny (1986).

Model 1 and Model 2. As previously discussed, Model 1 in Figure 1a hypothesizes a completely mediated relationship, while Model 2 presented in Figure 1b hypothesizes a partially mediated relationship. Baron and Kenny (1986) present guidelines to test the significance of a mediator variable. Using this framework, Model 1 and Model 2 can be tested using a series of regression equations, and the results of this analysis are presented in Table II[3].

Transaction-specific satisfaction

Based on the results presented in equations 1-4 of Table II, transaction-specific satisfaction significantly influences overall satisfaction (equation 1: $\beta = 0.745$, $p < 0.001$), transaction-specific satisfaction significantly influences repurchase intentions (equation 2: $\beta = 0.683$, $p < 0.001$), overall satisfaction significantly influences repurchase intentions (equation 3: $\beta = 0.704$, $p < 0.001$), and both overall satisfaction (equation 4: $\beta = 0.440$, $p < 0.001$) and transaction-specific satisfaction (equation 4: $\beta = 0.355$, $p < 0.001$) significantly influence repurchase intentions when modeled together. Furthermore, the influence of transaction-specific satisfaction decreases (from 0.683 in equation 2 to 0.355 in equation 4) when overall satisfaction is controlled. In general, Model 2 is preferred to Model 1 since the model allowing partial mediation appears to explain more variance ($R^2 = 0.55$) in repurchase intentions when compared to the explained variance ($R^2 = 0.50$) resulting from the full mediation model. In addition, Model 2 is preferred since transaction-specific satisfaction has a significant influence on repurchase intentions when overall satisfaction is controlled. Thus, it appears that although transaction-specific does influence overall satisfaction, it also has a direct influence on repurchase intentions.

Equation	Variable	β	t-value	Significance	R^2
1 ^a	TS (β_1)	0.745	11.76	0.000	0.555
2 ^b	TS (β_1)	0.683	9.84	0.000	0.466
3 ^b	OS (β_1)	0.704	10.45	0.000	0.496
4 ^b	TS (β_1)	0.355	3.71	0.000	0.552
	OS (β_2)	0.440	4.60	0.000	
5 ^b	TS (β_1)	0.126	1.27	0.207	0.631
	OS (β_2)	0.450	5.16	0.000	
	TS \times OS (β_3)	-0.358	-4.83	0.000	

Notes:

Variables: OS = overall satisfaction; TS = transaction-specific satisfaction; RI = repurchase intentions

^a Overall satisfaction (the mediator) served as the dependent variable

^b Repurchase intentions served as the dependent variable

Table II. Regression analysis

Moderator and mediator

Model 3. The third model in Figure 1c hypothesizes that overall satisfaction acts as both a moderator and mediator. Except for the moderating influence, all of the relationships presented in the model were tested and supported in Model 2. Thus, in order to test Model 3, only the significance of the interaction term needed to be investigated[4].

The regression equation used to test the moderating influence of overall satisfaction is presented as equation 5 in Table II. In this model, the interaction between transaction-specific satisfaction and overall satisfaction is significant ($\beta = -0.358, p < 0.001$). In addition, the main effect of transaction-specific satisfaction is not significant ($\beta = 0.126, p = 0.207$), while the main effect of overall satisfaction is significant ($\beta = 0.450, p < 0.001$). To better understand the moderating influence of overall satisfaction, the interaction was plotted. Median splits were performed on overall satisfaction and transaction-specific satisfaction. The results indicated that when overall satisfaction is high, transaction-specific satisfaction has little impact on repurchase intentions since repurchase intentions remain at the same high level regardless of the level of transaction-specific satisfaction. When overall satisfaction is low, transaction-specific satisfaction appears to have a significant influence on repurchase intentions. Finally, Model 3 provides an R^2 of 0.63, the highest explained variance in repurchase intentions of all three models. Furthermore, since Model 3 includes the relationships supported in Model 2 as well as a significant interaction, Model 3 is considered to best represent the relationships among transaction-specific satisfaction, overall satisfaction, and repurchase intentions.

Discussion

The literature is replete with studies investigating the antecedents and measurement of customer satisfaction (e.g. Babin and Griffin, 1998; Westbrook and Oliver, 1981; Yi, 1991). The current study investigates an area of customer satisfaction theory and measurement that has received much less attention: the relationships among transaction-specific satisfaction, overall satisfaction, and repurchase intentions.

Empirical results

The empirical results supported the notion that transaction-specific satisfaction can be empirically distinguished from overall satisfaction. This distinction was evident even when both types of satisfaction were measured using the same scale. In general, the results of this study suggest that overall satisfaction is a better predictor of repurchase intentions when compared to transaction-specific satisfaction. Although the difference in predictive ability was only marginal, the interaction between overall satisfaction and transaction-specific satisfaction indicates that under some circumstances, transaction-specific satisfaction is not a good predictor of repurchase intentions. Future studies should clearly specify which type of satisfaction is being measured so the results can be accurately synthesized with previous theory on either (or both) types of satisfaction.

Greatest contribution

Perhaps the greatest contribution of this study is the investigation of the relationships among transaction-specific satisfaction, overall satisfaction, and repurchase intentions. Although most researchers have at least conceptually adopted the full mediation model presented in Model 1 (e.g. Parasuraman *et al.*, 1994), the results of this study support a more complex model which incorporates both partial mediation and moderation. The results indicate that transaction-specific satisfaction directly influences repurchase intentions, but only when overall satisfaction is low. Thus, when the global

evaluation is low, consumers allow their evaluation of the last service encounter to influence repurchase decisions. When overall satisfaction (or the more global evaluation) is high, consumers do not appear to let their satisfaction level with the last encounter influence their repurchase intentions. Thus, even when transaction-specific satisfaction is low, repurchase intentions remain high as long as overall satisfaction is high. In other words, when overall satisfaction is high, it appears that consumers may give service providers another chance if there is a service failure or a less than fully satisfactory service encounter. This explanation provides insight into the Hoffman *et al.* (1995, p. 58) finding that "Even customers experiencing less than acceptable recoveries (apology and nothing) were still retained in over 55 percent (60/106) of the incidents reported." In general, the results emphasize the importance of developing and sustaining high levels of overall customer satisfaction.

Type of satisfaction

Managerial implications

The results of this study offer several managerial implications. First, this study provides managers insight into which type of satisfaction should be measured. In general, a service manager's goal should drive the use of either (or both) transaction-specific satisfaction or overall satisfaction. When the goal is the prediction of repurchase intentions and only one type of satisfaction can be measured, the results would suggest that overall satisfaction be measured. If, however, the goal is to continually monitor service quality and customer satisfaction at the service encounter level, managers should capture transaction-specific satisfaction judgments so that problems can be properly identified. Ideally, both types of satisfaction should be assessed in order to monitor both overall satisfaction with the service provider as well as satisfaction with a particular encounter. Both types of information are important for managers to track and can be easily collected with a total of only six measurement items. In general, questionnaires should clearly specify which type of satisfaction is being measured so that respondents can provide accurate feedback consistent with the study's objectives.

The results also suggest that the same scale can be used to measure both types of satisfaction, only the directions need to be altered to reflect satisfaction with a specific encounter versus overall satisfaction with the service firm. Therefore, service managers wishing to measure both types of satisfaction can use the same scale and need not develop separate scales to measure both constructs.

Service recoveries

This study also offers implications for the management of service recoveries. The results indicate that a previous level of overall satisfaction can mitigate the negative effect of a single, less than satisfactory service encounter. Therefore, when established customers experience less than satisfactory service encounters, service managers may wish to remind them of their previous overall satisfaction. Reminding customers of their overall satisfaction should increase the likelihood that this information will be accessible and that repurchase intentions will be based on overall satisfaction as opposed to low transaction-specific satisfaction. For example, during an apology a service manager may wish to state to the customer, "We know you have come to expect only the best from our firm." or "We are sorry we did not provide you with the high level of satisfaction that you have received in the past."

Relationship marketing

Consistent with the current trend towards relationship marketing, this study emphasizes the importance of developing long-term satisfaction. Managers should not, however, lose sight of the importance of individual transactions since overall satisfaction is a function of the satisfaction with each previous encounter. Ensuring transaction-specific satisfaction is especially important during early stages of a relationship when overall satisfaction is not well established and the impact of any one transaction may be great. Given the importance of these initial transactions, service managers may wish to focus on monitoring transaction-specific satisfaction during the early stages of a relationship. For example, service managers may wish monitor transaction-specific satisfaction of new customers (specifically for the first five to ten transactions) by using more frequent informal, verbal assessments as well as more formal methods such as comment cards.

Future research and limitations

The findings from this study provide many opportunities for future research. For example, what are the relationships among transaction-specific satisfaction, overall satisfaction, transaction-specific service quality, and overall service quality? Furthermore, the current study only considered transaction-specific satisfaction from the last service encounter. How would transaction-specific satisfaction from two, three, four, or more encounters ago affect overall satisfaction and repurchase intentions? Does only the last transaction-specific satisfaction affect repurchase intentions while the others affect only overall satisfaction? Does the severity of the satisfaction (either highly satisfied or highly dissatisfied) moderate the impact of transaction-specific satisfaction on repurchase intentions such that past evaluations have an impact only if they were extreme? The current study involved only one outcome variable, repurchase intentions. Future research should investigate the relationships among transaction-specific satisfaction, overall satisfaction and other related outcomes such as word-of-mouth, trust, commitment, and value.

Interpreted with caution

The results of this study should be interpreted with caution due to two primary limitations. First, the data were collected from students at a major southern university in the USA. Although theory testing using a highly homogeneous population is acceptable, the results should not be generalized beyond this population. Thus, future research should collect data using a more diverse population. Second, the present study used only one service category, hairstylists/barbers. Future research should replicate the current study across different service categories to enhance the generalizability of these findings.

Notes

1. The degree to which the last transaction, compared to all other transactions, affects the development of overall satisfaction is unknown. Longitudinal data that collect both transaction-specific satisfaction and overall satisfaction after each transaction would be needed to determine the relative impact of all transaction-specific satisfactions on the overall satisfaction construct.
2. Although identifying mediators and moderators plays an important role in the development of marketing theory, confusion often surrounds the discussion of these variables (Brown, 1989). A mediator is a variable that plays a causal intermediary role between an independent variable and a dependent variable, while a moderator is a variable that influences the strength or form of a relationship between a predictor variable and the dependent variable (see Baron and Kenny, 1986; Brown, 1989).
3. Partial mediation is established when the independent variable (transaction-specific satisfaction) affects the mediator (overall satisfaction) in equation 1, the independent variable affects the dependent variable (repurchase intentions) in equation 2, the mediator

influences the dependent variable in equation 3, and the mediator and independent variable affect the dependent variable in equation 4. To support partial mediation, the mediator's influence in equation 4 should decrease when compared to its influence on repurchase intentions in isolation (i.e. equation 2). Perfect mediation, which is hypothesized in Model 1, is supported under the first three conditions described above and when the independent variable has no influence on the dependent variable when the mediator is controlled in equation 4.

4. Prior to testing the interaction term, both transaction-specific satisfaction and overall satisfaction were mean-centered in order to reduce multicollinearity (Aiken and West, 1991). Typically, moderator regression consists of first testing the significance of the main effects prior to the testing of both main effects and the interaction term. This first step, however, was tested in the investigation of Model 2 and is presented in Table II (equation 4).

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This summary has been provided to allow managers and executives a rapid appreciation of the content of this article. Those with a particular interest in the topic covered may then read the article in toto to take advantage of the more comprehensive description of the research undertaken and its results to get the full benefit of the material present

Executive summary and implications for managers and executives

Transaction-specific and overall satisfaction

A customer's satisfaction or dissatisfaction with a single service encounter is "transaction specific". Overall satisfaction, in contrast, refers to the customer's satisfaction or dissatisfaction with a company based on all his or her experiences with the firm over a period of time. Customers asked about transaction-specific satisfaction are likely to comment on, for example, the specific actions of an employee. Comments about overall satisfaction, in contrast, may centre on, for example, the honesty of the firm.

Overall satisfaction may be based on many transactions or just a few, depending on the number of times the customer has used a particular service provider. Overall satisfaction is an aggregation of all previous transaction-specific evaluations, and is updated after each specific transaction much like expectations of overall service quality are updated after each transaction.

Transaction-specific satisfaction is likely to vary, since service quality is likely to differ from experience to experience. Overall satisfaction, in contrast, is likely to remain relatively stable. For example, a passenger may have a dissatisfying experience because of lost baggage on a single airline flight (that is to say, low transaction-specific satisfaction) yet still be satisfied with the airline (that is to say, high overall satisfaction) because of a number of previous trouble-free flights with the company.

Key role of overall satisfaction

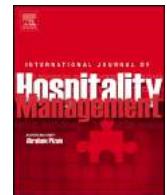
Jones and Suh suggest that overall satisfaction is a better predictor of repurchase intentions than transaction-specific satisfaction. Low transaction-specific satisfaction does reduce the likelihood of a customer returning to a given service provider, but only when the customer's overall satisfaction with that provider is low. When overall satisfaction with a company is high, consumers do not appear to allow a one-off disappointing experience to put them off going back. Customers seem willing to give the service provider another chance.

When established customers experience a disappointing level of service, managers should remind them of their previous good experiences with the firm. During an apology, a service manager may wish to state to the customer: "We know you have come to expect only the best from our firm," or "We are sorry we did not provide you with the high level of satisfaction that you have received in the past."

Closely monitor the satisfaction of new customers

In general, the survey results emphasize the importance of developing and sustaining high levels of overall customer satisfaction. Managers should not, however, lose sight of the importance of individual transactions, since the customer's overall satisfaction takes into account each of his or her previous encounters with the firm. Ensuring high levels of transaction-specific satisfaction is particularly important in the early stages when overall satisfaction is not well established and the impact of a single transaction may be great. Given the importance of these initial transactions, service managers may wish to monitor the transaction-specific satisfaction of new customers (especially for the first five to ten transactions) by using frequent informal, verbal assessments as well as formal methods such as comment cards.

(A précis of the article "Transaction-specific satisfaction and overall satisfaction: an empirical analysis". Supplied by Marketing Consultants for MCB University Press.)



Assessing Airbnb as a disruptive innovation relative to hotels: Substitution and comparative performance expectations

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ARTICLE INFO

Article history:

Received 17 September 2016

Received in revised form

29 December 2016

Accepted 27 February 2017

Available online 31 March 2017

Keywords:

Airbnb

Sharing economy

Peer-to-peer short-term rentals

Disruptive innovation

ABSTRACT

Millions of tourists have used Airbnb accommodations, and Airbnb is frequently discussed in terms of its current or future impacts on hotels. The purpose of this research was to investigate such impacts by determining the extent to which Airbnb is used as a hotel substitute and to examine how Airbnb guests expect their accommodations to perform relative to hotels. Together, these analyses were intended to provide empirical insight into Airbnb's status as a disruptive innovation. The study involved an online survey of over 800 tourists who had used Airbnb within the previous year. Nearly two-thirds had used Airbnb as a hotel substitute. When considering traditional hotel attributes (e.g., cleanliness and comfort), Airbnb was generally expected to outperform budget hotels/motels, underperform upscale hotels, and have mixed outcomes versus mid-range hotels, signalling some – but not complete – consistency with the concept of disruptive innovation. Numerous practical and theoretical implications are discussed.

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1. Introduction

Airbnb, a service that allows ordinary people to rent residences to tourists, has quickly become one of the most talked-about topics in the hospitality sector. The service has enjoyed extremely rapid growth since its inception in 2008, with over 100 million guests having stayed in Airbnb accommodations by the summer of 2016 (Chafkin and Newcomer, 2016), and a growing global inventory of over two million listings (Airbnb, 2016a). However, while it is generally accepted that Airbnb has shaken up the tourism accommodation landscape, much debate remains regarding the degree to which Airbnb siphons guests away from existing accommodations, and how the quality of Airbnb accommodations compares to hotel offerings.

Airbnb describes itself as “a trusted community marketplace for people to list, discover, and book unique accommodations around the world” (Airbnb, 2016a). Its accommodations typically involve an entire home (e.g., an apartment or house), or a private room in a residence where the host is also present, and Airbnb's diverse inventory ranges from very modest to extremely luxurious. The Airbnb website (www.airbnb.com) is quite straightforward: a prospective guest searches based on destination, travel dates, and

party size; the website then returns a list of available spaces that can be refined by attributes like price, neighbourhood, and amenities; and then individual listings can be selected for greater detail, which includes a description, photographs, and reviews from previous guests. When interested in a listing, the tourist generally sends the host a reservation request and/or message to express interest, possibly to ask questions, and often to provide information about the travel party. The host then may respond and ask any questions of the tourist, or if a reservation request has been made then the host can accept or reject the request. Payments are made through the Airbnb website, with the company charging both guests and hosts a small fee.

Airbnb has continually introduced noteworthy service improvements. For example, to enhance security, Airbnb has introduced numerous identity verification mechanisms, including providing an official form of photo identification and linking one's Airbnb profile with one's Facebook and LinkedIn accounts. In 2011, Airbnb began offering hosts access to free professional photographers whose pictures are verified with an Airbnb watermark (Boyd Myers, 2011), and introduced a 24-hour hotline (Kincaid, 2011). In 2013, Airbnb hired the founder of a major boutique hotel company as its Head of Global Hospitality & Strategy, responsible for promoting key standards in areas such as cleanliness, hosts' response time, and the accuracy of listing descriptions (Geron, 2013). More recently, Airbnb offered free smoke alarms and carbon monoxide detectors to thousands of hosts (Tam, 2014); launched an “Instant booking”

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feature permitting reservations at some rentals to be made immediately, without explicit host approval (Plautz, 2014); introduced a “Superhost” status badge for especially active and well-reviewed hosts (Airbnb, 2016b); and modified the reviewing procedures to encourage more honest (i.e., less positive) reviews (Rubin, 2014). Also, lately Airbnb has made efforts to attract more business travellers (currently a small segment of Airbnb’s guests) by setting up a dedicated business travel portal with customized search results and expenditure management tools, by partnering with various corporate travel management firms, and by introducing a “Business Travel Ready” badge that can be earned by listings with characteristics like a designated workspace (Dillet, 2015; Terdiman, 2014).

As Airbnb has expanded, it has triggered significant debate within the hotel industry regarding the threat that Airbnb poses. While some hoteliers and industry analysts perceive Airbnb as a threat, many others question Airbnb’s impacts. The skeptics generally argue that Airbnb is inconsequentially small, it provides a distinct and generally lower quality product serving a different market, and it is unappealing to the lucrative business travel market. This attitude is illustrated by a recent comment from Hilton Worldwide’s CEO:

We do not believe there is a material impact on the bulk of our markets or with our core business and leisure customers. . . I think it’s extremely hard for [Airbnb] to replicate what we are doing. And I don’t think [our core] customers suddenly woke up . . . and said we really don’t care about consistently high quality products and we don’t need service and we don’t need amenities. (DePillis, 2016)

The purpose of this study was to examine Airbnb’s potential to impact hotels. The study firstly involved assessing the degree to which Airbnb is presently used as a substitute for hotels. This substitution question has obvious implications for hotels, but also for destinations more generally. Whereas most analyses of Airbnb substitution have taken a supply-side perspective (e.g., Zervas et al., 2015), this study provides a useful demand-side view. This study secondly compared Airbnb guests’ performance expectations for the service with that of hotels in order to better understand both Airbnb’s strengths and weaknesses. This analysis complements motivation research on Airbnb choice that has mostly focused on the company’s strengths (e.g., Tussyadiah, 2015). Together, these two analyses provide empirical insight into Airbnb’s status as a “disruptive innovation,” which is a status claimed by Guttentag (2015) and frequently stated in the media, but which has not been tested. Although Airbnb represents part of a broader peer-to-peer tourism accommodation sector, with competitors such as HomeAway and Wimdu, there is noteworthy diversity within the sector (e.g., HomeAway only lists entire homes). To avoid any complications stemming from such differences, this study focused solely on Airbnb, the largest and most prominent company in the sector.

2. Literature review

2.1. Airbnb’s impacts on hotels

Existing research has considered the impacts of myriad internal and external factors on hotel performance, such as a hotel’s economic environment, geographic location, competitive strategy, and market orientation (Sainaghi, 2010). The emergence of Airbnb represents a novel and unique development with the potential to impact hotels. Research investigating Airbnb’s impacts on hotels primarily has taken a supply-side perspective. Most notably, Zervas et al. (2015) examined the relation between changes in Airbnb listing volume and hotel revenues in Texas. They concluded that a 10% increase in Airbnb listings corresponded with a 0.37% decrease

in hotel room revenue, a function of both occupancy and, to an even greater degree, rate decreases. The authors also found that the impacts were greater at lower-end hotels, independent hotels, and hotels that did not cater to business travellers. In an unpublished Master’s thesis, Neeser (2015) replicated Zervas et al.’s (2015) approach in Scandinavia. He found that Airbnb negatively impacted hotels’ average daily rates, but did not impact revenue per available room, suggesting hotels were reducing rates in order to maintain occupancy levels.

Several industry groups also have examined Airbnb’s impacts on hotels. Lane and Woodworth (2016), working for the commercial real estate company CBRE, examined U.S. Airbnb and hotel data, and found that Airbnb demand represented (a growing) 1.4% of hotel demand, and that Airbnb’s footprint was larger in major urban markets. The authors concluded Airbnb would impact hotels primarily by limiting price premiums during peak periods and by stifling inventory growth. In contrast, the hotel performance tracking firm STR compared Manhattan hotel data and Airbnb data, and found no clear evidence that Airbnb was cannibalizing hotel customers or undermining hotel pricing power even on very high occupancy nights (Haywood, 2016; Haywood et al., 2016). The tourism research firm HVS (2015), commissioned by the Hotel Association of New York City, estimated that in the 12 months ending August 2015 Airbnb resulted in a direct loss of \$451 million for New York City hotels, although this figure questionably presumed every dollar spent on Airbnb accommodation would have otherwise been spent in a hotel (Mayock, 2015). Finally, Swig (2014), a hospitality consultant, looked at San Francisco hotel occupancy rates from early 2014 and found weekday rates to be up and weekend rates to be down, which he suggested was due to Airbnb and other similar companies because weekend occupancies are driven more by leisure travellers, who are more likely to use Airbnb.

Nowak et al. (2015), working for the financial services company Morgan Stanley, conducted the only apparent (non-Airbnb) research on Airbnb’s substitution that has taken a demand-side view. Nowak et al. asked Airbnb users to indicate any number of accommodation alternatives Airbnb had replaced, and the top four responses were hotel (42%), bed-and-breakfast (36%), friends/family (31%), and extended stay hotel (30%), with 4% claiming they would not have otherwise taken the trip. Even though “hotel” was the most common response, the authors concluded Airbnb would have only a limited impact on hotels due to its focus on longer-duration leisure travellers instead of the short-stay business travellers integral to many hotels.

Finally, Airbnb has produced about two dozen destination-specific economic impact reports, which frequently have stated that around 30% of Airbnb guests would not have otherwise visited a destination or stayed as long without Airbnb. However, combining these two statements into a single category makes it impossible to know the first percentage (of guests who would not have otherwise visited a destination). This figure importantly would help signal the degree to which Airbnb is used as a substitute for existing accommodations.

2.2. Hotel choice and Airbnb choice

There exists a fairly substantial literature exploring the reasons why tourists choose one hotel over another. This research has generally involved respondents rating the importance of different hotel attributes (e.g., Chan and Wong, 2006), and it sometimes focuses on particular types of tourists, such as business travellers (e.g., Lockyer, 2002). Various studies have demonstrated that hotel preferences are influenced by traveller characteristics, including nationality (McCleary et al., 1998) and gender (Cobanoglu et al., 2003). Overall, this research has revealed a variety of primary attributes – cleanliness, location, reputation, price, value, service quality (e.g., staff

friendliness and helpfulness), room comfort, and security. It also has identified various secondary attributes that are noteworthy but tend to be perceived as less important, including restaurant quality, fitness amenities, parking facilities, loyalty programs, and the check-in and check-out procedures (e.g., Chu and Choi, 2000; Dolnicar and Otter, 2003; Sohrabi et al., 2012). Moreover, recent research has stressed the importance of online reviews on hotel decisions (e.g., Gretzel and Yoo, 2008).

A much smaller body of literature has begun examining Airbnb guests' motivations for using the service. Guttentag (2015) provided a conceptual overview of Airbnb and proposed three key appeals of the service – price, household amenities, and authenticity. Tussyadiah (2015) surveyed peer-to-peer short-term rental users (the broader accommodation category in which Airbnb resides), and found they were motivated by three factors – sustainability, community, and economic benefits – with economic benefits being the most significant. Finally, Nowak et al. (2015) surveyed U.S. and European Airbnb users and found that the top five reasons they had chosen the service were "cheaper price," "location," "authentic experience," "own kitchen," and "uniqueness of unit."

Whereas the hotel choice literature has focused on the choice between different hotel properties, the Airbnb choice literature has focused on the choice to use Airbnb more generally. These bodies of research also have examined fairly distinct sets of attributes, with the Airbnb literature focusing on Airbnb's unique set of characteristics, rather than those typically featured in hotel studies. While this distinct approach is understandable, the resulting problem is that the Airbnb choice literature focuses almost entirely on Airbnb's purported strengths. It seems equally important to understand how Airbnb compares with hotels along hotels' traditional attributes, as such knowledge will highlight any weaknesses in the Airbnb product and clarify the degree to which Airbnb guests are willing to tolerate such weaknesses in order to enjoy Airbnb's other benefits.

2.3. Disruptive innovation

The notion that has just been described – tolerating weaknesses in order to enjoy other benefits – perfectly encapsulates the concept of disruptive innovation, which Guttentag (2015) recommended as a useful lens through which to view Airbnb. As outlined by Christensen (1997) and Christensen and Raynor (2003), a disruptive innovation's appeal does not come from improved product performance; somewhat counterintuitively, disruptive innovations actually underperform when compared with existing competitors' primary attributes. Nonetheless, disruptive innovations introduce an alternative package of benefits generally centred on being cheaper, simpler, smaller, and/or more convenient. In other words, disruptive innovations are inferior "good enough" products when compared directly to existing competitors, but their unique set of attributes modifies the prevailing value proposition in a way that appeals to some consumers. Disruptive innovations' initial appeal is typically small, and early consumers consist of low-end consumers and/or previous non-consumers of the incumbent competing product. However, the disruptive product improves over time such that it can satisfy the demands of mainstream consumers. In doing so, it encroaches upon the existing market as it is increasingly adopted as a substitute for the incumbent product, which may be superior along some dimensions but offers a "performance oversupply." Because early on a disruptive innovation appeals only to a small market with minimal profits, it initially tends to be dismissed by leading firms that are content to concentrate on their more profitable market segments. Once these leading firms recognize the threat posed by the disruptive product, it may be so entrenched in the new market it has created that these firms struggle to compete.

The term "disruptive innovation" often is erroneously misapplied to any exceptionally novel product that "disrupts" a market in a more colloquial sense. To clarify, "radical" or "discontinuous" innovations are those that exhibit a significant level of "newness," often in terms of revolutionary technological advancements and/or dramatic changes in customer use, whereas disruptive innovations introduce a new value proposition (Christensen, 1997). In other words, the concepts are based on separate criteria. Also, disruptiveness is not an intrinsic, absolute characteristic of an innovation. Rather, disruptiveness must be relative to an incumbent product, meaning an innovation can be disruptive relative to one product and not another (Christensen, 2006).

As Guttentag (2015) suggested, the disruptive innovation concept seemingly applies directly to Airbnb, which appears to underperform in comparison with hotels when considering traditional hotel performance attributes like cleanliness, quality assurance, and the check in/out process. Nonetheless, for some consumers hotels may offer a "performance oversupply" regarding such attributes, meaning despite Airbnb's purported inferiority it can be appealing due to its alternative set of benefits. Indeed, as is typical of disruptive innovations, Airbnb accommodations often are cheaper than hotels (Guttentag, 2015; Haywood et al., 2016; Hockenson, 2013). Moreover, Airbnb accommodations may provide for a more unique and authentic experience, and they may offer useful household benefits (e.g., a kitchen) not typically available in hotels (Guttentag, 2015).

Nevertheless, Airbnb's status as a disruptive innovation has not been empirically examined. There unfortunately are no precise guidelines for what requisite characteristics define a disruptive innovation. Bower and Christensen (1995) initially explained, "Disruptive technologies introduce a very different package of attributes from the one mainstream customers historically value, and they often perform far worse along one or two dimensions that are particularly important to those customers" (p. 45). Also, Christensen has described disruptive innovations as generally being cheaper, simpler, smaller, and/or more convenient than incumbent products (Christensen, 1997; Christensen et al. 2015). These statements, however, are not precise enough for measurement purposes. Indeed, Danneels (2004) criticized Christensen for using example products with just one or two key performance dimensions, even though many products are far more complex.

Several researchers have attempted to overcome the ambiguities in identifying disruptive innovations, often in research predicting the disruptiveness of a product or a market's susceptibility to disruption. As one component of these assessments, they have generally considered whether a product aligns with the classic characteristics of disruptive innovation, relying on their own market research analysis or the opinions of industry members or experts. Rafii and Kampas (2002) proposed a scorecard for firms to assess disruptive threats, which included rating an innovation on its quality, cost, and ease of use. Hüsig et al. (2005) assessed the disruptive potential of wireless local area network technologies, and included a question about whether the potential disruption was "simpler, cheaper, more reliable or more convenient" (p. 30). Sainio and Puimalainen (2007) assessed the disruptive potential of four information and communication technologies, and included several items focused on whether the products introduced new value propositions. Keller and Hüsig (2009) assessed the disruptive potential of Google's web-based office applications with a scorecard including an item related to overall underperformance and another item related to being "cheaper, simpler, more comfortable or more reliable" (p. 1050). This inclusion of comfort and reliability extends beyond the typical descriptive attributes of disruptive innovation (i.e., cheaper, simpler, smaller, and more convenient),

thereby highlighting that disruptive innovations' new value proposition need not be limited to those four benefits.

3. Methods

3.1. Data collection

Tourists who had stayed in Airbnb accommodation during the previous 12 months were recruited to complete an online survey. Data collection began in July 2015 and ended in October 2015. Two Amazon gift cards of US \$50 each (or its international equivalent) were offered as incentives and distributed in lottery draws. Respondents needed to have been significantly involved in the decision to use Airbnb, and only one travel party member (from a respondent's most recent Airbnb stay) could complete the survey.

Because Airbnb is fairly new, has been used by only a small percentage of the population, and has not yet been widely researched, the desired respondents exhibited various characteristics of a "hard-to-reach" population (Marpsat and Razafindratsima, 2010). Consequently, a multiple-frame non-random online sampling approach was deemed necessary. The majority of the respondents were recruited via six travel-themed Facebook groups based around major Canadian cities, and consisting of thousands of members each. Additionally, respondents were recruited through Mechanical Turk (MTurk), an online panel that is increasingly being used for social science research. As recommended by Chen (2012) and Kittur et al. (2008), data quality from MTurk was promoted by paying a relatively high compensation (MTurk respondents were paid per completion, rather than entered in the lottery draws), by including two verifiable questions, and by restricting respondents to certain countries. A handful of other sampling approaches also were used to further bolster and diversify the sample. These approaches involved publishing invitation messages on travel-themed Facebook pages, travel-themed Twitter feeds, and an Airbnb-focused page on Reddit.com; sending invitation messages to a small number of Airbnb hosts and asking them to forward the invitation to their recent guests; sending invitation messages to travel bloggers who had recently used Airbnb; and including a referral link at the end of the survey.

Although the sampling approach was non-random, the combination of different sampling frames was meant to reduce the overall study sample bias. Also, both Facebook and MTurk, where most of the respondents were recruited, have been recognized as recommendable sampling frames that produce high-quality data on a level that is generally comparable to or better than many common alternatives (e.g., Buhrmester et al., 2011; Ramo and Prochaska, 2012). Moreover, as compared to the general population, many of the biases characterizing users of websites like Facebook, MTurk, and Reddit should be consistent with biases found among users of an online service like Airbnb.

3.2. Survey design and data analysis

The survey items were mostly Likert scale and multiple choice. The questions focused primarily on a respondent's most recent Airbnb stay in order to minimize confusion and recall issues. A pretest was conducted with several recent Airbnb guests who were members of the principal researcher's social circle.

To gauge Airbnb's impact on hotel nights, one survey item asked the most likely form of accommodation that would have been used if Airbnb and other similar services did not exist. The "other similar services" phrase was included to avoid respondents simply indicating comparable peer-to-peer short-term rental services. This straightforward approach to gauging substitution has been used previously in studies on car-sharing (e.g., Martin et al., 2010).

Pearson's chi-square tests (i.e., goodness-of-fit) were used to compare substitution preferences of different groups, and standardized residuals were used to identify significant group differences (Field, 2013). Also, a question was included on how the choice to use Airbnb affected trip duration, which assessed Airbnb's impact on destination visitor nights and offered insight into Airbnb's combination of these two categories in its economic impact reports.

To better understand how Airbnb is perceived as comparing to hotels, the survey assessed performance expectations of Airbnb, along with a hypothetical nearby budget hotel/motel, mid-range hotel, and upscale hotel, along various attributes. The three hotel classes were compared with Airbnb independently because disruption occurs relative to another product (Christensen, 2006), and different hotel classes represent fairly discrete products. This measure was developed uniquely for this study, but the attributes considered (e.g., cleanliness, comfort, and security) were largely drawn from the hotel choice literature (e.g., Chu and Choi, 2000; Dolnicar and Otter, 2003). However, three items were included relating to Airbnb's supposed unique value proposition – two experiential items related to authenticity and uniqueness, and a third item related to price. Some potentially important attributes, including amenities, staff/host friendliness, and staff/host helpfulness were not included because they would be judged differently for Airbnb and hotels (e.g., some consumers may prefer typical Airbnb amenities like washing machines whereas others may prefer typical hotel amenities like pools). All of these assessments were measured with a six-point Likert scale ranging from "Exceptionally poor" to "Exceptionally good" (except for price, which was measured with a scale ranging from "Very low" to "Very high"). These assessments were intended to explore consumers' perceptions of Airbnb, not to represent objective performance measures, as it is such perceptions that ultimately determine consumers' decisions. The comparative performance expectations of Airbnb and the different hotel classes were analyzed with paired-samples *t*-tests.

An assessment of the applicability of the disruptive innovation concept was based on both the substitution analysis and the performance expectations analysis. Firstly, because the process of disruption is inherently one of substitution, Airbnb's use as a substitute for a given hotel class provided an indication of whether the process was occurring. Secondly, because disruptive innovations underperform along traditional attributes but introduce a new value proposition, Airbnb's performance expectations relative to hotels indicated its consistency with the notion of disruptive innovation. This analysis seems to represent the first attempt at assessing a product's status as a disruptive innovation using consumers' behaviour and product attribute performance evaluations, rather than market research analysis and/or input from industry members or experts.

4. Results

4.1. Sample profile

A total of 923 surveys were received. Data screening eliminated numerous surveys due to issues such as incompleteness, carelessness, and incorrect answers to the verifiable MTurk questions. The final sample consisted of 844 respondents. Of these, 72.4% were from the Canadian travel-themed Facebook groups, 16.4% were from MTurk, 10.3% were from other sampling frames (e.g., Reddit and referrals), and 0.9% were of unspecified origin.

With regards to sample demographics, 67.8% of the respondents were female, 81.9% were between the ages of 21 and 40, 92.8% had at least a university or college degree, and 77.8% perceived their household financial status as at least "just above average" in their home country. Owing to the sampling frames from which most

Table 1

Most likely accommodation choice if Airbnb and other similar services did not exist (N = 842).

	%	n
Would not have taken trip	2.3	19
Friends or family	3.4	29
CouchSurfing	0.8	7
Hostel	16.6	140
Bed-and-breakfast	9.9	83
Budget hotel/motel	17.5	147
Mid-range hotel	43.1	363
Upscale hotel	4.3	36
Other	2.1	18

respondents were recruited, 74.3% of the respondents resided in Canada and 23.0% resided in the U.S. For their most recent Airbnb stay, 80.3% had been travelling for leisure, 59.7% were on an international trip, 18.1% perceived themselves as “backpackers,” 70.3% were staying in an entire home (rather than sharing a residence with the host), 62.5% were staying for between two and four nights, 75.5% were staying with between one and three other accompanying guests, and 57.6% were staying with a spouse or partner. Finally, 55.8% had used Airbnb no more than three times, 57.7% had first used Airbnb in 2014 or 2015 (data collection occurred between July and October 2015), and 9.9% had experience as Airbnb hosts.

To assess the representativeness of the sample, various sample characteristics were compared with characteristics of Airbnb's guest population that could be gleaned from Airbnb's various economic impact reports, and a report on its guests during the summer of 2015 (Airbnb, 2015). Airbnb stated in its summer 2015 report that 54% of its guests were female (Airbnb, 2015), in comparison with 67.8% of the present study's respondents. In the same report, Airbnb claimed that its average guest age is 35 (Airbnb, 2015), and estimating the mean age of the present study's respondents using the midpoint of each age group (e.g., 35 for “31–40”) resulted in a mean age of 33. Airbnb economic impact reports suggest that about 86% of its visitors are travelling for leisure, in comparison with 80.3% for the present study. Airbnb economic impact reports and claims to the media (Lu, 2015) both indicate that guests' average length of stay is 4.5 nights, and the average length of stay for respondents in the present study was 4.54 nights.

4.2. Hotel substitution

As can be observed in Table 1, when asked what type of accommodation respondents would have used if Airbnb and other similar services did not exist, nearly two-thirds (64.8%) indicated they used Airbnb as a substitute for a hotel. Of these, the vast majority indicated they would have stayed in a mid-range hotel, whereas upscale hotels were the least commonly indicated. Only 2.3% indicated they used Airbnb to take a trip they would not have otherwise taken. Also, when asked how the choice to use Airbnb impacted the number of nights the respondents spent in their destination, 72.7% indicated it had no impact, 26.5% indicated that choosing Airbnb led them to spend more nights, and 0.8% indicated that choosing Airbnb led them to spend fewer nights.

Chi-square tests were conducted to compare substitution behaviour amongst different groups, the results of which can be observed in Table 2. Significant differences were found by age group, but were mostly driven by younger respondents being more likely to use Airbnb as a substitute for hostels and older respondents being more likely to use Airbnb as a substitute for bed-and-breakfasts. Significant differences also were found between groups of different financial status, with a clear pattern demonstrating those of less wealth were more inclined to use Airbnb as a substitute for unpaid accommodation and hostels, whereas those

with more wealth were more inclined to use Airbnb as a substitute for bed-and-breakfasts, mid-range hotels, and upscale hotels. Somewhat similarly, significant differences were found between those who did and did not perceive themselves as backpackers, with backpackers nearly five times more likely to have used Airbnb as a substitute for a hostel, and also somewhat more likely to have used it as a substitute for a budget hotel/motel.

Significant differences also were found between respondents who had used different types of Airbnb accommodation, with those who had stayed in shared accommodation significantly more likely to have used Airbnb in place of a hostel, and those who had stayed in an entire home much more likely to have used Airbnb in place of a mid-range or upscale hotel. No significant differences were found when looking at respondents with different lengths of stay in their Airbnb accommodations. Nonetheless, significant differences were found between respondents who were and were not travelling with children. Those with children were significantly more likely to have used Airbnb as a mid-range hotel substitute and significantly less likely to have used it as a hostel substitute. Results also were slightly statistically significant when comparing respondents who had used Airbnb different numbers of times. There was no obvious pattern in the results, although it appeared that guests with less experience were somewhat less likely to use Airbnb as a hostel substitute and more likely to use it as a mid-range hotel substitute. Finally, no significant differences were found when comparing respondents based on the year they first used Airbnb.

4.3. Comparative performance expectations of Airbnb and hotels

Tables 3, 4, and 5 present respondents' performance expectations for Airbnb and hypothetical nearby hotels of different classes. T-tests found nearly every comparison between Airbnb and budget hotels/motels to be significant (Table 3), with Airbnb expected to outperform budget hotels/motels for all but one attribute ('ease of checking in/out'), including the supposed strengths of hotels/motels. Significant differences also were found between the performance expectations of Airbnb and mid-range hotels for every attribute (Table 4). Respondents expected Airbnb to significantly outperform mid-range hotels with regards to Airbnb's supposed strengths ('authenticity,' 'uniqueness,' and 'price') and several supposed hotel strengths ('cleanliness,' 'comfort,' and 'confidence that the overall quality would meet expectations'). On the other hand, respondents expected Airbnb to underperform mid-range hotels with regards to 'ease of placing a reservation,' 'ease of checking in/out,' 'ease of resolving unexpected problems,' and 'security.' Finally, when comparing the expected performance of Airbnb with upscale hotels, t-tests again found highly significant differences for every attribute measured (Table 5). Respondents expected Airbnb to underperform upscale hotels with regards to all of the supposed hotel strengths, and to outperform upscale hotels with regards to all of the supposed Airbnb strengths.

5. Discussion

This study offers important insight into how Airbnb guests perceive the service relative to hotels, and the extent to which they use it as a hotel substitute. In doing so, the study also empirically assesses the common characterization of Airbnb as a disruptive innovation. Even though this research used a non-probability sample, numerous parallels were found between the study sample and Airbnb's guest population, which gives confidence to the representativeness of the sample, and therefore the generalizability of the findings.

Table 2

Different groups' use of Airbnb as a substitute for different forms of accommodation.

Variable	No paid accomm	Hostel	B&B	Budget hotel/motel	Mid-range hotel	Upscale hotel	df	χ^2	p
Age (N = 817)									
≤30	7.4	23.0 ^{**}	6.7 [*]	18.6	41.8	2.5	10	49.514	<0.001
31–40	5.0	11.7 [*]	12.1	14.6	48.8	7.9 ^{**}			
≥41	7.0	7.7 ^{**}	16.9 [*]	21.8	43.0	3.5			
Household financial status relative to home country (N = 761)									
Below avg	10.1	24.4 [*]	6.5	19.6	36.3	3.0	10	23.022	0.011
Just above avg	6.5	17.2	10.4	18.3	44.2	3.4			
Above/Well above avg	5.0	12.2	11.3	16.8	47.9	6.7			
Backpacking (N = 817)									
No	7.0	10.3 ^{***}	11.2	16.8	49.9 [*]	4.8	5	134.69	<0.001
Yes	5.4	47.0 ^{***}	4.7 [*]	22.8	17.4 ^{***}	2.7			
Airbnb accommodation type (N = 815)									
Entire place	6.7	13.2 [*]	8.4	15.8	50.5 [*]	5.4	5	48.684	<0.001
Shared	6.9	26.1 ^{***}	13.5	22.4	29.4 ^{***}	1.6 [*]			
Trip duration (N = 812)									
1 night	3.9	17.1	17.1	21.1	39.5	1.3	20	24.560	0.219
2 nights	8.2	16.5	12.1	18.1	42.3	2.7			
3 nights	6.8	19.8	6.8	13.5	49.5	3.6			
4–5 nights	6.4	14.6	9.6	21.5	43.4	4.6			
≥6 nights	7.0	16.8	8.4	16.8	42.7	8.4			
Travelling with children (N = 824)									
No	6.8	18.7	9.9	18.4	42.1	4.1	5	19.592	0.001
Yes	5.6	3.3 ^{**}	11.1	13.3	60.0 [*]	6.7			
Total times used Airbnb (N = 811)									
1 time	7.9	13.0	7.3	16.9	50.8	4.0	15	25.505	0.044
2–3 times	7.6	14.1	10.1	17.7	46.9	3.6			
4–5 times	7.5	23.9 [*]	8.8	14.5	39.0	6.3			
≥6 times	3.0	19.2	13.1	21.7	38.9	4.0			
Year first used Airbnb (N = 810)									
2008–2012	7.4	12.1	11.1	17.4	47.4	4.7	15	13.018	0.601
2013	7.1	22.1	10.4	13.6	40.3	6.5			
2014	6.3	18.8	9.0	20.3	42.6	3.1			
2015	5.7	16.7	10.0	17.1	46.7	3.8			

Notes: The "No paid accomm" category includes respondents who indicated they would not have otherwise taken the trip, would have stayed with friends or family, or would have used CouchSurfing. The "Below avg" household financial status group includes respondents who indicated "Well below average," "Below average," or "Just below average." Asterisks signify cells that are significantly different from their expected values, as per their standardized residuals.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

5.1. Airbnb as a hotel substitute

This study found that Airbnb is used almost exclusively as a substitute for existing accommodations, and primarily for hotels. Only a tiny percentage of the respondents indicated that Airbnb allowed them to take a trip they would not have otherwise taken, or that they would have otherwise not used paid accommodation. In contrast, nearly two-thirds indicated they used Airbnb as a hotel substitute, with most indicating they used it as a mid-range hotel substitute, another sizeable portion indicating they used it as a budget hotel/motel substitute, and a small percentage indicating they used it as an upscale hotel substitute. These results are fairly consistent with supply-side research conducted by Zervas et al. (2015), who also found Airbnb's impact to be greater on lower-end hotels. The present study's demand-side analysis offers a valuable complement to such research because hotel performance is influenced by many confounding variables that complicate supply-side analyses. Moreover, demand-side analysis is preferable for estimating Airbnb's future impacts as it continues growing. The only other demand-side look at Airbnb substitution comes from Nowak et al. (2015), who similarly found Airbnb guests use the service as a substitute for hotels more than any other accommodation type. Also, the present study appears to be the first to examine substitution by different types of Airbnb guests. It was found that Airbnb guests

who were wealthier, non-backpackers, staying in entire homes, or travelling with children were more likely to use Airbnb as a substitute for mid-range and/or upscale hotels.

From a hotel perspective, the substitution question is critically important. Airbnb initially positioned itself as a hotel alternative (Airbnb, 2016c), but nowadays insists that it complements rather than competes with hotels. For example, an Airbnb co-founder and its Chief Technology Officer stated, "No hotels have gone out of business because of Airbnb . . . Airbnb is not a perfect substitute for a hotel. We excel at different things" (Dingman, 2015). This study's findings question such claims, but Airbnb's messaging is understandable. Even though Airbnb's common role as a hotel substitute reflects well on the service and could be touted in advertising, the more hotels fail to perceive Airbnb as a threat, the more complacent they will be in responding. Additionally, Airbnb's position on this topic is presumably related to its widespread regulatory battles, as policymakers will be much more amenable to Airbnb if it is not simply cannibalizing guests from existing accommodations.

To date, the reaction from the hotel sector to Airbnb has been mixed. Some hoteliers have voiced concerns over Airbnb (e.g., Bryan, 2015), and various hotel associations have advocated stricter regulatory oversight and enforcement (O'Neill, 2014). Nevertheless, many hoteliers have expressed skepticism regarding Airbnb's impacts (e.g., DePillis, 2016). For example, Doubletree's Global

Table 3

Airbnb performance expectations in comparison with budget hotels/motels.

Attribute	Accommodation	M	SD	df	t	p	N
Supposed strengths of hotels/motels (1 = "Exceptionally poor", 6 = "Exceptionally good")							
Cleanliness	Airbnb	4.94	0.84	830	35.00	<0.001	831
	Budget hotel/motel	3.36	1.06				
Comfort							
	Airbnb	4.81	0.88	821	35.34	<0.001	822
	Budget hotel/motel	3.17	1.05				
Confidence quality would meet expectations							
	Airbnb	4.61	1.02	822	26.41	<0.001	823
	Budget hotel/motel	3.15	1.29				
Ease of placing reservation							
	Airbnb	4.93	1.08	822	3.44	0.001	823
	Budget hotel/motel	4.75	1.20				
Ease of checking in/out							
	Airbnb	4.68	1.21	823	0.40	0.690	824
	Budget hotel/motel	4.70	1.17				
Ease of resolving unexpected problems							
	Airbnb	4.02	1.31	814	6.71	<0.001	815
	Budget hotel/motel	3.61	1.33				
Security							
	Airbnb	4.27	1.15	818	17.37	<0.001	819
	Budget hotel/motel	3.31	1.30				
Supposed strengths of Airbnb (1 = "Exceptionally poor", 6 = "Exceptionally good")							
Local authenticity of the experience	Airbnb	5.49	0.77	815	55.03	<0.001	816
	Budget hotel/motel	2.68	1.19				
Uniqueness (non-standardization) of the experience	Airbnb	5.47	0.81	820	63.13	<0.001	821
	Budget hotel/motel	2.21	1.19				
Price (1 = "Very low", 6 = "Very high")	Airbnb	2.78	0.90	820	11.23	<0.001	821
	Budget hotel/motel	3.31	0.99				

Notes: Respondents were asked to rate the performance they expected when booking their most recent Airbnb stay, plus the performance they would have expected in hypothetical nearby hotels of different classes. Price was measured by asking respondents to characterize the price of their Airbnb rental and hypothetical nearby hotels of different classes, relative to all tourism accommodations in the destination.

Table 4

Airbnb performance expectations in comparison with mid-range hotels.

Attribute	Accommodation	M	SD	df	t	p	N
Supposed strengths of hotels (1 = "Exceptionally poor", 6 = "Exceptionally good")							
Cleanliness	Airbnb	4.94	0.84	831	8.21	<0.001	832
	Mid-range hotel	4.61	0.88				
Comfort							
	Airbnb	4.81	0.89	825	10.54	<0.001	826
	Mid-range hotel	4.32	0.98				
Confidence quality would meet expectations							
	Airbnb	4.60	1.02	822	8.80	<0.001	823
	Mid-range hotel	4.15	1.12				
Ease of placing reservation							
	Airbnb	4.93	1.08	824	2.97	<0.001	825
	Mid-range hotel	5.07	0.99				
Ease of checking in/out							
	Airbnb	4.68	1.21	827	6.87	<0.001	828
	Mid-range hotel	5.06	1.00				
Ease of resolving unexpected problems							
	Airbnb	4.01	1.32	814	10.22	<0.001	815
	Mid-range hotel	4.60	1.08				
Security							
	Airbnb	4.27	1.15	819	3.91	<0.001	820
	Mid-range hotel	4.48	1.10				
Supposed strengths of Airbnb (1 = "Exceptionally poor", 6 = "Exceptionally good")							
Local authenticity of the experience	Airbnb	5.48	0.78	824	46.02	<0.001	825
	Mid-range hotel	3.06	1.22				
Uniqueness (non-standardization) of the experience	Airbnb	5.47	0.80	824	52.03	<0.001	825
	Mid-range hotel	2.62	1.29				
Price (1 = "Very low", 6 = "Very high")	Airbnb	2.78	0.91	828	29.30	<0.001	829
	Mid-range hotel	4.21	1.07				

Notes: Respondents were asked to rate the performance they expected when booking their most recent Airbnb stay, plus the performance they would have expected in hypothetical nearby hotels of different classes. Price was measured by asking respondents to characterize the price of their Airbnb rental and hypothetical nearby hotels of different classes, relative to all tourism accommodations in the destination.

Head stated, "We haven't seen any effect of [Airbnb] on our business. The research we've done shows it as a different kind of traveller typically for a different trip purpose" (Vivion, 2014). This attitude, at least within the upscale market, is understandable given Airbnb's current limited impact on upscale hotels and its struggle to attract many business travellers. Nonetheless, consistent with the process of disruptive innovation, this attitude highlights how incumbent firms overlook an encroaching threat from below by focusing on their immediate ability to retain their highest value customers (Christensen, 1997). Although there are limits to the degree hotels will be overtaken by Airbnb, the process of disruptive innovation suggests upscale hoteliers should not be content

that Airbnb's impacts have so far been mostly limited to budget and mid-range hotels, but should rather view these impacts as a possible harbinger for the future.

From a destination perspective, Airbnb's role as a substitute for existing accommodations means it may reduce visitors' overall expenditure in a destination (assuming they are saving money by using Airbnb). Moreover, Airbnb may have other negative consequences in a community, such as reducing housing stock and hurting the community fabric (Guttentag, 2015). Nevertheless, Airbnb guests may spend their economic savings from using Airbnb elsewhere in a destination, plus Airbnb may provide a destination with additional benefits, such as reducing economic leakages,

Table 5

Airbnb performance expectations in comparison with upscale hotels.

Attribute	Accommodation	M	SD	df	t	p	N
Supposed strengths of hotels (1 = "Exceptionally poor", 6 = "Exceptionally good")							
Cleanliness	Airbnb	4.94	0.84	828	22.85	<0.001	829
	Upscale hotel	5.76	0.62				
Comfort	Airbnb	4.81	0.89	822	18.70	<0.001	823
	Upscale hotel	5.60	0.77				
Confidence quality would meet expectations	Airbnb	4.60	1.03	820	14.44	<0.001	821
	Upscale hotel	5.28	0.93				
Ease of placing reservation	Airbnb	4.92	1.08	818	9.46	<0.001	819
	Upscale hotel	5.37	0.94				
Ease of checking in/out	Airbnb	4.68	1.21	823	13.01	<0.001	824
	Upscale hotel	5.39	0.93				
Ease of resolving unexpected problems	Airbnb	4.00	1.31	806	27.72	<0.001	807
	Upscale hotel	5.53	0.81				
Security	Airbnb	4.27	1.16	817	25.30	<0.001	818
	Upscale hotel	5.48	0.78				
Supposed strengths of Airbnb (1 = "Exceptionally poor", 6 = "Exceptionally good")							
Local authenticity of the experience	Airbnb	5.48	0.78	816	34.39	<0.001	817
	Upscale hotel	3.39	1.45				
Uniqueness (non-standardization) of the experience	Airbnb	5.47	0.81	818	30.73	<0.001	819
	Upscale hotel	3.55	1.54				
Price (1 = "Very low", 6 = "Very high")	Airbnb	2.78	0.91	830	40.62	<0.001	831
	Upscale hotel	5.21	1.47				

Notes: Respondents were asked to rate the performance they expected when booking their most recent Airbnb stay, plus the performance they would have expected in hypothetical nearby hotels of different classes. Price was measured by asking respondents to characterize the price of their Airbnb rental and hypothetical nearby hotels of different classes, relative to all tourism accommodations in the destination.

dispersing expenditure throughout residential areas, and engaging residents in the tourism sector. Indeed, this study found that a significant percentage of Airbnb guests increase their trip length because of Airbnb, which is consistent with research on peer-to-peer short-term rentals by [Tussyadiah and Pesonen \(2015\)](#). This noteworthy impact demonstrates Airbnb's ability to benefit local tourism economies and many of their myriad stakeholders (attractions, restaurants, transportation providers, etc.). However, the sizeable percentage of respondents who increased their length of stay due to Airbnb, combined with the much smaller percentage who indicated Airbnb allowed them to take a trip they would not have otherwise taken, raises questions regarding Airbnb's combination of these two groups in its economic impact reports. These findings suggest Airbnb may be combining these groups to obfuscate its data and avoid acknowledging the service's incapacity to stimulate significant additional visitation.

5.2. Performance expectations of Airbnb and hotels

This study examined Airbnb's performance expectations relative to hotels, thereby demonstrating how Airbnb is viewed within the broader tourism accommodation landscape, and highlighting some of Airbnb's potential weaknesses, instead of merely the strengths that have been the focus of Airbnb motivation research. When considering key hotel attributes (e.g., cleanliness and security), it was found that Airbnb significantly outperformed budget hotels/motels, significantly underperformed upscale hotels, and was expected to have mixed outcomes versus mid-range hotels. When considering attributes central to Airbnb's unique value proposition (experiential attributes and low price), Airbnb was expected to significantly outperform all three hotel classes.

These findings reflect very positively on the perceived quality of Airbnb accommodations. Outperforming budget hotels/motels virtually across the board, and outperforming mid-range hotels for many key attributes, is a noteworthy accomplishment for (generally inexpensive) accommodations managed by ordinary people. Nonetheless, the results also highlight some areas where Airbnb could improve. Airbnb's perceived security was only moderately high, which is noteworthy because trust and safety concerns are

key barriers to Airbnb adoption ([Tussyadiah, 2015](#)). Additionally, the respondents were not especially confident in Airbnb's ability to resolve unexpected problems, which is important because tourists do not want their trips spoiled by accommodation problems. This issue speaks to the delicate balance Airbnb is looking to strike between being a simple matchmaking service and being directly involved in ensuring quality stays. The ease of placing a reservation is a third area where Airbnb could improve, which is noteworthy because [Tussyadiah \(2015\)](#) found "lack of efficacy" to be a key barrier to Airbnb use. The recently introduced "Instant booking" option helps mitigate this issue, but only a limited portion of hosts use this feature. Airbnb likely would benefit from advertising that demonstrates the simplicity of using Airbnb for the first time. Finally, the ease of checking in/out was the one attribute for which Airbnb failed to outperform any of the hotel classes. Airbnb could mitigate this issue by partnering with prevalent businesses like Starbucks and Subway, who could house key boxes that guests could visit with a security code provided by the host.

Looking forward, it seems that Airbnb and hotels will attempt to mimic the other's strengths, leading to increased convergence between them. Airbnb certainly wishes to maintain the authentic, personal touch characterizing its accommodations and brand, but the company also seemingly wishes to provide a more reliable, professionalized guest experience. This desire is signalled by developments like the hiring of a Head of Global Hospitality & Strategy and the introduction of "Instant booking" and "Superhosts." On the hotel side, numerous hotel companies are looking to provide more authentic local character (e.g., [Oates, 2016b](#)), and several hotel companies also are launching brands featuring inexpensive rooms and inviting public areas for interaction (e.g., [Oates, 2016a](#)). The potential for such developments is that they perform better than traditional properties with regards to characteristics of Airbnb's value proposition, while also outperforming Airbnb along traditional hotel attributes like security.

5.3. Airbnb versus hotels: a disruptive innovation?

Disruptive innovations are adopted by mainstream consumers as substitutes for existing products and are partly defined by their

underperformance along existing products' key attributes, combined with their unique value proposition. This study's findings suggest Airbnb is not truly a disruptive innovation relative to budget hotels/motels, even though it is commonly used as a budget hotel/motel substitute, because Airbnb users perceive it as a superior product, even when considering budget hotels/motels' key performance attributes. On the other hand, respondents' expectations that Airbnb would underperform upscale hotels with regards to traditional hotel attributes, and outperform upscale hotels with regards to Airbnb's unique value proposition, perfectly represents the quintessential performance characteristics of a disruptive innovation. Airbnb's role as a substitute for upscale hotels, however, appears fairly limited, which suggests Airbnb is best considered as a disruptive threat to upscale hotels, rather than a current disruptor.

Airbnb was most commonly used as a substitute for mid-range hotels, but its varied performance expectations in comparison with mid-range hotels suggest some parallels with the disruptive innovation framework, without being fully consistent with the concept. There is no known precedent for determining the number or percentage of key attributes for which a disruptive innovation should underperform. [Bower and Christensen \(1995\)](#) claimed disruptive innovations "often perform far worse along one or two dimensions that are particularly important" (p. 45), and in this case Airbnb was expected to perform significantly worse than mid-range hotels along several important dimensions, including security. Nevertheless, cleanliness, comfort, and quality assurance are all especially important hotel attributes ([Chu and Choi, 2000; Dolnicar and Otter, 2003](#)), so Airbnb's expected ability to outperform mid-range hotels along these attributes signifies it does not perfectly represent a disruptive innovation relative to mid-range hotels.

This analysis highlights some key questions and issues regarding the nature of disruptive innovations. The findings underscore the notion that innovations are not intrinsically disruptive, but only relative to another product ([Christensen, 2006](#)). Additionally, the findings highlight the common misapplication of the concept to over-performing products. In fact, [Govindarajan and Kopalle \(2006\)](#) advocated recognizing "high-end" disruptions, but [Christensen \(2006\)](#) justifiably opposed this suggestion by stating incumbents' failure to respond to high-end innovations does not result from the same organizational factors. The findings also demonstrate the value in using consumer attitudes in disruptive innovation research. Whereas prior assessments of disruptiveness have been based on market research analysis and/or input from industry members or experts, the consumer perspective is invaluable because it truly signals whether a product is viewed as underperforming. This study's findings likely would have been different if hotel guests were surveyed, and the perceptions of non-users are certainly meaningful, but it is the perceptions of users that provide the optimal assessment of perceived underperformance. Finally, this analysis demonstrates the challenge of establishing a binary disruptiveness test when products have myriad subjective attributes. There is no straightforward way to determine what attributes ought to be inferior, meaning the onus is on the researcher to make a judgement call, and it seems worthwhile to note gradations of consistency with the concept, rather than subscribing to a dichotomous classification.

6. Conclusion

Airbnb represents an innovative accommodation product that has shifted perceptions of hospitality throughout the hotel industry. While Airbnb remains a topic of significant attention within the sector, there is little understanding of the degree to which it is used as a hotel substitute, or how Airbnb guests view the service relative to hotels. This study offers important insight into these questions

by showing that many Airbnb guests use the service in place of a hotel, and especially mid-range hotels. Moreover, the study demonstrates that Airbnb guests tend to have fairly high expectations of the service, even when considering traditional hotel attributes. This study also shows that the concept of disruptive innovation is only somewhat applicable to discussions of Airbnb's competition with hotels.

There are various limitations to this research. The use of an online non-probability sample means sample biases could have impacted the results, owing to biases associated with the sampling frames that were used and the resultant Airbnb users who responded to the survey. Even though various parallels were detected between the overall sample and Airbnb's guest population, thereby giving confidence to the generalizability of the findings, there are still inherent limitations with a non-random sample. Also, nearly all of the respondents were North American. Additionally, respondents' performance expectations for Airbnb may have been influenced by their actual Airbnb experiences. Moreover, it should be noted that this analysis only examined two components of disruptive innovation – whether substitution was occurring and whether the innovation itself exhibited characteristics of a disruptive innovation – but did not assess the disruptive process comprehensively (e.g., the response from existing firms).

This research highlights various possible directions for future research. It would be beneficial to achieve a more complete understanding of the Airbnb choice process to better show why it is used as a substitute for hotels. For example, it is unclear if Airbnb guests tend to seriously investigate and consider hotel options before choosing Airbnb. Longitudinal research tracking Airbnb guests' substitution patterns over time also would prove quite useful, as it would indicate whether Airbnb is increasingly being used as a substitute for certain types of accommodation. Furthermore, it would be interesting to compare Airbnb guests' hotel performance expectations with that of hotel guests. It also would be useful to assess the Airbnb performance expectations of tourists who considered Airbnb but ultimately chose a different accommodation. Finally, this study introduced a new consumer-based strategy for helping to classify innovations as disruptive. This general approach can be applied to other apparent disruptive innovations in tourism and beyond.

Funding

This research was supported by the Social Sciences and Humanities Research Council of Canada.

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GEYSKENS, Inge; STEENKAMP, Jan-Benedict E. M.; SCHEER, Lisa K.; and KUMAR, Nirmalya. The effects of trust and interdependence on relationship commitment: A trans-Atlantic study. (1996). *International Journal of Research in Marketing*. 13, (4), 303-317. Research Collection Lee Kong Chian School Of Business.

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The effects of trust and interdependence on relationship commitment: A trans-Atlantic study

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Abstract

In recent years, interorganizational relationship management has become of paramount interest in marketing channels research. Marketing managers and researchers have identified mutual commitment among exchange partners in a marketing channel as central to successful relationship marketing and as key to producing significant benefits for firms. We consider two types of commitment that may characterize interfirm relationships. Affective commitment expresses the extent to which channel members *like* to maintain their relationship with specific partners. Calculative commitment measures the degree to which channel members experience the *need* to maintain a relationship. After conceptualizing commitment, we offer a set of hypotheses concerning the joint impact of trust and interdependence on both affective and calculative commitment. Testing our hypotheses in a field study involving two countries, we find strong evidence that total interdependence enhances both affective and calculative commitment. Which type of commitment develops depends on trust. The unexpected positive effect of interdependence asymmetry on affective commitment seems to be in line with a stream of research that has emphasized the positive role of power differences in promoting the effective coordination of channel relationships.

Keywords: Marketing channels; Commitment; Trust; Interdependence; Cross-national

1. Introduction

Relationship commitment has recently emerged in the marketing channels literature as a critically important element for channel survival (e.g., Anderson and Weitz, 1992; Morgan and Hunt, 1994) and per-

formance (Kumar et al., 1994; Noordewier et al., 1990). Channel member commitment connotes solidarity and cohesion (Dwyer et al., 1987), encouraging the channel partner firms to resist apparently attractive short-term alternatives in favor of the expected long-term benefits of staying with existing partners (Anderson et al., 1994; Morgan and Hunt, 1994).

The recognition that commitment is central to successful relationship marketing has triggered re-

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search on the factors that contribute to developing, maintaining and increasing commitment. Recent studies suggest that both structural elements of the channel relationship and channel firm attitudes can impact relationship commitment. We focus on one structural element, the channel interdependence structure, and one attitudinal factor, trust in one's channel partner, that have been identified as having an impact on commitment. Whereas considerable evidence indicates that trust positively affects commitment (Anderson and Weitz, 1989; Morgan and Hunt, 1994), the effects of channel firm interdependence on commitment are less clear, in part because different researchers have examined different aspects of channel firm dependence or interdependence.

In this paper, we argue that the effects of trust and interdependence on relationship commitment are more complex than revealed by previous findings. First, although recent social science research has found commitment to be a multi-faceted construct (e.g., Allen and Meyer, 1991; Mathieu and Zajac, 1990), channel studies have almost exclusively focused on a more affective kind of commitment, neglecting a second, more instrumental type of commitment, viz. calculative commitment. Recognition of this second type of commitment generates the possibility that trust and interdependence could have different impacts on affective commitment versus calculative commitment. Secondly, we propose that trust and interdependence will have an interactive effect on affective commitment. Finally, marketing theories frequently have been tested only in a single country, often the United States. It is not clear to what extent research findings and insights obtained in one particular country are applicable to other countries. As Cunningham and Green (1984), (p. 9) pointedly observe: "This is essentially a question of external validity and research should be encouraged to determine which marketing principles can be universally applied and which are basically ethnocentric". Therefore, we test the cross-national validity of our hypotheses with data from two countries, the United States and the Netherlands.

The structure of the paper is as follows. First, we discuss the construct of commitment, distinguishing between affective and calculative commitment. Next, we develop hypotheses about the impact of the channel interdependence structure and trust on commit-

ment. Then, we describe the research methodology and test our hypotheses on data collected from automobile dealers in the United States and the Netherlands. Finally, we discuss the limitations of our research and the implications of our findings.

2. The nature of commitment – affective commitment and calculative commitment

Commitment typically has been defined as a channel member's intention to continue the relationship (e.g., Anderson and Weitz, 1989; Dwyer et al., 1987). Organizational researchers have noted, however, that several different motivations can underlie this intention, and thus have identified various different types of commitment (Allen and Meyer, 1991). Of these, affective commitment and calculative commitment appear most frequently and also seem to be the most relevant for interorganizational relationships (Mathieu and Zajac, 1990). Both affective and calculative commitment are psychological states, i.e., relatively stable attitudes and beliefs about the relationship that arise, at least in part, out of interaction (Huston and Robins, 1982), but they clearly arise from different *motivations* for maintaining a relationship.

Past channel studies, however, have usually focused solely on affectively motivated commitment (e.g., Anderson and Weitz, 1992; Kumar et al., 1995a; Kumar et al., 1995b; Morgan and Hunt, 1994) where the underlying motive to maintain a channel relationship is a "generalized sense of positive regard for, and attachment to, the organization" (Konovsky and Cropanzano, 1991, p. 699). According to this view, an affectively committed channel member *desires* to continue its relationship because it likes the partner and enjoys the partnership (Buchanan, 1974). It experiences a sense of loyalty and belongingness (Jaros et al., 1993; Porter et al., 1974).

Calculative commitment, in contrast, is the extent to which channel members perceive the *need* to maintain a relationship given the significant anticipated termination or switching costs associated with leaving. It results from a 'cold' calculation of costs and benefits, including an assessment of the investments made in the relationship and the availability of

alternatives to replace or make up for the foregone investments (Allen and Meyer, 1991). As calculative commitment is based in the perceived structural constraints that bind the firm to its channel partner, it reflects a rather negative motivation for continuing the relationship.¹ Despite the attention paid to the construct of calculative commitment in industrial/organizational psychology and organizational behavior research (e.g., Mathieu and Zajac, 1990; McGee and Ford, 1987), it has been virtually ignored in the channels literature. Although Ganesan (1994) examines 'commitment', his operationalization is dominated by items reflecting the buyer's economic utility derived from a long relationship with its vendor. Buchanan (1992), on the other hand, does not empirically examine calculative commitment, but she suggests that a channel firm may have an incentive to make a commitment to the relationship because of the inherent value of its partner's resources. Only Kumar et al. (1994) in a working paper have explicitly distinguished between affective and calculative commitment in both theory and measures.

The organizational behavior literature has typically conceptualized affective commitment and calculative commitment as being independent; the extent to which one is affectively committed does not affect the degree of calculative commitment, and vice versa (e.g., Allen and Meyer, 1991; McGee and Ford, 1987). If this is true, the use of global commitment measures – which measure intention to continue a relationship without consideration of the underlying motivation – could confound or mask different, and possibly even opposite effects on affective commitment versus calculative commitment.

Furthermore, the use of the more general term 'commitment' to describe either of these two very different facets creates considerable confusion in the interpretation of commitment theories, models and empirical findings. As calculative and affective commitment are distinctly different in nature, interdependence structure and trust could have differential effects on these facets.

3. The effects of interdependence on affective and calculative commitment

Since marketing channels are defined as sets of interdependent organizations involved in the process of making a product or service available for use or consumption (Stern and El-Ansary, 1992), interdependence is a crucial concept in marketing channels research. Channels researchers have often derived their definitions of dependence from the Emerson (1962) conceptualization of power-dependence theory; each party's dependence on its partner is determined by (1) its motivational investment in the relationship, and (2) the replaceability of the partner. Motivational investment refers to the value of the resources or outcomes mediated by the other party. This aspect of dependence has often been operationalized via the 'sales and profits' approach (El-Ansary and Stern, 1972); the greater the sales and profits that the channel partner accounts for, the greater the channel member's dependence on its partner (e.g., Frazier et al., 1989; Frazier and Rody, 1991). The replaceability component of dependence refers to the difficulty of replacing one's channel partner because of switching costs or the lack of alternative partners (e.g., Buchanan, 1992); the more difficult it is to replace a partner, the greater is the channel member's dependence on that partner. Following Emerson's conceptualization, an assessment of a firm's dependence should encompass both motivational investment and replaceability.

In contrast to early research on channel dependence that focused on the effects of a firm's absolute dependence on its partner without reference to its partner's dependence, recent studies have incorporated both firms' dependence (e.g., Buchanan, 1992; Gundlach and Cadotte, 1994; Kumar et al., 1995b).

¹ Calculative commitment is an attitudinal phenomenon as it measures the degree to which a firm *experiences* a need to continue a channel relationship due to the high costs of leaving. As such, calculative commitment distinctly differs from dependence, which refers to the structure of the relationship. Whereas dependence measures structural elements that bind the firm to the partner, calculative commitment measures to what extent the firm's *motivation* to continue the relationship with that partner is based on these structural ties. Our data provide evidence that a firm's calculative commitment and its dependence on the channel partner are distinct constructs; correlations between these constructs were 0.338 (the Netherlands) and 0.263 (the United States).

Various researchers have recently argued that a comprehensive view of the channel interdependence structure must include both total interdependence and interdependence asymmetry (Gundlach and Cadotte, 1994; Kumar et al., 1995b). Total interdependence refers to the sum of each firm's dependence on its partner; this value is an assessment of what Emerson (1972) terms 'relational cohesion'. Interdependence asymmetry refers to the difference between the firm's dependence on its partner and the partner's dependence on the firm. Symmetric interdependence exists when the parties are equally dependent on each other.

The various elements of the channel interdependence structure can have diverse effects on the channel members' attitudes and behavior (Gundlach and Cadotte, 1994; Kumar et al., 1995b). We posit that total interdependence and interdependence asymmetry will have divergent effects on affective and calculative commitment.

3.1. Total interdependence

The Dwyer et al. (1987) model of relationship development highlights a process of gradual expansion of interdependence between buyer and seller. To arrive at a state of high interdependence, i.e., a state in which both buyer and seller dependence are high, partners must go through a number of relationship development phases in which they continually enlarge the investments they make in one another, in order to demonstrate and signal their good faith (Anderson and Weitz, 1992; Johanson and Mattson, 1985). If one of the channel members is not satisfied with the relationship, it will not have its own position 'weakened' by investing in the other partner. Therefore, all else being equal, increasing total interdependence demonstrates to a channel member that efforts to maintain the relationship are reciprocated by its partner (Anderson and Weitz, 1992), that partners adapt to fit each other better (Hallén et al., 1991), that the proportion of common to competitive interests increases (Kumar et al., 1995b), and that customer/seller loyalty is achieved (Dwyer et al., 1987). These converging interests lead us to propose that high total interdependence causes channel members to prefer their relationship to continue for affective reasons. Evidence for the effect of total interde-

pendence on affective commitment has been provided by Kumar et al. (1995b) for dependence conceptualized as replaceability. We seek to corroborate their findings for a broader conceptualization of dependence, encompassing both motivational investment and replaceability, and hypothesize:²

H1. Greater total interdependence leads to higher affective commitment for both channel firms.

Ties of total interdependence provide each party in the relationship with the opportunity to facilitate the other's goal attainment. More highly interdependent firms have more to lose if the partnership ends, as they have made a lot of idiosyncratic investments in the relationship (Dwyer et al., 1987). Hence, it would be contrary to the self-interest of those channel members to end their relationship, as they have much to lose. We expect, therefore, that when total interdependence increases, each firm's necessity to continue the relationship will increase too, because firms have created mutual exit barriers (Anderson and Weitz, 1992). Therefore:

H2. Greater total interdependence leads to higher calculative commitment for both channel firms.

3.2. Interdependence asymmetry

Recently, the consequences of interdependence asymmetry have become a major theme of research in the marketing channels literature (e.g., Anderson and Weitz, 1989; Kumar et al., 1995b). These researchers have consistently argued that channel relationships with more asymmetric interdependence are more dysfunctional because of the exploitation opportunities that result from the imbalance. Essentially the same rationale explains the negative effect of interdependence asymmetry on affective commitment. Greater interdependence asymmetry is likely to reduce each firm's affective commitment, because the disparity in their dependence will tend to put their interests in conflict. A deeper understanding of

² All stated hypotheses are based on the assumption of 'all else being equal'.

this negative relationship requires distinguishing between the more and the less dependent channel member.

For the less dependent partner, having relative power over its weaker partner makes it likely this power will be used to achieve the partner's cooperation and to obtain valuable outcomes. The stronger firm has little structural motivation to identify with or become attached to the weaker partner (Kumar et al., 1995b; Robicheaux and El-Ansary, 1975). For the more dependent party, its fear of exploitation reduces its satisfaction with the relationship (Anderson and Narus, 1984) and consequently also its motivation to continue the relationship for affective reasons (Anderson and Weitz, 1989). In line with these studies, we hypothesize:

H3. Greater interdependence asymmetry decreases affective commitment for both channel firms.

For calculative commitment, the picture is different. Calculative commitment is based on an economic rationale; a firm is motivated to stay with its partner because it needs to from an economic point of view. For the less dependent channel member, as interdependence asymmetry increases, its power advantage over its partner increases. The less dependent firm thus has lower need to continue the relationship, although it may well intend to do so because of its ability to achieve its goals through its dominance over the partner. Thus the less dependent firm's calculative commitment will be reduced as the interdependence asymmetry increases.

On the other hand, the more dependent firm's calculative commitment is expected to increase as the interdependence asymmetry increases. As its relative dependence on the more powerful partner becomes greater, the less dependent firm is in an increasingly vulnerable position. Hence, we expect that the weaker firm will be motivated to continue the relationship because it is the *necessary* thing to do, given the high perceived switching costs. We thus propose a positive relationship between interdependence asymmetry and calculative commitment for the more dependent firm and hypothesize:

H4. Greater interdependence asymmetry increases calculative commitment for the more dependent

channel partner, but decreases calculative commitment for the less dependent firm.

4. The effects of trust on affective and calculative commitment

The centrality of trust in developing long-term relationships has been emphasized repeatedly in the marketing channels literature (e.g., Anderson and Weitz, 1989; Dwyer et al., 1987; Morgan and Hunt, 1994). In social psychology, a consensus seems to be emerging that trust encompasses two essential elements – trust in the partner's honesty and trust in the partner's benevolence (e.g., Larzelere and Huston, 1980; Rempel et al., 1985). Each of these dimensions has been examined at times by channels researchers. Honesty refers to the belief that one's partner stands by its word, fulfills promised role obligations, and is sincere (Morgan and Hunt, 1994; Scheer and Stern, 1992); benevolence reflects the belief that one's partner is interested in the firm's welfare and will not take unexpected actions which will negatively impact the firm (Anderson and Narus, 1990; Anderson and Weitz, 1989). Trust, therefore, exists to the extent that the channel member believes its partner to be honest and benevolent.

In examining the effects of trust on commitment, we extend previous research by (1) exploring the differential effects of trust on affective and calculative commitment, and (2) considering how the effects of dependence asymmetry on commitment are moderated by trust.

4.1. The main effects of trust

Trust, as well as the process of interfirm adaptations and interorganizational learning by which trust is built, are so highly valued in interfirm relationships that parties will strongly desire to continue these relationships (Granovetter, 1985; Hallén et al., 1991). Empirical support for the positive main effect of trust on affective commitment has been provided in marketing channels by Anderson and Weitz (1989) and Morgan and Hunt (1994). Although these studies both refer to global 'commitment', their operationalizations reflect primarily affective commitment. Consistent with these studies, we hypothesize that the higher a firm's trust in its partner, the higher its

motivation to continue the relationship for affective reasons:

H5. Higher trust increases affective commitment for both channel partners.

Trust reflects a firm's confidence, positive expectations and attributions that its partner is honest and responsive to the firm's needs (Rempel et al., 1985). Holmes and Rempel (1989) report that high-trust parties maintained positive feelings toward their partners by discounting negative elements in ways that confirmed their positive trusting attitudes. Trusting individuals did not naively ignore negative elements in relationship issues, but they made fewer negative attributions.

The tenor of a distrusting relationship is quite different. When trust is low, firms are more likely to carefully scrutinize and monitor the other partner's behavior, to guard against the partner's opportunism, and to incur various costs of such vigilance. When trust is low, therefore, decisions as to whether to maintain the relationship are more likely to be based on a calculation of immediate benefits versus costs. A channel member who intends to continue the relationship is more likely to be motivated to do so because it *cannot* easily replace its current partner and obtain the same resources and outcomes outside its current relationship. We therefore posit that as a firm's trust in its partner decreases, it is more likely to perceive that it needs to continue the relationship rather than that it wants to maintain the relationship. We hypothesize:

H6. Higher trust decreases calculative commitment for both channel partners.

4.2. Interactive effect of trust and interdependence asymmetry on affective commitment

In the channels literature, the potential exploitation of the more dependent partner by the less dependent partner has consistently been advanced as the primary reason for the anticipated negative effects of interdependence asymmetry on affective commitment. When faced with an asymmetric relationship, negative feelings toward the partner are likely to prevail and, consequently, affective commitment de-

creases (Anderson and Weitz, 1989; Anderson and Narus, 1990; Kumar et al., 1995b).

We agree that exploitation, when it occurs, has a devastating effect on affective commitment. However, we do not concur with the implicit assumption that exploitation is an inherent human characteristic, surfacing whenever it is unchecked by governance modes. A state of high interdependence asymmetry certainly creates the potential for exploitation, as the less dependent partner faces *temptation* to exploit its power advantage while the relatively dependent partner endures the *fear* of being exploited. But interdependence asymmetry does not, in and of itself, inevitably result in the realization of exploitation. We submit that trust can impede such exploitation and consequently moderate the negative effect of interdependence asymmetry on affective commitment.

The relatively powerful (less dependent) channel member could use coercive, negative types of power to achieve immediate compliance or, alternatively, could exercise more positive, constructive types of influence to build and deepen the relationship with the objective of greater long term cooperation. When the relatively powerful firm refrains from exploiting its structural power advantage, the relatively dependent channel member may interpret this as a signal that its dominant partner intends to work together to promote joint goals over the long run (Anderson and Weitz, 1989; Molm, 1981). By disdaining negative power use in favor of more constructive power use, the more powerful firm can both convey its trust in the weaker partner and also attempt to build the partner's trust in the firm.

When the relatively dependent firm trusts in the dominant partner's honesty and benevolence (Larzelere and Huston, 1980; Rempel et al., 1985), it attributes cooperative and sincere intentions to its partner. Consequently, its fear of exploitation and the resulting feelings of uncertainty are reduced. The weak channel member is most likely to trust the relatively powerful partner when it perceives that the dominant partner uses its power constructively to promote joint interests and collective goals (Dwyer et al., 1987) and to improve channel performance and satisfaction for both partners (Robicheaux and El-Ansary, 1975). When a relatively powerful firm can trust its weaker partner's honesty and cooperative intentions, it has ample reason to forsake the

opportunity to exploit this weaker partner (Molm, 1981). Trust results in lower conflict and higher satisfaction (Anderson and Narus, 1990), better personal relations (Håkansson and Johanson, 1988), and a beneficial reputation (Granovetter, 1985), as compared to the use of coercive and exploitative practices to achieve desired outcomes.

Consequently, for both the less dependent firm and the more dependent firm, higher trust will reduce the negative impact of interdependence asymmetry on affective commitment. We therefore propose an interaction effect between trust and dependence asymmetry.

H7. For both channel partners, the negative effects of interdependence asymmetry on affective commitment are mitigated by trust.

5. Method

5.1. Sample and data collection procedure

As firms grow increasingly international in character, the need to establish cross-cultural validity of theoretical models of marketing channel relationships becomes more germane (Cunningham and Green, 1984; Frazier et al., 1989). We collected data from two different countries, namely the United States and the Netherlands. We concentrated on dealers' commitment to their supplier and the role of their perceptions of interdependence structure and trust in shaping this commitment. The samples were drawn from lists of automobile dealers that were purchased from commercial sources in the two countries.

In the United States the list of 2100 new car dealers was reduced by deleting duplicate listings and those dealers for whom no contact name was available. Surveys with personalized cover letters were mailed to 1640 automobile dealers with follow-up letters to nonrespondents four weeks later. Questionnaires were received from 453 automobile dealers, a response rate of 28%. After elimination of questionnaires from which excessive amounts of data were missing, the final U.S. sample consisted of 417 dealers.

In the Netherlands, the questionnaire was mailed to a random sample of 1600 dealers drawn from a

list 4000 new car dealers representing the entire country. As no contact name was available for these dealers, cover letters were not personalized. Furthermore, because of resource limitations, no follow-up letters to nonrespondents were mailed. These factors lowered our response to 19% with 309 questionnaires returned. After elimination of questionnaires from which excessive amounts of data were missing, the final Dutch sample consisted of 289 dealers. Our response rates of 28 and 19 percent are within the range typically reported for channel studies. Using the Armstrong and Overton (1977) procedure, no significant differences ($p > 0.10$) were found between early and late respondents on any of our constructs, nor on other variables such as the number of makes of new cars carried by the dealer. Thus, nonresponse bias appears not to be a problem.

Dealers in both countries were asked to report on the automobile supplier (usually the manufacturer for the U.S. dealers and an automobile importer for the Dutch dealers) whose product line accounted for the largest share of their firm's sales. Telephone calls were made to a subset of the dealers to ensure that the informant was the person in the organization who most frequently interacted with the supplier and consequently was the most knowledgeable about the relationship with the supplier. These confirmations and an examination of the titles held by the informants (President, Owner, General Manager, or some combination thereof) suggest that our informants were competent.

5.2. Measure development

Commitment. Affective and calculative commitment were each measured by three items based on the construct definitions and scales from Kumar et al. (1994). The measures use a seven-point Likert type response format. Affective commitment items tap the degree to which a dealer is motivated to continue the relationship with its supplier out of affective reasons. The set of calculative commitment items reflect the extent to which a dealer's motivation to continue the relationship is based on high perceived losses in case the relationship would end. Both affective commitment (*ACOM*) and calculative commitment (*CCOM*) construct scores were computed by averaging the item scores, hence ensuring that both construct scores range between 1 and 7.

Trust. Trust exists when a firm believes its partner is honest and benevolent (Larzelere and Huston, 1980; Rempel et al., 1985). Trust in the supplier's honesty was measured by five items assessing the extent to which the supplier is honest, truthful, and keeps its promises. A five item supplier benevolence scale captured the dealer's belief that the supplier considers the dealer's interests or welfare. The lower-level constructs of honesty and benevolence were equally weighted to create a composite score for trust (*TRUST*) ranging between 1 and 7.

Interdependence. Dealer dependence and dealer's perception of supplier dependence were measured by six items each. Measuring the *dealer's* perception of the interdependence structure was consistent with our examination of the antecedents of the dealer's commitment to the relationship, which is affected by how the dealer perceives the interdependence structure.

Conforming to the Emerson (1962) conceptualization of dependence, we included both motivational investment and replaceability. The reseller's motivational investment was measured using three items which assessed the percentage of sales and profits the supplier's line provides and how important the relationship is to achievement of the reseller's goals. The dealer's perception of the supplier's motivational investment was similarly measured by three items except that, following Frazier and Rody (1991), the profit item was replaced by an item assessing how important the supplier considers the reseller's territory. Thus, our motivational investment facet scales combined adaptations of the Frazier and Rody (1991) sales and profit index with the El-Ansary and Stern (1972) measure. The items that assessed percentages of sales and/or profits accounted for by the partner, were converted to seven-point scales (cfr. Frazier and Rody, 1991). The dealer's perception of its own replaceability and its supplier's replaceability each were measured using three parallel items adapted from the Heide and John (1988) replaceability scale. These items capture the opportunity costs of the value that would be lost if the relationship ended and the switching costs associated with termination and replacement.

Following precedent (Frazier et al., 1989; Frazier and Rody, 1991) as well as the argument of Heide and John (1988) that different measures of dependence such as concentration of exchange and replaceability may not covary because they assess different aspects of dependence, we conceptualized dependence as a multidimensional composite index (Bollen and Lennox, 1991; Howell, 1987). Consistent with how such formative indicators are interpreted (Bollen and Lennox, 1991), it is posited that our dependence items result in dependence rather than vice versa. For example, we assert that dependence is high when it is difficult to replace the sales from a relationship and/or when a high percentage of sales are accounted for by the relationship, but we do not expect the converse (e.g., that an increase in dependence causes a high percentage of sales to be accounted for by the relationship). Because dependence can be created in various alternative ways that are captured by our items, we do not anticipate that an increase in dependence will require a simultaneous increase in all items. As Bollen and Lennox (1991) note, internal consistency is not a criterion for assessing the validity of such multi-dimensional composites, but rather "to assess validity we need to examine other variables that are effects of the latent construct" (p. 312). Support for our hypotheses or nomological validity will provide substantial evidence of the validity of our dependence measures. Supplier dependence and dealer dependence scores were computed by averaging the corresponding motivational investment and availability of alternatives scores, again ensuring that all construct scores ranged between 1 and 7.

Our measure of total interdependence (*INTER-DEP*) was constructed by summing dealer dependence and supplier dependence scores. Interdependence asymmetry (*ASYMTRY*) was calculated as the absolute value of the difference between supplier and dealer dependence.

Table 1 shows sample items for all the measures used in the study, as well as the Cronbach alpha reliabilities of the measures in both countries.

5.3. Measure validation

Consistent with our conceptualization, trust was specified as a two-factor model. The fit for each country was good. The overall fit indices for the Netherlands were: $\chi^2(34) = 73.24$, Comparative Fit Index (*CFI*) = 0.972, Tucker-Lewis Index (*TLI*) =

Table 1
Summary of measures

Construct	Sample items ^a	Number of items		Cronbach's α ^b	
		Netherlands	U.S.	Netherlands	U.S.
<i>Commitment</i>					
Affective commitment	We want to remain a member of the supplier's network because we genuinely enjoy our relationship with them. It would be too expensive for us to terminate our relationship with the supplier.	3	3	0.81	0.85
Calculative commitment		3	3	0.80	0.81
<i>Trust</i>					
Honesty	Our organization can count on the supplier to be sincere.	5	5	0.81	0.85
Beneficence	When making important decisions, the supplier is concerned about our welfare.	5	5	0.90	0.93
<i>Dependence</i>					
Dealer's motivational investment	Over time, we expect this supplier to account for an increasing percentage of our firm's profits and sales.	3	3	n.a.	n.d.
Dealer's replaceability	There are other suppliers who could provide us with comparable product lines.	3	3	n.a.	n.a.
Supplier's motivational investment	The supplier's relationship with us is very important to the supplier's achievement of their organizational goals.	3	3	n.d.	n.a.
Supplier's replaceability	In our trade area, there are other firms who could provide the supplier with comparable distribution.	3	3	n.a.	n.a.

^a With three exceptions, all items were measured on seven-point scales, with 'strongly disagree' and 'strongly agree' as the anchors. The exceptions were three motivational investment items (two for the dealer, one for the supplier), which were measured as percentages of sales and/or profits.
^b n.a. = not applicable.

Table 2

Regression results for calculative commitment

Independent variables	Netherlands		United States	
	b (t-value)	β	b (t-value)	β
Intercept	4.300 (50.085) ^a	0.000	4.349 (56.373) ^a	0.000
INTERDEP	0.358 (5.358) ^a	0.325	0.212 (4.112) ^a	0.193
ASYMTRY * D1	-0.478 (-2.314) ^b	-0.129	-0.434 (-2.099) ^b	-0.093
ASYMTRY * D2	0.342 (2.150) ^b	0.120	0.356 (3.761) ^a	0.170
TRUST	-0.173 (-1.970) ^b	-0.120	-0.547 (-8.737) ^a	-0.407
R^2	0.12		0.21	
F(n, m)	(4, 284) = 9.458		(4, 412) = 26.591	

^a Significant at $p < 0.01$ (one-tailed test).^b Significant at $p < 0.05$ (one-tailed test).^c Significant at $p < 0.10$ (one-tailed test).

0.962, root mean square error of approximation (*RMSEA*) = 0.063, and for the United States were: $\chi^2(34) = 159.58$, *CFI* = 0.954, *TLI* = 0.940, *RMSEA* = 0.094. All factor loadings were highly significant (minimum *t*-value was 6.9) and exceeded the 0.4 level commonly considered meaningful in factor-analytic investigations (Ford et al., 1986). These findings support the convergent validity of the items (Anderson and Gerbing, 1988). For both countries, the correlation coefficient between benevolence and honesty was significantly below unity ($p < 0.0001$) which supports the discriminant validity of the two factors. The cross-national equivalence was further tested by specifying a two-country model in which the pattern of fixed and free parameters is the same in both countries (Bagozzi and Yi, 1988). The fit of this model was also very good: $\chi^2(68) = 232.85$, *CFI* = 0.933, *TLI* = 0.947, *RMSEA* = 0.059.

To provide a stringent test of our measurement models for affective and calculative commitment, all six commitment items were evaluated in a single two-factor model. The national-level analysis indicated a good fit for each country; the Netherlands: $\chi^2(8) = 16.86$, *CFI* = 0.985, *TLI* = 0.971, *RMSEA* = 0.062, United States: $\chi^2(8) = 24.22$, *CFI* = 0.984, *TLI* = 0.970, *RMSEA* = 0.070. All items loaded significantly on their hypothesized factor (minimum *t*-value was 10.1), and all loadings exceeded 0.6. The correlation between affective and calculative commitment was significantly below unity ($p < 0.0001$)

in both countries. The two-country model, specifying the same pattern in both countries also yielded a good fit: $\chi^2(16) = 41.08$, *CFI* = 0.984, *TLI* = 0.971, *RMSEA* = 0.047. In sum, the national-level and cross-national level analyses indicate a high level of cross-national equivalence at the measurement level for trust, affective commitment and calculative commitment. Hence, we can examine relations among them in cross-cultural research (Triandis, 1982).

5.4. Results

The effects of dependence structure and trust on calculative and affective commitment were tested by estimating the following two equations:

$$\begin{aligned} CCOM &= a_0 + a_1 \text{INTERDEP} + a_2 \text{ASYMTRY} * \text{D1} \\ &\quad + a_3 \text{ASYMTRY} * \text{D2} + a_4 \text{TRUST}, \\ ACOM &= b_0 + b_1 \text{INTERDEP} + b_2 \text{ASYMTRY} \\ &\quad + b_3 \text{TRUST} + b_4 \text{ASYMTRY} * \text{TRUST}, \end{aligned}$$

where $D1 = 1$, if supplier dependence exceeds dealer dependence; 0, otherwise. $D2 = 1$, if dealer dependence exceeds supplier dependence; 0, otherwise.

The dummy variables *D1* and *D2* differentiate between those asymmetric relationships where the supplier is in a position of relative dependence (*D1* = 1) versus those where the dealer is relatively

Table 3
Regression results for affective commitment

Independent variables	Netherlands		United States	
	b (t-value)	β	b (t-value)	β
Intercept	5.039 (94.035) ^a	0.000	5.207 (117.728) ^a	0.000
INTERDEP	0.085 (2.039) ^b	0.096	0.109 (3.601) ^b	0.120
ASYMTRY	0.067 (0.881)	0.038	0.097 (1.969) ^b	0.064
TRUST	0.712 (12.916) ^a	0.610	0.811 (21.774) ^a	0.728
ASYMTRY * TRUST	0.223 (3.237) ^a	0.142	0.047 (1.343) ^c	0.043
R^2	0.47		0.60	
F(n, m)	(4, 284) = 62.628		(4, 412) = 153.304	

^a Significant at $p < 0.01$ (one-tailed test).

^b Significant at $p < 0.05$ (one-tailed test).

^c Significant at $p < 0.10$ (one-tailed test).

dependent on the supplier ($D2 = 1$).³ As error residuals from separate OLS regressions were found to be uncorrelated, each equation was estimated separately, using OLS.⁴ The data from the United States and the Netherlands were kept separate to examine the cross-cultural generalizability of our findings. The results are reported in Table 2 for calculative commitment and in Table 3 for affective commitment.

The results for calculative commitment indicate support for all of our hypotheses concerning the effects of trust and interdependence structure on calculative commitment for both countries. Calculative commitment is greater when total interdepen-

dence is higher, supporting H2. When asymmetry increases, calculative commitment decreases for the less dependent party, and increases for the more dependent channel member (H4). Further, trust in the supplier negatively impacts a dealer's calculative commitment (H6).⁵

The results also indicate that affective commitment is higher when total interdependence is greater, consistent with H1. Increasing trust positively impacts affective commitment (H5). Whereas the significant positive interaction effect between interdependence asymmetry and trust supports H7, contrary to H3 no negative effect of dependence asymmetry on affective commitment is observed. Though interdependence asymmetry was significantly related to affective commitment in the United States, the result was opposite the predicted direction ($b = 0.097$; $p = 0.025$). Also for the Netherlands, a small positive, though not significant, effect of asymmetry on affective commitment was found ($b = 0.067$; $p = 0.19$).

6. Discussion

This study examined the joint impact of the dealer's perceptions of the channel interdependence

³ Note that in the equation for affective commitment, the dummy variables $D1$ and $D2$ do not appear. Since asymmetry is operationalized as the *absolute value* of the difference between supplier and dealer dependence, this implies that we assume that the effects of ASYMTRY and ASYMTRY * TRUST on affective commitment do not differ between relatively dependent and relatively powerful dealers. This is consistent with the theory section in which no differential relations are hypothesized. To examine whether this assumption held true, we estimated a model in which we analyzed the effect of interdependence asymmetry for relatively dependent versus relatively powerful dealers. Four new variables were created by multiplying ASYMTRY and ASYMTRY * TRUST by $D1$ and $D2$. No significant difference ($p > 0.20$) was found between the regression coefficients for $D1 * ASYMTRY$ and $D2 * ASYMTRY$ nor between $D1 * ASYMTRY * TRUST$ and $D2 * ASYMTRY * TRUST$.

⁴ The data were mean centered to reduce multicollinearity (Jaccard et al., 1991).

⁵ For calculative commitment, no interaction effect between trust and interdependence asymmetry was hypothesized. An additional model was estimated including this interaction effect. Consistent with our expectations, no significant interaction was found in either country.

structure and its trust in the supplier on affective and calculative commitment. Previous research suggests that a channel member's commitment increases when total interdependence and trust increase and when interdependence asymmetry decreases (Anderson and Weitz, 1989; Ganesan, 1994; Kumar et al., 1995b). Our results confirm that these are major factors affecting relationship commitment. However, we advance this literature and extend previous research by demonstrating that, depending on the type of commitment examined, the magnitude and the direction of the effects of trust and interdependence structure differ. Calculative commitment is affected more strongly by the interdependence structure of the relationship than is affective commitment, while trust has a stronger effect on affective commitment than on calculative commitment.

Theoretical implications. Our findings suggest that deepening interdependence within a channel relationship will, by its very nature, tend to increase the calculative commitment of both parties. The extent to which this preoccupation with the somewhat negative, calculative motivation for relationship continuation is supplanted by the more positively oriented affective commitment depends on whether or not trust exists between the parties. Trust can lead even highly interdependent firms to focus less on calculative motivations and emphasize the *desire* to maintain the relationship because of identification with and attachment to the partner. In the absence of trust, affective commitment is highly unlikely, but whether or not calculative commitment develops depends on the interdependence structure.

In relationships characterized by asymmetric interdependence, greater asymmetry is associated with increased calculative commitment by the more dependent partner and less calculative commitment by the less dependent firm. As a firm's relative dependence increases, it has greater *need* to maintain the relationship; as a firm's relative power increases, this necessity is lower. So, in the absence of trust, the relatively powerful firm in a highly asymmetric channel relationship would be expected to exhibit relatively low levels of both affective commitment and calculative commitment. This implies that this less dependent firm has other motivations for its continuance of the relationship such as, for example, the awareness that it can use its relative power to

achieve its strategic goals. Other researchers have argued that additional types of commitment beyond affective and calculative commitment exist (e.g., Allen and Meyer, 1991; Kumar et al., 1994). Future research could examine what other types of motivation, if any, come into play when neither calculative commitment nor affective commitment is strong.

Our most surprising finding is that, contrary to our expectation, interdependence asymmetry did *not* have a negative impact on affective commitment. Our findings suggest that asymmetry can have a small positive effect on affective commitment; also, asymmetry and trust have a positive interactive effect on affective commitment. This positive relationship between interdependence asymmetry and affective commitment seems somewhat curious, but it may be indirect evidence that interfirm power can play a positive role in promoting the effective coordination of channel relationships (e.g., Frazier and Rody, 1991; Scheer and Stern, 1992) for both the relatively powerful and the relatively dependent channel member (Blau, 1964). Frazier et al. (1989) argue that the more powerful partner does not need coercive strategies to obtain cooperation, but instead will rely on noncoercive strategies whenever possible. As these are perceived as fairer by the weaker partner (Blau, 1964), a supportive exchange atmosphere leads to increased communication, greater agreement and value congruence (Tedeschi et al., 1973) and, consequently, a sense of identification that contributes in important ways to a partner's motivation to continue the relationship for affective reasons (Kumar et al., 1994). Furthermore, Williamson (1975) has argued that in an imbalanced situation, ideology is often used as a unifying and cooperation-inducing force by the more powerful party. Future research is needed to examine the extent to which the more powerful firm's use of, or reluctance to use, various types of power function as mediating mechanisms through which interdependence asymmetry has a positive effect on affective commitment.

We advance the external validity of commitment studies by testing our hypotheses with data gathered from automobile dealers in two different countries and find strong evidence for the cross-national validity of our measures and results. Despite the cultural differences and variations in sample composition,

competitive conditions, and legal environment between the Netherlands and the United States, the effects of trust and interdependence structure on commitment are quite similar and always in the same direction for the two countries. This attests to the generalizability of our dyadic hypotheses over different external political economic structures.

Managerial implications. When managers focus on altering the interdependence structure of their relationship, should they strive for affective commitment or for calculative commitment? Should they focus on managing the interdependence structure of their relationship, on increasing trust, or on both? Kumar et al. (1994) have argued that the consequences of affective commitment are superior to those for calculative commitment; affectively committed channel members will invest more in the relationship, will perform at a significantly higher level and will be more resistant to opportunistic behavior. Therefore, given the choice between developing closeness through affective versus through calculative commitment, those managing channel relationships should strongly cultivate the former over the latter. Building trust should therefore be of higher importance than altering the dependence structure.

Admittedly, trust is more easily developed in more highly interdependent, symmetric relationships (Kumar et al., 1995b), but our research suggests that working to develop trust, and actually achieving a trusting relationship, can pay handsome dividends regardless of the interdependence structure. Managers may worry too much about being dependent on another company. Provided they focus on developing trust, even asymmetrical relationships can be successful without being scary for the more dependent party. This is good news for all those in highly asymmetrical relationships. Dependence imbalances are of relatively minor importance if trust can be developed.

Future research. Future research on the effects of trust and interdependence on commitment might advance in several ways. First, consistent with the political economy approach, we focused on the dyadic relationship. However, network theorists (e.g., Johanson and Mattson, 1985; Hallén et al., 1991) argue that it is useful to examine the position of firms in networks of exchange relationships in addition to analyzing dyads. Future research could extend

the present work on the effects of interdependence and trust on commitment to networks. Two potentially useful constructs that might be added as antecedents of commitment in networks are anticipated constructive effects on network identity and anticipated deleterious effects on network identity (Anderson et al., 1994). Second, we found that compared to affective commitment, trust and interdependence structure predict less variance in calculative commitment. Previous research indicated that trust and interdependence are two major antecedents of affective commitment. However, these variables predict less variance in calculative commitment, a construct which has hardly been researched in a channels context. This suggests that calculative commitment is also affected by other and, as yet, unknown variables. Future research could explore other antecedent conditions of calculative commitment. Third, as there are two sides to a dyad, supplier commitment also deserves attention (Anderson and Weitz, 1992). In the future, researchers could address the extent to which dealer commitment and supplier commitment converge, and – in case of divergence – investigate the factors that cause the two channel members to be differentially committed to their relationship. Fourth, measures of total interdependence and interdependence asymmetry were obtained from the dealer's side only. The supplier might have a different opinion regarding the interdependence structure of the relationship. While using dealer perceptions of interdependence is consistent with our goal to shed light on the dealer's motivation and commitment, additional insight could be gained by exploring dyadic data.

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How to Sustain the Customer Experience: An Overview of Experience Components that Co-create Value With the Customer

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Nowadays the experience factor plays an increasingly important role in determining the success of a company's offering. The literature on Customer Experience is growing fast and the debate among scholars and practitioners is fervent. While many studies explore such theme from a theoretical viewpoint, tools aimed at supporting marketing managers in devising the right stimuli to support an excellent Customer Experience are still scarce. In this perspective, this study sheds some light on the concept of Customer Experience, and on how the right environment and setting for the desired Customer Experience should be created in such a way as to contribute to the value creation for customers and the company itself. Drawing from the results of a survey submitted to several groups of customers, this paper attempts to understand the specific role of different experiential features in the success achieved by some well-known products. Following the empirical investigation, this work also suggests an interpretative model to support the marketing manager in generating the proper stimuli to activate the various components of the Customer Experience.

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Keywords: Experimental marketing, Customer experience, Customer behaviour

Introduction

Nowadays competing in a global market has become increasingly difficult and only the creation of long-lasting competitive advantages seems to offer an avenue for survival. But where should a company start looking to develop a competitive advantage? Many scholars advocate that one of the main routes to reach it is by means of a much stronger focus on the customer (Douglas and Craig, 2000; Farinet and Ploncher, 2002; Kotler and Keller, 2006; Peppers and Rogers, 2000).

In the last years, and particularly in the process of devising a company's strategy, this growing attention on the customer resulted in an increased focus on CRM philosophies. More recently, as the number of contact points between a company and its customers increased, such attention to the customer revealed the fundamental importance of monitoring the many experiences that originate from those contact points.

In this perspective, the central idea is to expand the transaction-based notion of Customer Relationship to the “continuous” concept of Customer Experience. Consequently, it becomes necessary to consider aspects that refer to the emotional and irrational side of customer behavior (Holbrook and Hirschman, 1982) and which, more than the only rational ones, account for the whole experience coming from the set of interactions between a company and its customers. Such experience plays a fundamental role in determining the customers’ preferences, which then influence their purchase decisions. In fact, whilst the classical economic theory regards the consumer as a logical thinker whose purchasing decisions are based on rational problem solving, the recent developments on the literature on economics and marketing, and particularly the new stream of the Experiential Marketing, advocates for the exploitation of intangible elements linked to the emotional value perceived by customers.

In addition, a similar position can be found in the managerial field; in fact, 85% of senior business managers believe that differentiating solely on the traditional elements, such as price, product and quality, is no longer a sustainable competitive advantage and even more senior managers hold the Customer Experience as the next competitive battleground (Shaw and Ivens, 2005).

Despite such vibrant enthusiasm, however, the reality is very different, and far from being close to either what the literature advocates or what many companies claim in their statement of intent.

In addition, the scientific literature on this topic shows the limitations and inadequacies that are typical of those research fields which are still far from their maturity, particularly as it lacks both in terms of a precise terminology and of structured and standardized approaches that can support the adoption of the above mentioned practices.

Given these considerations, the aim of this paper is to contribute towards the formalization and the improvement of the existing models and approaches on the matter. In particular, the present study contributes to the scientific debate in terms of a further rationalization of the approaches and theories so far developed and in attempting to provide an answer to certain open issues. Specifically, in this work it is provided:

- ❖ a conceptual definition of “Customer Experience” based on the most relevant scholarly and managerial contributions;
- ❖ an analysis of the specific role played by the experiential features in a sample of innovative products with respect to the outcomes of their introduction to the market;
- ❖ an interpretative model aimed to support a company in the process of devising contexts and arti-

facts that are conducive of a (Customer) Experience, and which can then be used by consumers to co-produce their own experience.

State-of-the-art Literature on Experiential Marketing

The concept of Customer Experience was firstly conceived in the mid-1980s when, along with the mainstream literature in consumer behavior that deemed customers as rational decision makers, a new *experiential* approach offered an original view to consumer behavior (Holbrook and Hirschman, 1982). The importance of various hitherto neglected variables was re-considered: “the role of emotions in behavior; the fact that consumers are feelers as well as thinkers and doers;...the roles of consumers, beyond the act of purchase, in product usage as well as brand choice” (Addis and Holbrook, 2001). Despite these initial sparks, the concept of Customer Experience came more relevantly to the fore in the 1990s with Pine and Gilmore’s book on the Experience Economy (1999); the authors present the “*experiences*” as a new economic offering, which emerges as the next step after commodities, goods and services in what they call the *progression of economic value*. Hence, in the following years a flourishing of different contributions focused their attention on the Customer Experience as a new lever to create value for both the company and the customer (Addis and Holbrook, 2001; Carù and Cova, 2003; Ferraresi and Schmitt, 2006; Forlizzi and Ford, 2000; LaSalle and Britton, 2003; Milligan and Smith, 2002; Ponsonby-Mccabe and Boyle, 2006; Prahalad and Ramaswamy, 2004; Schmitt, 1999; Schmitt, 2003; Shaw and Ivens, 2005; Smith and Wheeler, 2002). The starting point of these approaches is a renewed way to consider the well-known concept of consumption: it becomes a *holistic experience* which involves a *person* – as opposed to a *customer* - as a whole at different levels and in every interaction between such person and a company, or a company’s offer (LaSalle and Britton, 2003). In this perspective, the *memorability* of the “staged” events, as in Pine and Gilmore’s works, is no longer of primary importance: what contributes to the creation of value is not so much selling memorable experiences but to enable the customer to live all the moments of the relationship with a company in an excellent way, even beyond her expectations (LaSalle and Britton, 2003) or, according to the viewpoint of Prahalad and Ramaswamy (2004), to co-create their own unique experience with the company. In this perspective, companies do not sell (or stage, according to Pine and Gilmore’s perspective) experiences, but rather they provide artifacts and contexts that are conducive of experiences and which can be properly employed by consumers to co-create their own, unique, experiences (Carù and Cova, 2003; Carù and Cova, 2007). Indeed, Schmitt (1999) states that “as a marketer you need to provide the right

environment and setting for the desired customer experiences to emerge". More recently, a comprehensive contribution has been offered in the book "Consuming Experience" (Carù and Cova, 2007), in which the authors identify a "continuum of consuming experiences" ranging from experiences that are mainly constructed by the consumers, to experiences that are largely developed by companies (a kind of approach which is close to Pine and Gilmore's viewpoint), passing through experiences that are co-created by consumers and companies (as per Prahalad and Ramaswamy). Accordingly, the role of the firm changes in each stage of the continuum: from a company pursuing almost a traditional product or service marketing approach to a company adopting a holistic and immersive experiential marketing approach (thus providing immersive experiences, whereby a consumer dives into an experience that is fully developed in details by a company), passing through a co-creation stage, in which a company provide the consumer with the basic platform and raw materials that are then being used by the consumer to mold and obtain his/her own experience.

As the scientific contributions are rich and diverse, so are the different interpretations and conceptualizations of the Customer Experience offered by each author; nevertheless, despite the differences of perspective and the various models proposed, one can identify some common core characteristics of the Customer Experience. First, it has a temporal dimension which originates from the entire set of contact points (or moments of truth, Carlzon, 1987) between the customer and the company, or the company's offer (Addis and Holbrook, 2001; Carù and Cova, 2003; LaSalle and Britton, 2003), then it is strictly *personal* and it involves and engages a customer at different levels (rational, emotional, sensorial, physical and also "spiritual") so as to create a holistic Gestalt (Brakus, 2001; Schmitt, 1999).

While the overall picture offers plenty of potentiality, if we exclude some pioneers, only few companies have adopted the perspective of the Customer Experience, whereas the many are still far from the level of success that can potentially be obtained by leveraging on the Customer Experience.

Two facts can then be regarded as main reasons for such slow adoption rate: one is the lack in the extant literature of models, interpretation and conceptualization offering a common terminology and a shared mindset, the other is the lack of structured managerial approaches, which can only be overcome by a deeper comprehension of the role played by the *Customer Experience*.

Conceptual Framework

This paragraph outlines the reference framework of the research. In the first part we elaborate, drawing

from the debate in literature, a definition of Customer Experience which underlies the subsequent analysis; the second part delves into the concept of Customer Experience and introduces its elementary dimensions: the experiential components.

In the third part we describe a general framework whereby the inter-relations between the concepts of Customer Experience and value exchanged are outlined, as well as the relationships between such concepts, the customer and the company.

A Definition of Customer Experience

For our purpose, we consider a definition of Customer Experience which takes into account the most relevant scientific contributions; specifically, we define the concept of Customer Experience as an evolution of the concept of relationship between the company and the customer.

"The Customer Experience originates from a set of interactions between a customer and a product, a company, or part of its organization, which provoke a reaction (LaSalle and Britton, 2003; Shaw and Ivens, 2005). This experience is strictly personal and implies the customer's involvement at different levels (rational, emotional, sensorial physical and spiritual) (LaSalle and Britton, 2003; Schmitt, 1999). Its evaluation depends on the comparison between a customer's expectations and the stimuli coming from the interaction with the company and its offering in correspondence of the different moments of contact or touch-points (LaSalle and Britton, 2003; Shaw and Ivens, 2005)."

This definition serves as a basis for a deeper conceptualization of Customer Experience, which is explained in the following paragraph.

The Multidimensionality of the Customer Experience

While still complying with the fundamental rule that a good experience must holistically and consistently involve a person at different levels, and following previous conceptualization, we base our analysis on the psychological concept of *modularity of mind* (Pinker, 1997). Various psychological and behavioral studies (Anderson, 1995; Brakus, 2001; Fiske and Taylor, 1991; Goleman, 1995; Schmitt and Simonson, 1997; Tavassoli, 1998) distinguish three basic systems – *sensation, cognition* and *affect* – each with its own structures, principles and mutual interactions. In addition, when considering a person *per se*, these studies take into account the set of one's *actions*, the system of *values* and *beliefs* (from which *lifestyles* and *behaviors* are derived) and *relationships*.

Furthermore, the multidimensionality of experiences is also widely recognized in the medical literature. For instance, many neurophysiologic studies support the widely accepted notion that pain is a multidimensional experience including sensory, cognitive

and emotional components (i.e. Fulbright *et al.*, 2001); this is consistently supported by findings from human brain imaging studies showing that multiple cortical regions are activated during the presentation of painful stimuli (Coghill *et al.*, 1994; Derbyshire and Jones, 1998; Jones *et al.*, 1991; Paulson *et al.*, 1998; Talbot *et al.*, 1991).

Therefore, drawing from this literature, and following the stream of other scientific works (Brakus, 2001; Fornerino *et al.*, 2006; Schmitt, 1999, 2003), we conceptualize the Customer Experience as a multidimensional structure composed by elementary components. Nevertheless, one must keep in mind that, as indeed the study proved, customers hardly ever recognize such kind of structure. In contrast, we expect that customers perceive each experience as a complex but unitary feeling, each component being hardly distinguishable from the others.

As above mentioned, our conceptualization of the elementary components of the Customer Experience has some elements in common with the model proposed by Schmitt (1999) and with the results of Fornerino *et al.* (2006). Moving from the basic idea of "engagement at different levels" Schmitt (1999) proposes a modular conceptualization of the concept of Customer Experience. Specifically, Schmitt identifies five *Strategic Experiential Modules*: sensory experiences (sense); affective experiences (feel); creative cognitive experiences (think); physical experiences, behaviors and lifestyle (act); and social-identity experiences that result from relating to a reference group or culture (relate). Fornerino *et al.* (2006) analyze the case of an immersive consumption experience and identify five distinct dimensions: sensorial-perceptual, affective and physical-behavioral (components) and social and cognitive (facets).

Hence, drawing from the extant literature, the (experiential) components we have assumed as dimensions of the Customer Experience are:

- ❖ *Sensorial Component*: a component of the Customer Experience whose stimulation affects the senses; an offering, whose aim is to provide good sensorial experiences, can address sight, hearing, touch, taste and smell so as to arouse aesthetical pleasure, excitement, satisfaction, sense of beauty (good examples are Jamba Juice bars or Lush stores).
- ❖ *Emotional Component*: a component of the Customer Experience which involves one's affective system through the generation of moods, feelings, emotions; an offering can generate emotional experience in order to create an affective relation with the company, its brand or products (good examples of brands which claim a strong emotional link with their customers are Barilla and Kinder Surprise).
- ❖ *Cognitive Component*: a component of the Customer Experience connected with thinking or

conscious mental processes; an offering may engage customers in using their creativity or in situations of problem solving; furthermore a company can lead consumer to revise the usual idea of a product or some common mental assumptions (as happened with the Barbie, the first doll with the image of a young woman).

- ❖ *Pragmatic Component*: a component of the Customer Experience coming from the practical act of doing something; in this sense the pragmatic component includes, but is not exhausted by, the concept of usability (the Apple iMac offers an optimal example of what it means to design an extraordinary practical experience for users based on usability standards). In fact it does not only refer to the use of the product in the post-purchase stage, but it extends to all the product life-cycle stages (see for an example KitchenAid and Whirpool's initiative called Insperience).
- ❖ *Lifestyle Component*: a component of the Customer Experience that comes from the affirmation of the system of values and the beliefs of the person often through the adoption of a lifestyle and behaviors. Frequently an offering may provide such experience because the product itself and its consumption/use become means of adhesion to certain values the company and the brand embody and the customers share (as in the consumption of *no logo* products).
- ❖ *Relational Component*: a component of the Customer Experience that involves the person and, beyond, his/her social context, his/her relationship with other people or also with his/her ideal self. An offering can leverage on such component by means of a product which encourages the use/consumption together with other people (i.e. Disneyland parks) or which is the core of a common passion that may eventually lead to the creation of a community or still a *tribe* of fans (i.e. Ducati); finally the product (as *haute couture* apparel) can be also a means of affirmation of a social identity, inducing a sense of belonging or of distinction from a social group; in this case the link with the lifestyle component is very relevant.

While mainly drawing from the results of the above mentioned works, the dimensions of the Customer Experience we propose bear some differences. First, taking into consideration Schmitt's act module, we distinguish the physical aspects from the values and join the physical part with the sensorial dimension. Such approach is also consistent with recent neurophysiologic studies, whereby the physical and sensitive aspects are considered as a unitary dimension. Secondly, we add a new dimension, namely the pragmatic component, which we drew from the extant literature on the user experience (Arhippainen, 2004; Battarbee and Koskinen, 2005; Forlizzi and Ford, 2000) and which takes into account the aspects related to the human-objects interaction.

The General Framework

Drawing from the extant theories on value creation and co-creation we propose a conceptual framework where the concepts of Customer Experience and exchanged value are encapsulated and their mutual-relations and the inter-relations with the main entities (the company and the consumer) are outlined.

As before introduced, the Customer Experience originates from a set of interactions between a customer and a product, a company or part of its organization and the value that the consumer and the company gain is created through that set of interactions (Addis and Holbrook, 2001). Additionally, following Addis and Holbrook (2001) we make a distinction between two kinds of consumer value: *utilitarian value* (or functional value) and *hedonic value* (or experiential value).

Such distinction draws from the subject-object interaction as described by Holbrook (1999) whereby the type of value depends on the relative weight of the objective (or functional) features of the product over the subjective responses of the consumer (see Holbrook, 1999), which, turn, are elicited by specific aspects of the offer, which we refer to as "experiential features". Equally, on the basis on the relative weight of the hedonic value over the utilitarian value, products can be classified into three groups: *hedonic products*, *utilitarian products*, and *balanced products*, for which a balance between the two types of value is present (see Figure 1).

On the other hand, on the side of the company, the value generated from the set of interactions between the customer and the company (even when mediated by the company's offering) has a potential impact both on the traditional performance measures (i.e. market share, sales, profitability) and on a set of intangible assets of the company (brand equity and customer equity).

The general framework is represented in Figure 2.

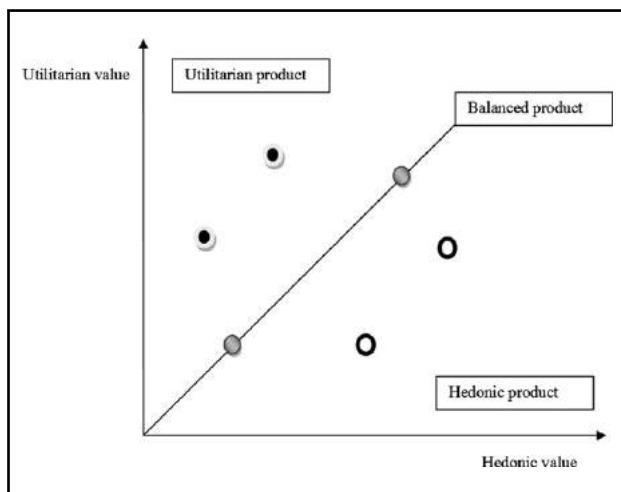


Figure 1 Hedonic, Utilitarian and Balanced Products
(Adapted from Addis and Holbrook, 2001)

Research Methodology

This study takes into consideration the role of the Customer Experience in determining the outcomes of the introduction of some well-known and remarkably successful products; to simplify the choice of the cases to be analyzed, we select our sample of cases among those that are considered, both in the existing literature and in the common opinion, as successful and are characterized by widely-known brands with a very strong image. Furthermore, we specifically consider products that are not characterized by a strong superiority in technological aspects (which mainly convey functional value) so as to better isolate and outline the role played by experiential features.

As the research project aims at suggesting an interpretative model of the above described phenomena, and due to the novelty of the matters, an explorative study was carried on. For such reason, the analyzed data were partially qualitative.

Sampling of the Cases

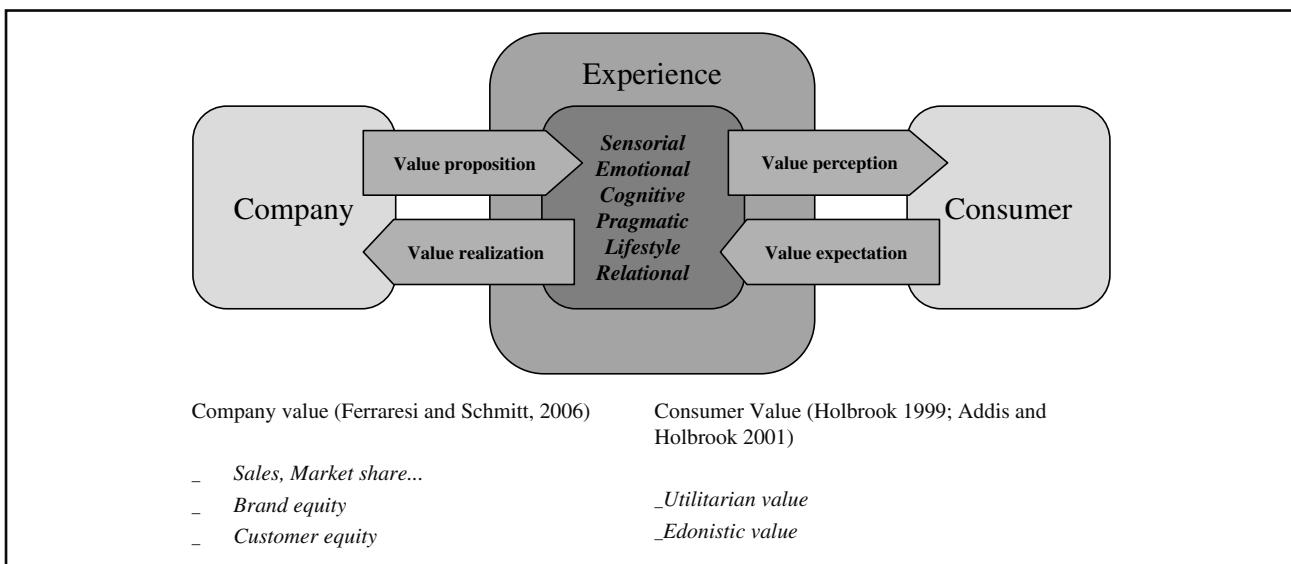
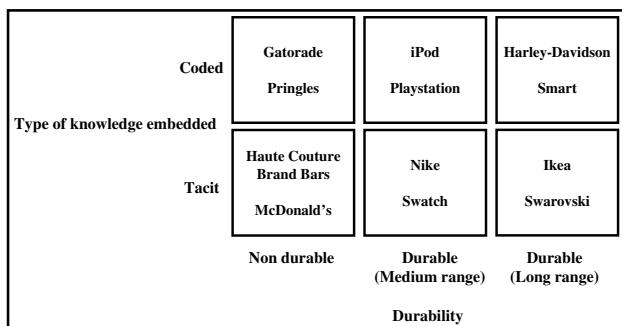
Cases were selected to achieve an appreciable degree of heterogeneity in terms of Customer Experience conveyed to the market. Specifically, two variables, namely:

- ❖ *type of knowledge embedded (tacit vs. coded, as per Polanyi, 1983);*
- ❖ *durability (non durable, medium range, long range)*

were considered for the selection process since they have a considerable impact in determining the Customer Experience (see Figure 3).

Investigation Methodology

The research has been carried out in two phases. In the first part, the experiential features of the offering proposed by the company have been analyzed by means of secondary sources and direct interviews: this phase was meant to understand the marketing strategy used by the company and the aspects of the Customer Experience on which the company focused in its strategy. In the second part, a market research has been performed to assess how customers perceive and evaluate the different components of the Customer Experience and to assess which of the six components were perceived as the most relevant for each of the products analyzed. In particular, following Calder and Malthouse, 2006 a survey, both explorative and descriptive in nature, was carried out by means of a structured questionnaire with multiple choice, rating scale and agreement scale questions based on a 1-4 Likert scale. The choice of the questionnaire as investigation means has been taken both on the basis of some precedents (as the already

**Figure 2 General Framework****Figure 3 Sample of Selected Cases**

mentioned work by [Calder and Malthouse, 2006](#)) and on the ground of the fact that data collected through questionnaires permit the use of specific statistical analyses, which can be applied to explore the internal structure of the Customer Experience, as it has been conceptualized in our study.

The questionnaire has been submitted to a non-statistical sample of almost 200 units (for each analyzed product, totaling 2368 units) chosen among individuals, between 16 and 55 years, who usually buy/use the considered product (for further information on the sample, please refer to the sample description in [Appendix 1](#)). We outline that the choice of employing a non-statistical sample implies some problems on results generalizability; this issue, however, can be considered as being not too relevant due to the explorative nature of the research. The proposed interpretative model, in fact, can be subsequently validated and tested on the basis of a multiple case study analysis.

The administered questionnaire (a sample of which can be found in [Appendix 2](#)) had been pre-tested on a small sample of consumers, hence the final version is made up of three parts: the first is aimed at collecting demographical information (age, gender,

education, etc.) about the respondents; the second investigates the motivations on the basis of the purchase by analyzing the role of the experiential features; the last section is aimed at comparing the evaluation of the different components in order to understand which one the customers consider as most relevant. The questionnaire was administered to the sample both in paper and electronic format (on the WWW).

Data Analysis

The framework for the analysis of the data is based on the conceptualization of the Customer Experience as a multidimensional concept. The first analysis was carried out on the collected data to assess the relative weight of the utilitarian value when compared to the hedonic value.

In a second phase each component of the Customer Experience has been analyzed to investigate how customers evaluated it and how much relevant it was when compared with the others. This part of the analysis was aimed at defining the interpretative model (see paragraph 6).

A factor analysis was carried out to explore the internal structure of the dataset, additionally, further qualitative analyses and a cluster analysis (for some specific cases in which it seemed relevant to identify the existence of differences in customer behavior and evaluations) were conducted.

Results of the Survey

As mentioned in the previous paragraph the analysis of the data obtained by the survey was aimed at reaching two main results:

- ❖ the comprehension of the relative weights of the experiential features over the functional ones in the perception of value (for each of the twelve product analyzed);
- ❖ the definition of the contribution of each experiential component to the overall evaluation of the offer.

Utilitarian vs. Hedonic Value

The first analyses were oriented at determining the relevance of the whole hedonic value as compared to the utilitarian one. Figure 4 presents the results and demonstrates that overall the experiential features are perceived by customers almost as much relevant as the functional ones, indeed 7 products out of 12 have been classified as "balanced" and 2 products have been reported to be "hedonic": Harley Davidson and Smart. Such observations should however be tempered with the consideration that certain types of experiences are particularly difficult to be investigated simply by means of a questionnaire. Those are experiences which indeed are felt by a customer but often at a sub-conscious level, thus a quick and superficial analysis, such as that performed while responding to a questionnaire, is likely to miss or underestimate their real impact. Further, people often show a tendency to undervalue the influence of communication campaigns, advertising and other marketing strategies on their purchase decisions; often an impulse purchase, mainly dictated by irrational motivations, is later re-interpreted in rational terms and thus underestimated in the reported perceptions of a questionnaire.

As for the relational component, the analysis from secondary sources showed that such kind of compo-

	Hedonic Value	Utilitarian Value	Type of product
SWATCH	2.40	3.13	Utilitarian*
PRINGLES	2.13	2.91	Balanced
HARLEY DAVIDSON	3.03	1.71	Hedonic*
SMART	2.98	2.63	Hedonic*
IPOD	3.02	3.35	Balanced
NIKE	2.28	3.07	Utilitarian*
H.C. BRAND BARS	2.48	2.93	Balanced
PLAYSTATION	2.59	3.22	Balanced
GATORADE	2.56	2.81	Balanced
MCDONALD'S	2.31	3.04	Utilitarian*
IKEA	2.81	3.06	Balanced
SWAROVSKI	2.65	3.08	Balanced

Figure 4 Main Results of the Survey (a). *ANOVA:
p-value < 0.05

ment is associated to certain group of customers, which represent only a fraction of the entire market (i.e. the relational component tied with collecting practices). Consequently, the average score reported by such component is substantially lowered by the large part of the sample which is definitely not interested in this kind of component of the Customer Experience. As expected, a cluster analysis confirmed this line of reasoning isolating two clusters of customers, one remarkably affected by the relational component, the other substantially indifferent.

Experiential Components

The second set of analyses was oriented at determining the scores of each experiential component for each product under analysis. The results have been summarized in Figure 5 (scores have been calculated as mean of the scores of the components of the Customer Experience).

Scores have been divided into three sets according to their distance from the mean of the scale used (which is 2.5); namely: scores much above the mean, scores near the mean or slightly above and scores below the mean.

Additionally, two considerations can be drawn from Figure 5:

- ❖ the value associated with the sensorial component is substantially high (above the mean) across all the considered cases;
- ❖ the value associated with the relational component does not vary sensibly across products and it is lower than expected, indeed no occurrences have been reported to be much above the mean. This can be explained, as previously mentioned, by the presence of two different groups of consumers within a given polled sample, one of those being substantially indifferent to the specific experiential component.

Given such particularities, in defining the interpretative model (proposed in the next paragraph) we

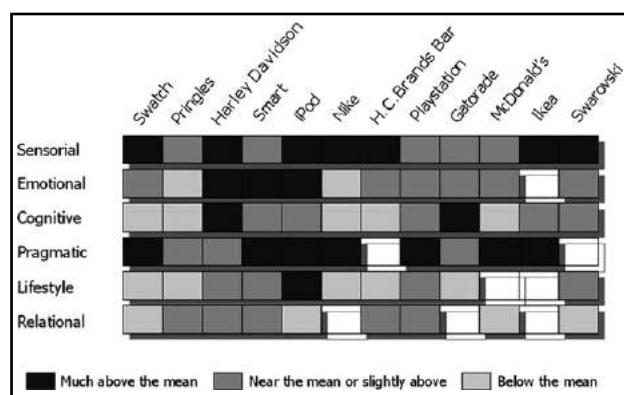


Figure 5 Main Results of the Survey (b)

decided to analyze separately the sensorial and the relational component.

Complex Experiences

The main objective of the factor analysis was to study whether the experiential components were actually being perceived separately by customers or not. Such investigation is important both from a theoretical perspective and from a managerial perspective. Theoretically, as we hypothesized the existence of complex experiences whose modularity cannot be decomposed (as perceived by customers), and managerially since managers, while greatly benefiting from a simple and straight-forward tool (operating on single and separated components) definitively ought to take into account potentially complex interactions, should they be identified in the factor analysis.

Indeed, the results of the factor analysis showed that each case reported both pure components (that is, factors that can be related to a single experiential component) and "mixed components" (that is, factors whose variables belong to different experiential components). Mixed components can be considered as a cue for the hypothesized existence of interrelations between components, which in turn stand for complex experiences. Complex experiences thus emerge as specific case in which the components are so intimately intermingled that consumers are unable to draw any separation between them.

An example of the results of the factor analysis for the iPod case is reported in appendix.

The Interpretative Model

The interpretative model consists of two parts. First of all, on the bases of the evidence reported in the discussion of the results, other qualitative analyses were carried out to infer further insight on the sensorial component.

In the second part, first we analyze the relevance of the four components that reported the highest differences in scores among the analyzed cases: emotional, cognitive, pragmatic and lifestyle. Then, the relational component was analyzed separately: taking into account the results of the cluster analysis, the model defines different typologies of relational component proposing a link between them and the characteristics of the product analyzed. The output of this second part is the Commitment/Involvement Matrix.

Sensorial Component

As before mentioned, the sensorial component was reported to score high across all the cases. Despite

	Score	Sensorial Experience	Link with core functionalities
SWATCH	3.48	Sight	No
PRINGLES	2.65	Taste	Yes
HARLEY DAVIDSON	3.53	Sight	No
SMART	2.70	Sight	No
IPOD	3.63	Hearing	Yes
NIKE	3.21	Sight	No
H.C. BRAND BARS	3.62	Sight	No
PLAYSTATION	2.90	Sight&Hearing	Yes
GATORADE	2.53	Taste	Yes
MCDONALD'S	2.67	Taste	Yes
IKEA	3.31	Sight	Yes
SWAROVSKI	3.63	Sight	Yes

Figure 6 Typologies of Sensorial Component

this uniformity of results, an in-depth analysis revealed that whenever a clear link between the core functionality of a product and a natural sense could be established (e.g. iPod/hearing, Pringles/taste, etc.) then that specific sensorial component was perceived as being the most relevant for the user. On the other hand, when a clear link could not be identified, the results showed that sight was the sense perceived as most important.

Figure 6 reports when such a link could be established between core functionalities of a product and the specific sensorial component.

Such observation poses some caveats from a managerial point of view, and specifically when conceiving how and what specific features of the offering should be framed so as to address the sensorial component.

Commitment/Involvement Matrix

The analysis of the scores reported in association to the emotional, cognitive, pragmatic and lifestyle components suggested the definition of two variables that could account for the differences of relevance reported for the four components. Namely the two variables are:

- ❖ *Customer involvement*, which is the level of importance a customer attributes to an object, an action or an activity and the enthusiasm and interest they can generate (Dalli and Romani, 2000; Goldsmith and Emmert, 1991). Such variable is affected by two factors: cost of the offering (both in absolute terms and in relative terms when compared with competitors') and impact on the customer's self image. In this case, a higher cost of the offering requires a greater willingness to pay, which is more likely to be attained when

the offer provides a significant emotional component. On the other hand, when a product has a relevant impact on one's image the sharing of the values embedded in the offer is fundamental (lifestyle component).

These assumptions can be compared with the data collected to verify the existence of a relation between customer involvement and the emotional and lifestyle components. Considering the means of the score obtained for the two modules and contrasting them with the 2.5 cut-off value (mean of the 1-4 Likert scale) it was possible to divide the analyzed cases into two groups: one set with scores higher than the mean (marked in grey in Figure 7), and the other set with scores lower than the mean (marked in white in Figure 7) and thus ascertain that actually the first group includes cases characterized by higher involvement than the ones in the second group.

- ❖ *Customer commitment*, which is the effort in terms of resources the customer makes to use the product (adapted from Grandinetti and Paiola, 2003). Such variable is influenced by two factors: purchase/use frequency and level of complexity in using the product. A higher level of the former makes an easy and comfortable use/consumption (pragmatic component) desirable; a higher level of the latter requires a greater rational engagement (cognitive component).

As before, we compared these hypotheses with the data collected to search for the existence of a link between customer commitment and the cognitive and pragmatic components. Even in this case we considered the means of the scores obtained for the two

	Emotional Component	Lifestyle Component	Emotional + Lifestyle Components (mean)
SWATCH	3.03	2.28	2.65
PRINGLES	1.79	1.53	1.67
HARLEY DAVIDSON	3.83	2.85	3.34
SMART	3.59	2.82	3.21
IPOD	3.45	3.08	3.27
NIKE	1.31	1.98	1.65
H.C. BRAND BARS	2.66	1.98	2.32
PLAYSTATION	2.44	2.02	2.23
GATORADE	2.71	1.83	2.27
MCDONALD'S	2.15	N.R.	1.08
IKEA	N.R.	N.R.	0
SWAROVSKI	2.65	2.90	2.78

Figure 7 Emotional and Lifestyle Components. ANOVA: p-value < 0.05

	Cognitive Component	Pragmatic Component	Pragmatic + Cognitive Components
SWATCH	1.65	2.74	2.19
PRINGLES	1.60	2.95	2.28
HARLEY DAVIDSON	3.42	2.34	2.88
SMART	2.96	3.63	3.30
IPOD	2.46	3.68	3.07
NIKE	1.33	3.57	2.45
H.C. BRAND BARS	1.55	N.R.	0.78
PLAYSTATION	2.60	3.32	2.97
GATORADE	3.12	2.67	2.90
MCDONALD'S	1.86	3.01	2.44
IKEA	2.09	3.03	2.56
SWAROVSKI	2.44	N.R.	1.22

Figure 8 Cognitive and Pragmatic Components. ANOVA: p-value < 0.05

modules and contrasted them with the 2.5 cut-off value (mean of the 1-4 Likert scale).

Hence, it was possible to divide the analyzed cases into two groups (one group with scores higher than the mean, marked in grey in Figure 8, and the other with scores lower than the mean, marked in white in Figure 8) and verify that actually the first group includes cases characterized by higher commitment than the ones in the second group.

Customer Commitment and Customer Involvement were used to explain the relevance of the four components; in the case of the relational component the same two variables could be applied to describe three sub-typologies of the relational component. Accordingly, three kinds of relational component could be identified:

- ❖ absent or superficial: when a low-level customer involvement is present the relational component stems from interpersonal relationships that are temporally limited to the time spent while using the product (e.g. Playstation and Pringles);
- ❖ connected to collecting practices; when the relational component is more intense than in the previous case (due to the high level of customer involvement), but the low commitment level indicates that the relational component is mainly generated by collecting practices stemmed from the ownership of the product (e.g. collectors clubs for Swatch and Swarovski);
- ❖ profound: for the high-involvement/high-commitment products the relational component is even more intense and is due to the existence of communities of customers. In this case, interpersonal relationships are built not exclusively on a common interest, but on shared lifestyles

	Target Scope	Source/occasion
Absent or superficial	Whole target market	Usage of the product
Profound (community)	Specific segment within the target market	Ownership and usage of the product
Collecting	Specific segment within the target market	Ownership of the product

Figure 9 Relational Component: Target Scope and Sources

and systems of values and are originated both from the joint usage/consumption of the product and from its ownership (e.g. Harley Davidson and Smart).

Each sub-typology of the relational component presents specific characteristics depending on the scope of the target for which the relational component is relevant, and on the sources and the occasions in which the relational component is originated and takes place (Figure 9).

Considering the two proposed variables, the role played by the relational component and the results reported in Figure 7 and in Figure 8, a four-quadrant matrix (Figure 10) can be drawn. Each quadrant contains offers with a specific combination of the Commitment/Involvement couple. Accordingly, each quadrant identifies a specific configuration with respect to the four components considered. The products were then positioned within the quadrants

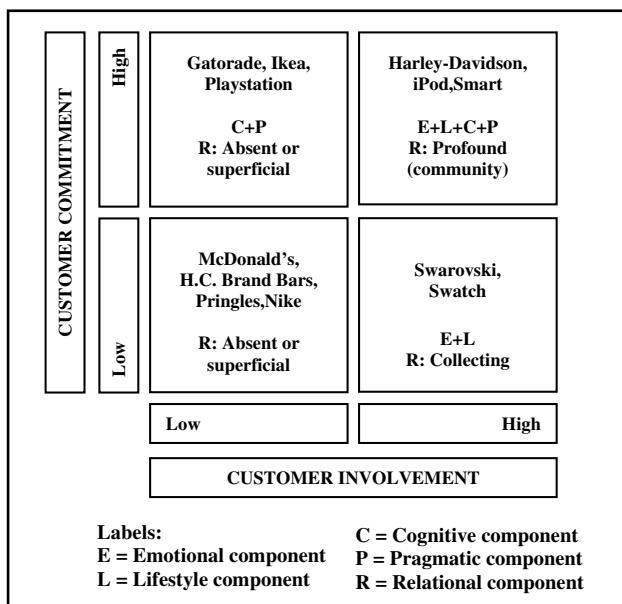


Figure 10 Commitment/Involvement Matrix

according to the matching association between the reported scores and a given configuration of the set of four components. Furthermore, depending on the combination of the Commitment/Involvement couple, the relational component assumes one of the three sub-typologies earlier specified (also reported in Figure 10).

Finally, once each product has been positioned in the matrix, one can observe how the chosen variables suitably characterize the four clusters obtained.

Conclusions and Future Developments

The above analyses show how important it is to pay attention to the new arising tendencies in customers' behavior interpretation. The study proved that a relevant part of the value proposed to customers, and actually recognized by them, is linked to experiential features; we found that, regardless of the context, customers want to live positive consumption experiences. Living a positive Customer Experience can promote the creation of an emotional tie between a firm's brand and its customers which in turn enhance customer loyalty. Yet this does not imply that customers neglect the importance of functionalities: sometimes as required standard, sometimes as factors enabling an optimal experience. We notice that the functional value (or utilitarian value) obtains almost always (except in two cases) a score near the experiential (hedonic) one; in some cases even a little higher. Therefore this part of the study based on the analysis of best practices proves that it is important to deliver an adequate balance between utilitarian and hedonic value.

The results also show that these successful products involve customers' senses, emotions, thoughts, acts, values and relations in different ways: each product leverages on more than one component, the particular combination depending on the characteristics of the product itself. Furthermore, we can infer that, by leveraging on more components, it is theoretically possible to intensify the whole hedonic value thanks to the existence of positive interferences among the activated components. Hence, resting on psychological and sociological interpretations about the generation and elaboration of sensations, thoughts, emotions, behaviors and relationships and of their interactions and interrelations (Goleman, 1995), we can hypothesize the existence "complex experiences" involving more than a single component. Indeed, we found that each of the products we analyzed leverages on some experiential components; but at a deeper investigation, we noticed that the components are not activated independently: sometimes there are relevant overlapping areas and clear interrelations, as reported by the factor analysis (possibly an issue to be further investigated in future researches). From a managerial viewpoint, this

observation suggests that when devising a value proposition focused on the Customer Experience, companies should carefully regard at potential interactions between the components of the Customer Experience on which their products leverage so as to fully exploit the effects above described.

Managerial Implications

Due to the lack of a rigorous phase of validation of the suggested model, we need to precise that the results do not allow a straight generalization. However, that notwithstanding, we can still draw some implications and suggestions aimed at supporting a manager in devising a value proposition, especially when the value delivered to the customer should ideally be driven both by experiential features (hedonic/experiential value) and by functional characteristics (utilitarian/functional value), thus possibly increasing the odds of a good market response.

We sum up these indications into four guidelines:

1. *Develop Experience-driven innovations;* more than Technology push or Market driven innovations, the ones leveraging on experience have better chances to get a positive market response as they seem more likely and more capable of meeting new customers' needs;
2. *Consider the functional features of the commercial offer* in order to create a sustainable competitive advantage with respect to competitors. Because the utilitarian value is still one of the main drivers of customers' evaluation and perception of a new product, it ought to be paid full attention, particularly when those functionalities act as enabling factors for great experiences.
3. *Provide a venue for an integrated Customer Experience* according to the position in the "Consuming Experience" continuum where the Customer Experience is being provided. Specifically, when experiences are mainly created by consumers, the experiential features of the product or service being offered should be systematically addressed (as it is for Pringles and Gatorade cases). In the case of experiences that are co-developed by companies and consumers, companies should enable the molding and forging of a consumer's own experience by providing the experiential basic materials (as it is for Harley-Davidson case). Finally, for experiences that are mainly created by companies, the whole set of products, services and context should be addressed in a systematic and consistent way (as it is for McDonald's and Haute-Couture Brand Bars cases).
4. *Keep in mind that the different components of the Customer Experience depend on the characteristics of a given product.*

Specifically, at an operational level, the proposed interpretative model can be used to identify:

- ❖ which sensorial component should characterize a new offer (in the light of its core functionalities);
- ❖ which components of the Customer Experience are consistent with the levels of Customer Involvement and Customer Commitment of the offer;
- ❖ which sort of relational component is to be activated when dealing with different levels of customer involvement and customer commitment of a specific offer.

Next Developments

The main drawbacks of this study are connected to the fact that complex experiences (that is, experiences originating from the interaction of two or more components) were isolated in the factor analysis but not accounted under the interpretative model.

Such interactions could be further explored by means of a multi-way ANOVA so as to isolate both the main effects of the "pure" components and account for the interaction effects which originate the complex experiences.

Moreover, while our study was not intended to develop a general scale for measuring each experiential component, we recognize that such is an important area which deserves a specific investigation.

Another avenue for a further path of research would entail the exploration of whether certain types of experiences (such as very common experiences or experiences which are particularly familiar to a customer) can still be accounted as a legitimate Customer Experience. In this respect it would be interesting to account for a sort of updating mechanism whereby the expectations of a customer are systematically updated as he or she lives a specific experience.

A further advancement of the research would take into considerations the sets of experiences that can be originated across each specific stage of the purchasing process (e.g. in-store experience), thus exploiting a much wider scope of experience than the one which can be offered by mere products.

Eventually, a further validation of the model is needed, for instance by means of multiple case studies so as to achieve an analytical generalizability.

Acknowledgement

The authors would like to thank the anonymous referees and the editor of this paper (Prof. H. Laroche) for the insightful comments and suggestions. The authors also gratefully acknowledge the support of Fabrizio Rossi and Pablo Daini for their collaboration in survey data collection and preliminary analysis.

Appendix 1. Sample Description

Product	Number of questionnaires	Sex		Age			
		F (%)	M (%)	16–20 (%)	21–30 (%)	31–40 (%)	40–55 (%)
Swatch	221	37	63	25	41	1	33
Pringles	184	48	52	21	59	16	4
Harley Davidson	219	6	94	0	28	54	18
Smart	207	11	89	7	63	24	6
iPod	187	6	94	20	57	16	7
Nike	198	17	83	25	55	15	5
H.C. Brands Bar	188	40	60	16	59	22	3
Playstation	239	4	96	47	45	7	1
Gatorade	191	24	76	33	48	14	6
McDonald's	186	49	51	29	52	14	5
Ikea	174	69	31	4	64	25	7
Swarovski	174	81	19	4	50	33	13
Education level		Region		Employment Status			
		High school or less (%)	Degree or more (%)	North (%)	Centre-South (%)	Homemaker + Unemployed + Retired (%)	Student (%)
Swatch	51	49	77	23	3	41	56
Pringles	46	54	82	18	3	55	41
Harley Davidson	76	24	83	17	1	5	94
Smart	83	17	61	39	0	24	76
iPod	67	33	70	30	1	43	56
Nike	70	30	67	33	3	55	42
H.C. Brands Bar	62	38	98	3	0	34	66
Playstation	89	11	50	50	4	59	37
Gatorade	80	20	75	25	2	50	48
McDonald's	73	27	59	41	5	44	51
Ikea	58	42	77	23	3	29	68
Swarovski	66	34	68	32	12	22	66

Appendix 2. Questionnaire (iPod)

Demographic information

Age

- Less or equal to 20
- 21–30
- 31–40
- More than 40

Gender

- Male
- Female

Education

- High school or less
- Degree or more advanced

Employment

- Homemaker
- Student
- Employed
- Retired
- Unemployed

City/town of residence: _____

Respondent-product interaction information

How often do you use your iPod?

- Often, once or more frequently a day
- Occasionally, some times a week
- Rarely, some times a month

Appendix 2 (continued)**Respondent-product interaction information**

What is the main reason that you use your iPod?

- Listen to the music
- Record conversations
- Store any kind of files
- Other reasons (please specify): _____

Please tell us the main reasons why you chose an iPod over other mp3 players (please select at maximum 3 answers)

- Quality/price ratio
- Performance (battery life, quick file transfer...)
- Aesthetical aspects
- Ease of use
- Distinctiveness with respect to other mp3 players
- Apple brand
- Opportunity of being part of a community
- Other reasons (please specify): _____

Please tell us which of the following statements about you and your iPod are true:

- I use it to record conversations
- I use it to transfer any kind of file
- I use speakers to listen to my music even without earphones
- I use extra functions of my iPod such as the diary, the alarm, the calendar, etc.
- I play with my iPod's included games

Please tell us how much you agree / disagree with the following statement (1-4 Likert scale)

- It is easy and comfortable to use
- The interface is user-friendly
- File transfer to and from a PC is quick and easy
- It is comfortable to carry and to use even in motion (dancing, running, working out...)

Please tell us how important each of the following statement is for you (1-4 Likert scale)

- Opportunity of being part of a community
- Opportunity of sharing and exchanging tunes with other iPod users

Please tell us how important each of the following features of the iPod is for you (1-4 Likert scale)

- Design
- Essential and slick style
- Color and material
- Sound clearness
- Sound quality

When do you normally use your iPod?

- When I want to relax
- When I want to have fun
- When I am travelling
- Other occasions (please specify): _____

What kind of image about yourself do you think you are expressing when using your iPod?

- Young and active person
- A person different from the mass
- A person who loves having fun
- No specific image
- Other (please specify): _____

Please tell us how important each of the following features of the iPod is for you (1-4 Likert scale)

- Quality/price ratio
- Performance (battery life, quick file transfer, etc.)
- Aesthetical aspect (form factor, design, color,...)
- Sound quality
- Distinctiveness with respect to other mp3 players
- Image of the iPod (young, innovative, dynamic, etc.)
- Extra functions (diary, games, calendar...)
- Apple brand
- Ease of use
- Opportunity of being part of a community
- Use during moments of fun and entertainment

Appendix 3. Factor Analysis iPod (6 factors)

Pure Components		Coefficient	Experience typology
Answers			
FACTOR 1: SENSORIAL COMPONENT			
Sound clearness	0.848	Sensorial	
Sound quality	0.859	Sensorial	
FACTOR 2: PRAGMATIC COMPONENT			
The interface is user friendly	0.807	Pragmatic	
It is easy and comfortable to use	0.759	Pragmatic	
FACTOR 3: RELATIONAL COMPONENT			
Opportunity of being a member of a community	0.880	Relational	
Complex experiences			
FACTOR 4: SENSORIAL/LIFESTYLE COMPONENTS			
Design	0.848	Sensorial	
Elegant and essential style	0.773	Sensorial	
Material and colour	0.717	Sensorial	
Esthetical aspects (shape, colour, design...)	0.728	Sensorial	
Specificity and distinctiveness with respect to other MP3 players	0.543	Lifestyle	
iPod image (young, innovative...)	0.590	Lifestyle	
FACTOR 5: PRAGMATIC/COGNITIVE/LIFESTYLE COMPONENTS			
Simple and fast file transfer from P.C.	0.432	Pragmatic	
Extra functions (diary, games, calendar...)	0.660	Cognitive	
Existence of a dedicated line of accessories (loudspeakers, cases, car accessories,...)	0.707	Cognitive	
Prestige and fame of Apple brand	0.462	Lifestyle	
FACTOR 6: PRAGMATIC/RELATIONAL/EMOTIONAL COMPONENTS			
It is easy-to-carry and to use even in motion (dancing, running, working out...)	0.468	Pragmatic	
Opportunity of sharing musical files with other iPod owners	0.557	Relational	
Usage for fun/entertainment	0.776	Emotional	

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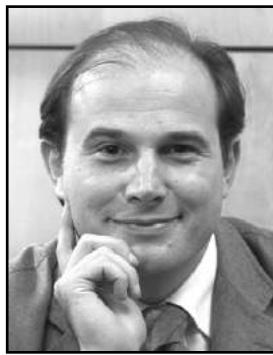
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Omega 32 (2004) 407–424

omega
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Consumer trust in B2C e-Commerce and the importance of social presence: experiments in e-Products and e-Services

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Received 29 April 2002; accepted 28 January 2004

Abstract

Reducing social uncertainty—understanding, predicting, and controlling the behavior of other people—is a central motivating force of human behavior. When rules and customs are not sufficient, people rely on trust and familiarity as primary mechanisms to reduce social uncertainty. The relative paucity of regulations and customs on the Internet makes consumer familiarity and trust especially important in the case of e-Commerce. Yet the lack of an *interpersonal* exchange and the *one-time* nature of the typical business transaction on the Internet make this kind of consumer trust unique, because trust relates to *other people* and is nourished through *interactions* with them.

This study validates a four-dimensional scale of trust in the context of e-Products and revalidates it in the context of e-Services. The study then shows the influence of *social presence* on these dimensions of this trust, especially benevolence, and its ultimate contribution to online purchase intentions.

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Keywords: Trust; World Wide Web; Electronic commerce; Trust scales; Predictability; Ability; Integrity; Benevolence; Familiarity; Disposition to trust; Social presence

1. Introduction

Research tells us that human beings like to reduce their social uncertainty. In other words, they seek ways to understand, predict, and occasionally attempt to control the behavior of other people. When social uncertainty cannot be reduced through rules and customs, people resort to trust and, to a lesser degree, to familiarity as major social complexity reduction methods [51]. Indeed, trust is among the most enduring characteristics of human interaction [4,51,70], especially when the expected outcomes of the

interaction with others are not fully governed by rules and guarantees [4,42,43,79].

Trust is also a central element in many commercial activities [15,18,65], especially when the trusting party depends on, yet lacks control over the trusted party and where, consequently, trust that the trusted party will behave as expected can serve as a substitute for formal agreements in commercial exchanges [18,33,46,51].

Consistent with this observation, trust should be even more important in e-Commerce than in traditional commerce because of the paucity of rules and customs in regulating e-Commerce and because online services and products typically are not immediately verifiable. Moreover, online transactions lack the assurance provided in traditional settings through formal proceedings and receipts [20,65]. Indeed, research has shown that high levels of consumer trust encourage online purchase intentions [20,41] and help retain

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online customers [65], while the lack of it is the main reason individuals do not shop online [34]. There is also a growing recognition in industry circles that, as just argued, consumer trust facilitates e-Commerce (see US Better Business Bureau as reported in Cole [8]). Indeed, many dot.com failures have been attributed to the vendor's inability to create a strong trusting relationship with its customers [14], and, consistent with this observation, *only 5% of VISA International clients appear to trust e-Commerce*, a very low percentage compared with other financial transactions [49].

Yet, it must be recognized that the application of trust to e-Commerce does not apply perfectly to traditional business settings. Trust is an *interpersonal* determinant of behavior that deals with beliefs about the integrity, benevolence, ability, and predictability of other people [52,55]. However, in contrast to face-to-face commerce and to other applications of trust in the literature discussed below, there are typically no interpersonal interactions in e-Commerce, neither direct nor implied. Such interactions, or even cues relating to them, are notably missing from e-Commerce Websites [65].

How then does trust relate to e-Commerce where there is no interpersonal interaction and where there is no human agent toward whom this trust can be directed and on whose behavior it can be based? Given these unique circumstances, this study examines which of the established dimensions of trust in interpersonal relationships and in traditional Business-to-Consumer (B2C) commerce pertain to consumer trust in B2C Internet vendors (e-Trust). In doing so, this study extends the Familiarity and Trust Model of e-Commerce [20] in the following manner: (1) it embraces a multi-dimensional trust construct rather than a single dimension of trustworthiness to examine each dimension of trust on its own; and (2) it introduces a trust antecedent in the model which taps into the perception that, despite the lack of interpersonal interaction, there is still a sense of social presence on a Website.

These objectives were addressed through two free simulation experiments. The initial study built and verified a scale that captures the dimensions of trust in purchasing books on the Internet. The second study then replicated and extended the first study by adding social presence as an antecedent of trust in purchasing flight tickets online. The experiments utilized the Websites of two major players in this market-space, Amazon.com and Travelocity.com, respectively. Amazon.com sells tens of millions of books, CDs, and DVDs to more than 17 million customers, according to its Website. Travelocity.com sells airline tickets and associated services. *The Economist* recently ranked Amazon.com as the most visited US Website and Travelocity.com as the 10th [78]. There is also a growing recent interest in Travelocity.com within the airline industry [56,57] making the results of this study of particular interest to the industry.

The present study shows (1) that e-Trust is composed of four distinct beliefs dealing with the integrity, benevolence, ability, and predictability of the vendor; (2) that among these beliefs, integrity and predictability are the pertinent ones;

(3) that the control variables disposition to trust and familiarity affect these beliefs; and (4) that e-Trust, especially the belief in benevolence, is increased by the perception of social presence in the Website.

2. Theoretical foundations and models

2.1. What is trust?

One of the central aspects of human behavior is the need to control and predict (or at least to understand) the social environment. Individuals have a need to "know" in advance how their behavior will influence the behavior of others, and how the behavior of others will consequently affect them. Rules and customs do provide some measure of social complexity reduction by regulating many aspects of social behavior, but properly understanding this social world is complex beyond human capacity because other individuals are essentially independent agents over whom one has little, if any, actual control and whose behavior is not always obvious or, indeed, rational. As a result, when interacting with others, individuals need to consider a vast number of possible interrelated behaviors that other individuals and organizations might exhibit [51].

Yet taking into consideration so many relevant interrelated behaviors is cognitively overwhelming. One way of coping with this social complexity is to presume that others will behave in a socially acceptable manner within the context of the relevant interaction and will not suddenly behave in unpredictable and socially unacceptable ways. When rules and customs are not enough, trust becomes the substitute guarantor that replaces relevant rules and customs as the guarantor that the expected outcomes of the relationship will materialize [42,43]. This assumption is the essence of trust [51].

Accordingly, trust is a context-dependent multidimensional social concept whose relevant significant dimensions depend on the circumstance of the interaction [6,19,50,69], and contains both *behavioral intentions* and *cognitive elements* [50,55,69].² The behavioral intentions aspects of trust deal with behavior that increases one's own vulnerability to others under conditions of interdependence; the cognitive aspects of trust deal with context-related beliefs about the trusted party that provide the context and justification for this behavior [50,69]. In general, research suggests

² Adding to this complexity is the lack of a standardized terminology. For example, the three trust beliefs of integrity, benevolence, and ability are called "trustworthiness" by Mayer et al. [52] and "antecedents of trust" by Jarvenpaa et al. [39], the latter using the term "trustworthiness" to reflect perceived behavior. Some earlier studies do not even differentiate between trust beliefs and trust. Some use the term "trust" in conjunction with "benevolence" (e.g., [48]) or "integrity" (e.g., [47,61,73], or as a mixture of ability and integrity (e.g., Ganesan [19]).

that the cognitive aspects of trust deal with beliefs that the trusted party will behave ethically [37] and will carry out expected commitments [4,13,48,52,71,73] under conditions of vulnerability and dependence [72]. This form of trust, discussed at length in the next section, deals typically with beliefs regarding the *ability*, *benevolence*, and *integrity* of the trusted party. Recent research also adds *predictability* to this list [52,55]. Although research has found many other situation-dependent beliefs, the first three beliefs seem to be common across many settings [30] and play a central role in management studies of trust where predictability is sometimes also added (e.g., [52,55]).

2.2. Definition of trust

The distinction between the behavioral and the cognitive aspects of trust began with Deutsch's [13] seminal study of trust in the Prisoners' Dilemma game [30]. Deutsch [13] concluded that trust is a set of *expectations* that lead to behavioral intentions that involve potential loss, because of the absence of control over those upon whom one depends. Based on an extensive literature review, Giffin [30] too defined trust as "reliance upon the characteristics of an object, or the occurrence of an event, or the behavior of a person in order to achieve a desired but uncertain objective in a risky situation" (p. 105). This trust, explains Giffin [30], typically consists of the three trust dimensions that were long ago set forth in Aristotle's *Rhetoric*: intelligence (corresponding to ability), good character (honesty and integrity), and good will (benevolence).

Examining trust in social exchanges, Blau [4] also concluded that trust contains three distinct beliefs: integrity, benevolence, and ability. Schurr and Ozanne [73] likewise define trust in this way. Rotter [71] also defined interpersonal trust as "an expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied on" (p. 444). Again, trust is defined as a situation-specific expectation or belief that determines behavior. Luhmann [51], too, while not considering *ability*, made a distinction between the trust dimensions dealing with *integrity* and those dealing with *benevolence* in his analysis of the role of trust in social relations.

Later research has taken a similar view. Examining business activities, Zucker [86] has defined trust as a set of shared social expectations that are essential for and determine social behavior, enabling individuals to respond to each other without the explicit specification of contractual details. Similarly, Korsgaard et al. [45] argue that trust is the confidence that team members have in the good will and honesty (that is to say, benevolence and integrity) of their leader, while Hart and Saunders [33] have defined trust as the confidence that another party will behave as expected, combined with expectations of the other party's good will. This trust is composed of a perception of the partners' competence, openness (the willingness not to withhold information), caring (not taking unfair advantage), and reliability. Mishra [58], exam-

ining trust in the context of organizational response to crisis, applies the same dimensionality of trust. In a like fashion, McAllister [53] defines trust as "the extent to which a person is confident in, and willing to act on the basis of, the words, actions, and decisions of another" (p. 25), that is, as a behavioral intention based on beliefs. Kumar [46] and Ramaswami et al. [64] define trust as dependability based upon perceptions of procedural justice—fairness in managing a relationship, policies and procedures—and distributive justice—the perceived fairness of outcomes.

In a comprehensive review of management research on trust in a special issue on trust in the *Academy of Management Review*, Rousseau et al. [72] conclude that a common element in this research is that trust deals with "the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (p. 395). Consistent with Lewis and Weigert [50], Rousseau et al. [72] also note that trust differs depending upon the history and nature of the relationship between the parties. In cases such as "initial trust" [55], trust is composed of (1) beliefs dealing with competence (ability), benevolence, honesty (integrity), and predictability, and (2) trusting-intentions; while in other cases, such as "opportunistic betrayal" [16], trust is composed of benevolence and integrity alone.

Aligned with these views is the marketing literature which develops two general approaches in its studies of trust: (1) as a behavioral intention and (2) as a set of beliefs [61]. In the latter school of thought, Schurr and Ozanne [73] define trust as the "belief that a party's word or promise is reliable and that a party will fulfill his/her obligations in an exchange relationship" (p. 940); this belief leads to behavioral intentions. Citing this definition, Dwyer et al. [15] expand on Blau's [4] work when they define trust as a set of beliefs relating to the exchange partner's ability and willingness to take part in the social exchange. Similarly, Anderson and Narus [2] argue that the essence of business exchanges is a firm's belief that another party will behave in a manner that will promote the well being of the firm and refrain from harmful actions. Moorman et al. [59,60] conceptualize trust in a similar manner. Trust is "a willingness to rely on an exchange partner in whom one has confidence" (p. 315) [59]. Morgan and Hunt [61] regard trust as confidence in another person's reliability and integrity. As in Moorman et al. [60], Ganesan [19] also defines trust as a willingness to depend upon another, based on beliefs or expectation resulting from the partner's experience, reliability and benevolence. This definition reflects two major dimensions of trust in the realm of marketing: credibility and benevolence. The former is composed of reliability and ability, a dimension Ganesan calls "objective credibility", whereas benevolence deals with motives.

Trust is a relatively new concept in IS research. Examining virtual teams in the Internet environment, Jarvenpaa et al. [39] found that trust (termed "antecedents of trust" by Jarvenpaa et al. [39]) consists of three distinct factors: ability, integrity and benevolence. These three beliefs affect

the members of virtual team's trusting behavioral intentions, meaning their willingness to depend upon other team members. In these virtual teams, integrity consistently had the strongest effect on trusting intentions while the importance of ability decreased over time. Gefen [20], in the context of e-Commerce, defines trust as a single dimension construct dealing with a consumer's assessment that the vendor is trustworthy, based on Luhmann's [51] definition of trust as a social complexity-reducing mechanism that leads to a willingness to depend on a vendor; this willingness is derived from the perception that the vendor will fulfill its commitments. Also based on Luhmann [51], a more recent study by Gefen [22] dealing with ERP adoption, conceptualized trust in a vendor's technical support team as composed of the three dimensions suggested by Giffin [30]—integrity, benevolence, and ability.

2.3. The varying dimensionality of trust

Table 1 summarizes the dimensions of trust as operationalized in previous research. Although there is an apparent agreement on the meaning of trust as an alternative to rules and customs, it should be noted that the dimensions that constitute it are context-specific [50,51]. To understand this varying dimensionality of trust one needs to go back to the psychological need behind trust.

2.4. Social presence

In the research cited above, however, the phenomenon studied was mostly an ongoing *interpersonal* interaction with another person or organization over extended periods of time. Indeed, trust is typically built gradually through extensive ongoing interactions that enable individuals to create reliable expectations of what other persons or organizations may do [4,51]. This is interesting from the perspective of the current study because the lack of an interpersonal interaction is a key defining characteristics of e-Commerce!

This *social context* is an important characteristic of trust [4,51]. This is also a common theme in the trust-building behaviors discussed in some of the articles in Table 1. The reason is that trust, in general, is built through constructive interactions with *other people* [4,18,51]. Since human interaction with the trusted party, whether face-to-face or by any other means, is a precondition of trust [4] the perception of a high degree of social presence, implying direct or indirect human contact, in the relationship should, arguably, contribute to the building of trust. Certainly, deliberately avoiding the creation of a social interaction and making the relationship devoid of a social presence, such as showing a "cold shoulder", reduces trust [4]. Extending this logic implies that another way in which trust in an e-Commerce Website may be built is through imbuing the medium of communication with a high social presence: the perception that there is personal, sociable, and sensitive human contact in the medium [74].

Social presence theory [74] describes how this social context affects medium use. Also related to media information richness theory [12,67,75], social presence theory argues that medium users assess the degree of social presence required by the task and fit it to the social presence of the medium, that is, how much a medium enables a communicator to experience communication partners as being psychologically present [74,81]. High social presence is typically found in face-to-face communication whereas low social presence is often found in e-mail (sans multi-media cues), and paper-based mail. Channel richness can vary depending on circumstances [77,85], however, and social presence can be high or low in any given Website.

Granted that an e-Commerce Website typically involves no actual interaction with other people, does not mean, however, that social presence cannot be embedded in a Website. If photos of people can convey a sense of personal, sociable and sensitive human contact, so too should multimedia Websites. Indeed, many Websites contain pictures of smiling people (a good example of this is <http://virginmobileusa.com/>) as they would be added in a typical brochure. This antecedent is of particular interest assuming that the perception of social presence can still be created despite the lack of actual human contact. Another way in which this is done in many Websites is through adding a "social touch" to the interaction, such as welcoming the consumer by name as he or she enters the Website and making Website and subsequent e-mail communications personalized. The two Websites used in this study adopted such a strategy, which resulted in variable responses to the social presence of the site.

Higher perceived social presence may also increase trust through its effect on increased electronic communication, as shown in e-mail interactions [28]. Communication is a necessary ingredient of constructive interaction. Indeed, research has found that richer media, that is, media higher in social presence, tend to be preferred in communications settings where the task is ambiguous and uncertain (see Straub and Karahanna [76], for a meta-analysis of this work).

Social presence should also build trust through the perception that the vendor is displaying through the Website a sense of personal, sociable, and sensitive human contact. From a consumer perspective, such attributes are clearly desirable. When dealing with consumer queries and grievances, they are even an expected aspect of any service or product. Hence, in accordance with Luhmann's [51] and Blau's [4] observation that trust is increased when the trusted party shows behavior or other indicators in accordance with one's expectations, the perception that the e-Vendor is embodying a high degree of social presence in the Website should increase consumer trust, to the degree that such indications are expected. This proposed, dynamic role of social presence adds a new perspective because of the generally and inherently lower levels of social presence in e-Commerce Websites.

Table 1
Trust dimensions in previous research

Source	Dimensions
Blau [4]	Integrity, benevolence, and ability
Giffin [30]	Integrity, benevolence, and ability
Rotter [71]	Predictability
Luhmann [51]	Integrity, and benevolence
Rotter [70]	Dependability
Schurr and Ozanne [73]	Predictability
Zucker [86]	Shared social expectations
Dwyer, Schurr and Oh [15]	Ability and willingness
Anderson and Narus [2]	Belief in trustworthiness
Crosby et al. [11]	Integrity and benevolence
Buttler [6]	Availability, competence (ability), discreteness, fairness, integrity, loyalty, openness, promise fulfillment, receptivity (all these factors are determinants of trustworthiness)
Moorman et al. [60]	Belief in trustworthiness
Moorman et al. [59]	Integrity and ability
Ganesan [19]	Experience (ability), reliability, and benevolence
Morgan and Hunt [61]	Reliability and integrity
Mayer et al. [52]	Ability, benevolence, and integrity (as antecedents of perceived trustworthiness)
Hosmer [37]	Expectation of “morally correct decisions” (p. 399)
Kumar et al. [48]	Honesty (integrity) and benevolence
Kumar et al. [47]	Honesty (integrity) and benevolence
Kumar [46]	Honesty and dependability
Korsgaard et al. [45]	Good will and honesty (i.e., integrity)
McAllister [53]	Trustworthy, caring
Mishra [58]	Competence (ability), openness, caring (benevolence), reliability
Ramaswami et al. [64]	Belief in trustworthiness
Hart and Saunders [33]	Predictability, competence, openness, caring, and good will
Elangovan and Shapiro [16]	Benevolence and integrity
Jarvenpaa et al. [39]	Ability, integrity and benevolence
McKnight et al. [55]	Competence (ability), benevolence, honesty (integrity), and predictability
Rousseau et al. [72]	Positive expectations
Gefen and Silver [27]	Ability, integrity, and benevolence
Jarvenpaa and Tractinsky [41]	Combination of trustworthiness, integrity and benevolence.
Kollock [44]	Trustworthiness
Gefen [20]	Belief that the e-Vendor is trustworthy
Ridings and Gefen [68]	Ability, integrity, and benevolence
Gefen [23]	Belief that the e-Vendor is trustworthy
McKnight et al. [54]	Competence, integrity, and benevolence
Gefen et al. [26]	Ability, integrity, and benevolence
Gefen et al. [25]	Belief that the e-Vendor is trustworthy
Pavlou [63]	Belief that the e-Vendor is trustworthy

2.5. Research model and hypotheses

Two experiments were conducted to test the research model. The objectives of study 1 were (1) to build a multi-dimensional scale of trust, (2) to verify the hypotheses regarding which trust dimensions affect purchase intentions in spite of the lack of actual human interaction, and (3) to confirm that trust, also as a multi-dimensional construct, is affected by the control variables familiarity and trusting

disposition. The objective of study 2 was, first, to replicate study 1, and then to examine whether social presence has an effect on the verified scale of trust created in study 1.

Given the distinct possibility that a dishonest e-Vendor might have procedures that allow its employees not to keep promises to the customers, the belief in the integrity of the e-Vendor should be a central belief convincing the consumers that their expected outcomes from the interaction will be fulfilled, and should, therefore, be a significant dimension

of trust, in this case by reducing social uncertainty involved in breaking promises. Moreover, a dishonest e-Vendor may even make inappropriate use of credit card and personal information and could track purchase activity without prior approval. The reality of such threats is evidenced in Websites that automatically track e-Commerce shopping and then inappropriately use the information generated [62]. Trust in the integrity of the e-Vendor should decrease the social uncertainty involved in such behaviors, thus reducing the range of unacceptable social behaviors, and in doing so should assure the consumer of his or her expected outcomes when purchasing from the e-Vendor.

H₁. Consumer trust in an e-Vendor's integrity increases intentions to purchase online from that e-Vendor.

Like integrity, potential buyers must also believe in the predictability of the vendor. They need to expect that it will behave reliably, for instance, in delivering the goods and services on time by abiding to accepted and expected rules of conduct, and in doing so reduce social uncertainty relating to when and how these goods or services will be delivered. We postulate that, even in the online shopping environment, because there are human agents involved and the behavior of these agents can directly affect the consumers' outcome from the interaction, also predictability should be a significant characteristic of trust and increase consumer willingness to purchase online from the e-Vendor.

H₂. Consumer trust in an e-Vendor's predictability increases intentions to purchase online from that e-Vendor.
Also ability is hypothesized to have an effect on purchase intentions. The trust dimension of ability is the assessment that the trusted party knows its job and that this knowledge reduces the uncertainty that is involved in the trusting party obtaining its expected outcomes from the relationship by virtue of reducing the possible range of undesirable behaviors relating to inadequate ability that the trusted party may show. Since a lack of ability to perform the task properly should influence the trusting party's expected outcome in the case of e-Commerce, ability too should be a significant predictor of purchase intentions.

H₃. Consumer trust in an e-Vendor's ability increases intentions to purchase online from that e-Vendor.

The last trust dimension, benevolence, deals with the belief that the trusted party actually cares about the trusting party. Caring as an aspect of emphatic good service generally increases customer satisfaction and retention [23,83,84]. Benevolence reduces social uncertainty by allowing the trusting party to rule out undesirable behavior, namely the possibility that the trusted party will act with a short-term opportunistic profit motive while the trusting party is behaving with a long-term orientation. It too should accordingly be a significant predictor of purchase intentions.

H₄. Consumer trust in an e-Vendor's benevolence increases intentions to purchase online from that e-Vendor.

How then does trust arise in an e-Commerce environment? The literature suggests that trust in a typical business

or social environment is created through two processes: constructive interaction [1,2,4,31,35,46,55,60,61] and interpersonal behaviors and cues that indicate trustworthiness [19,46,52,60,61,64]. These behaviors facilitate trust by confirming a belief in fair play—not being taken advantage of—and showing that the trusted party is investing its fair share in the relationship [19,43]. Another way trust can be built is through observed behavior that is in accordance with expectations, so that showing a trustworthy track record builds trust [4,27,51]. Many such behaviors and cues have been identified in the literature: (1) a trustworthy track record of previous behavior [46,53,86]; (2) the nature of the business interaction [19,27,33,39,46,64]; (3) showing a willingness to invest in a long-term relationship [2,4,13,35,46,61]; (4) investing beyond what was required by the initial contract [19]; (5) cooperation [11,15]; (6) staying in touch [11]; and (7) not demonstrating opportunistic behavior [61,82].

In accordance with Luhmann's [51] and Blau's [4] observation that trust is increased when the trusted party shows behavior or other indicators in accordance with one's expectations, the perception that the e-Vendor is embodying a high degree of social presence in the Website should also increase consumer trust, to the degree that such indications are expected. This proposed, dynamic role of social presence adds a new perspective because of the generally and inherently lower levels of social presence in e-Commerce Websites.

Conversely, when a Website conveys a *low social presence*, it is transmitting a "cold-shoulder" message. That message is not typically what builds trust [4]. Moreover, given that a personal, sociable service from a vendor is, in general, an integral part of the service consumers pay for, *consumers confronted with a site with low social presence* would have little reason to believe in the *integrity* of such an e-Vendor if the consumer believes that the e-Vendor is not servicing him or her in what has come to be expected. A consumer also has few reasons to believe in the *benevolence* of such a vendor to provide good service, given that the e-Vendor is not sensing and responding with good service. The *ability* of a vendor to provide service is also scrutinized by consumers when a Website does not appear to be responsive. Consumers may wonder whether they are dealing with an organization that has competent staff. And, finally, the consumer has little reason to believe in the vendor's *predictability*. Why should the consumer expect future predictable service given that current-day service standards are not being met? Accordingly:

H₅. Higher social presence embedded in a Website increases consumer trust in an e-Vendor's integrity.

H₆. Higher social presence embedded in a Website increases consumer trust in an e-Vendor's predictability.

H₇. Higher social presence embedded in a Website increases consumer trust in an e-Vendor's ability.

H₈. Higher social presence embedded in a Website increases consumer trust in an e-Vendor's benevolence.

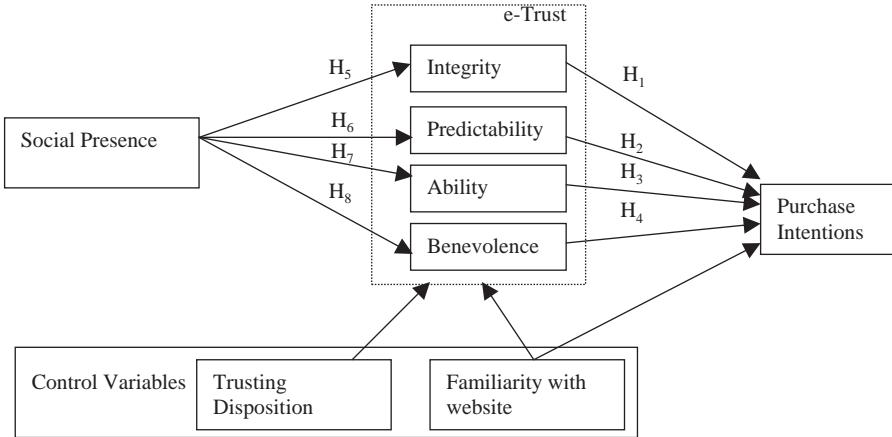


Fig. 1. Research model.

2.6. Control variables

The literature, specifically the Familiarity and Trust model [20] and its derivatives [25,26], suggest that trust also depends on a trusting disposition and familiarity, and that online purchase behavior also depends on familiarity. Accordingly, familiarity and trusting disposition are added as control variables based on [20]. A detailed discussion of the control variables appears in Appendix D. The research model is shown in Fig. 1. In Study 1 hypotheses 5–8 were not tested.

3. Methods and data analysis for study 1: Free simulation experiment using Internet book purchasing task

The research was conducted in two related, but distinct studies. In study 1, a four-dimensional scale of e-Trust was created. The reliability, convergent, and discriminant validity of the scales were then evaluated as well as whether the dimensions of trust are affected by the two e-Trust antecedents that were identified by previous research [20]. In study 1 hypotheses H₁ through H₄ were examined. Study 2 revalidated the four dimensions of e-Trust, examined these hypotheses, and extended the research model to include Social Presence as an additional antecedent of e-Trust with hypotheses H₅–H₈.

Both studies were free simulation experiments where the experimental setting duplicates or simulates, as closely as possible, a real world situation. The strength of this technique is that it allows the researcher to observe and measure subjects engaged in real world task [17]. Because no variables are specifically manipulated (only observed and measured), the technique is known as a “free” simulation experiment. The specific advantage of using a free simulation in the case of this research was to refresh, in the

mind of the e-Consumers, the nature of the interaction with the e-Vendor, and, thus, increase the content validity of the study by collecting responses based on a recent activity. This is a true experiment in that manipulation of the subjects is occurring, although subjects are not formed into treatment groups, as in the most common lab experiments [17].

In selecting the sites to be included in this study, we deliberately chose e-Vendors that are well known and widely used. In fact, both were recently listed among the top 10 visited sites [78]. Selecting these sites controlled for extraneous variance dealing with e-Vendor size, risk in dealing with unknown vendors, and reputation [41].

3.1. Research design: study 1

3.1.1. Instrument and task creation

The purchase intentions scale, which dealt with consumer intentions to purchase books on a Website and to provide credit card information in the process, the familiarity scale, and the trusting disposition scale were adapted from the literature for the special circumstances of the selected Website [20]. Items for the four dimensions of trust reflect aspects of the dimensions as they apply to B2C e-Commerce. The items reflecting ability deal with the e-Vendor's knowledge, competence, and provision of good service. Items reflecting integrity deal with the e-Vendor's honesty and keeping of promises. The items reflecting benevolence deal with the e-Vendor's benevolence, willingness to assist and support, and with consideration toward the customer. The items reflecting predictability deal with knowing what to expect from the e-Vendor. The scales were created by selecting and adapting items from marketing research that dealt with service-providing or buyer-seller relationships [11,19,48,60,61] and that applied also to e-Commerce activity. It should be noted in this context that none of these marketing studies utilized the same scale. Moreover,

occasionally, even in the same study (e.g., [19]) there is no single scale for trust across scenario types. To these items additional items were added to reflect themes in the qualitative trust literature [4,18,36]. All items were statements and subject responses were offered on a 7-point scale ranging from Strongly Agree (1) to Strongly Disagree (7).

The items were pilot tested with two experienced web shoppers to ensure linguistic and thematic clarity, and were then pre-tested with 95 subjects from the population (MBA students) in an experiment identical to the one that was later conducted to collect the actual data (see details below). The factorial validity of the proposed scale was examined with a Principal Components factor analysis, and two items, IN4 and AB2, that loaded highly on more than one factor were dropped because they did not load cleanly in the factor analysis. The scales are shown Appendix A.

3.1.2. Experimental procedure: study 1

All told, 250 MBA subjects in a business school in the Mid-Atlantic region of the USA took part in the first experiment. The classes in which the experiments were performed did not deal with e-Commerce and the subjects were not rewarded for their participation. There was no overlap between subjects who took part in the pre-testing and those who took part in the first main data collection. The subjects were given a brief introduction telling them that the study dealt with e-Commerce and asking for their assistance. The experimenter then demonstrated the features of www.amazon.com, and requested subjects to navigate to the Website on their in-lab PCs and go through the procedure of buying the textbook of the course they were currently taking, but not to actually purchase the book. This ensured that the subjects' memory was refreshed about the Website and its procedures prior to completing the experimental instrument.

At the conclusion of the task, subjects were asked to fill in the experimental instrument. Only after filling it and returning the instrument were the subjects debriefed about the research model and the hypothesized role of trust. In this manner, prior knowledge could not affect the responses. In all, 90% of the subjects completed the task and gave complete enough data for inclusion in the study resulting in 226 usable questionnaires. The subjects were mostly in their late twenties ($N = 95$), early thirties ($N = 71$), or late thirties ($N = 28$). Of those who disclosed their gender, half were men ($N = 101$) and half were women ($N = 100$). 130 subjects had purchased at least once previously at www.amazon.com.

3.1.3. Data analysis: study 1

The research model was examined using PLS. PLS combines a factor analysis with multiple linear regressions to estimate the parameters of the measurement model (item loadings on constructs) together with those of the structural model (regression paths among the constructs) by minimizing residual variance. The t -values are then estimated

using a jackknife method [7,80]. PLS is especially suited for exploratory research [7,24,29,80], such as the current study.

In addition to parameter estimation, PLS can also test the convergent and discriminant validity of the scales. This is shown when: (1) measurement items load more strongly on their assigned construct than on the other constructs in a Confirmatory Factor Analysis (CFA), and when (2) the square root of the Average Variance Extracted (AVE) of each construct is larger than its correlations with the other constructs [7,29]. Appendix B shows the results of this PLS CFA: all the measurement items loaded considerably more strongly on their respective factor than on the other constructs. All the items loaded very significantly, with p -values well within the 0.01 level, on their assigned construct. Table 2, later, shows the inter-construct correlations and square root of the AVE (in the diagonal grayed boxes).

Table 2 shows that all constructs share considerably more variance with their measurement items than with the other constructs. Table 2 also shows that all the PLS composite construct reliability coefficients are in the upper 0.80s and 0.90s. The descriptive statistics show that the subjects had a positive trusting disposition, were familiar with Amazon.com, showed proclivities toward trusting in all four dimensions of trust, and reported that they were likely to purchase at the Website.

The research model with the PLS jackknife estimates is presented in Table 3. Coefficients supported at a 0.01 level are shown with a double asterisk. The analysis shows that Purchase Intentions was, as hypothesized, affected by Familiarity and by e-Trust ($R^2 = 37\%$). Among the dimensions of e-Trust, only Integrity and by Predictability affected Purchase Intentions. Most of the dimensions of e-Trust were affected, albeit not strongly, by Trusting disposition and by Familiarity.³ The degrees of explained variance of the dimensions of trust were: Predictability 13%, Benevolence 16%, Integrity 16%, and Ability 14%. There are few surprises in these tests as they reconfirm linkages in Gefen's [20] original OMEGA study, albeit extending it considerably by examining trust as a four-dimensional construct, rather than as a single dimension.

³ In exploratory, post hoc tests, additional analyses were also performed on the data separating between experienced and inexperienced consumers based on whether the consumer reported previous purchases at the e-Vendor. These additional analyses used stepwise linear regressions that replicated the linkages in the original research model. The data analyses of both experienced and inexperienced users showed equivalent significant linkages to Table 4, the only major exceptions being that: (1) among experienced consumers ($N = 130$), benevolence reduced purchase intentions, and (2) among the inexperienced subjects ($N = 96$) predictability was an insignificant predictor of purchase intentions.

Table 2
Composite PLS reliability and inter-construct correlations and square root of AVE

Amazon	Intended purchase	Predictability	Benevolence	Integrity	Ability	Trusting disposition	Familiarity
Intended purchase	0.906						
Predictability	0.402	0.906					
Benevolence	0.297	0.529	0.830				
Integrity	0.482	0.587	0.619	0.899			
Ability	0.350	0.513	0.609	0.568	0.861		
Trusting disposition	0.191	0.277	0.333	0.269	0.208	0.829	
Familiarity	0.476	0.256	0.251	0.322	0.329	0.150	0.868
PLS reliability ^a	0.901	0.902	0.899	0.926	0.895	0.907	0.924
Mean (std.)	2.83 (1.36)	3.09 (1.09)	3.14 (1.00)	2.97 (0.95)	2.65 (0.94)	3.37 (1.14)	3.00 (1.53)

^aPLS reliability is calculated as: $\rho = (\sum \lambda_i)^2 / ((\sum \lambda_i)^2 + \sum \varepsilon_i)$.

Table 3
Study 1 (Amazon.com) findings: path coefficients

Dependent	Independent					
	IN	PRED	AB	BEN	Trusting disposition	Familiarity
Purchase Intentions (USE)	0.31**	0.16**	n.s.	n.s.		0.35**
Integrity (IN)				n.s.		0.29**
Predictability (PRED)					0.24**	0.22**
Ability (AB)					0.16**	0.30**
Benevolence (BEN)					0.30**	n.s.

n.s. = insignificant.

** Significant at the 0.01 level.

4. Methods and data analysis for study 2: free simulation experiment using internet flight purchasing task

4.1. Research design: study 2

Having validated the e-Trust scales in the *e-Product space*, the objectives of the second study were (1) to replicate study 1, to extend the generalizability of the proposed trust scales to equivalent activities in the *e-Services space*, and (2) to extend the testing of the model by examining whether social presence affects e-Trust. As noted above, the low social presence in a typical Website as compared with a typical brick-and-mortar storefront selling the same services or products is one of the major differentiating characteristics of the Web-based “new-economy”.

4.2. Instrument adaptation: study 2

Study 2 used exactly the same scale item wording as study 1, other than having “Travelocity” replace “Amazon” and “flight tickets” replace “books.” The experimental instrument also contained scale items measuring Social Presence. The Social Presence scale presented in Table 4 was adapted from Gefen and Straub [28].

Table 4
Additional scale used in study 2

Social presence	Code
There is a sense of human contact in the Website	SP1
There is a sense of personalness in the Website	SP2
There is a sense of sociability in the Website	SP3
There is a sense of human warmth in the Website	SP4
There is a sense of human sensitivity in the Website	SP5

4.3. Experimental procedure: study 2

The second experiment was conducted with 171 other MBA subjects in the same business school in the Mid-Atlantic region of the USA, using the same Internet-accessible computer lab. These classes, likewise, did not deal specifically with e-Commerce and the students were not rewarded for their participation. As in study 1,

Table 5

Composite construct reliability and inter-construct correlations and square root of AVE

Travelocity	Intended purchase	Predictability	Benevolence	Integrity	Ability	Trusting disp.	Familiarity	Social presence
Intended purchase	0.911							
Predictability	0.423	0.902						
Benevolence	0.323	0.446	0.833					
Integrity	0.455	0.502	0.591	0.805				
Ability	0.392	0.580	0.453	0.633	0.819			
Trusting disp.	0.349	0.303	0.313	0.357	0.406	0.824		
Familiarity	0.372	0.171	0.164	0.159	0.097	0.058	0.856	
Social presence	0.329	0.294	0.481	0.308	0.257	0.288	0.145	0.836
Construct reliability	0.907	0.897	0.901	0.846	0.859	0.894	0.916	0.919
Mean (std.)	3.25 (1.52)	3.34 (1.20)	3.39 (1.33)	3.04 (1.02)	2.79 (1.01)	3.45 (1.15)	3.29 (1.66)	4.49 (1.56)

the subjects were given a brief introduction telling them that the study dealt with e-Commerce and asking their assistance. The experimenter then demonstrated the use of www.travelocity.com to check for flights and then book, albeit not to purchase, a round-trip flight from NYC to London UK in two weeks' time. The subjects were then requested to navigate to the Website and go through the procedure of buying an equivalent ticket, but not actually purchasing it. Having completed the task, the subjects were asked to complete the experimental instrument. With a 93% response rate, the sampling resulted in 161 usable instruments. Subjects were mostly in their late twenties ($N = 56$), early 30s ($N = 56$), or late thirties ($N = 21$). Of those who disclosed their gender, 61% were men ($N = 89$) and 39% were women ($N = 57$).

4.4. Data analysis: study 2

As in study 1, data were examined using PLS. The CFA (see Appendix C) shows that all the measurement items load much more strongly on their respective construct than on the other constructs. All the items loaded very significantly on their respective assigned construct, with p -values well within the 0.01 level. Table 5, below, shows the inter-construct correlations and square root of the AVE (in shaded boxes in the diagonal). Table 5 shows that all constructs share considerably more variance with their measurement items than with the other constructs, showing convergent and discriminant validity. The PLS composite construct reliability coefficients are in the 0.80s and 0.90s. The descriptive statistics show that the subjects had an equivalent positive trusting disposition as subjects in study 1; were familiar with the vendor; were slightly less trusting in most dimensions of trust; and reported that they were very likely to purchase at the Website although they assessed that its overall social presence as low.

The research model with the PLS jackknife estimates is presented in Table 6. The analysis shows that Purchase

Intentions was affected by Integrity and Predictability and by Familiarity ($R^2 = 34\%$). The dimensions of e-Trust, except for Benevolence, were affected by Trusting disposition. Social Presence affected Integrity, Benevolence, and Predictability, but not Ability. Only Predictability, however, was affected by Familiarity.⁴ Explained variance of the trust dimensions were: Predictability 15%, Benevolence 27%, Integrity 19%, and Ability 19%.

5. Discussion, limitations, and implications

Academic research (e.g., [20,41,65]) and industry reports (e.g., BBC [3], Cole [8]) claim that trust is important in e-Commerce. This study upholds this thesis, showing that 34–37% of the variance of consumer intentions to purchase an e-Product in study 1 and an e-Service in study 2 were explained by elements of e-Trust and the control variable Familiarity. Data analyses of two experiments show that our research model for e-Trust in the B2C space generally holds.

The study contributes to explanatory models of e-Trust by refining the models offered by previous research, by expanding the theory-base to include dimensions of trust, and by adding the dimension of social presence as another antecedent of e-Trust. The importance of each e-Trust dimension is explained in the context of reducing the social

⁴ As in study 1, the data were re-analyzed splitting the data into experienced ($N = 104$) versus inexperienced ($N = 57$) consumers, according to whether they self-reported previous purchases at the specific e-Vendor. The data were analyzed with stepwise regression, although special caution needs to be exercised given the sample sizes. These analyses show equivalent effects to the model above, except that (1) here too, benevolence among experienced consumers had a negative effect on purchase intentions, and (2) among experienced consumers, predictability was not a significant predictor of purchase intentions, perhaps because of the type of service Travelocity.com sells and the fact that variance in the quality of bookings are co-dependent on partners.

Table 6
Study 2 (Travelocity.com) findings: path coefficients

Dependent	Independent						
	IN	PRED	AB	BEN	Trusting disposition	Social presence	Familiarity
Purchase intentions (USE)	0.26**	0.19**	n.s.	n.s.	0.24**	0.21**	0.29**
Integrity (IN)					0.24**	0.21**	n.s.
Predictability (PRED)					0.36**	n.s.	0.13**
Ability (AB)					n.s.		n.s.
Benevolence (BEN)						0.41**	n.s.

n.s. = insignificant.

** Significant at the 0.01 level.

uncertainty involved in achieving the consumers' outcomes from the interaction in the unique context of e-Commerce with its lack of an interpersonal contact.

The studies also reinforced the interpretation that e-Trust is a multi-dimensional construct, but showed that only its dimensions of integrity and predictability are significant antecedents of purchase intentions in e-Commerce. As explained above, trust is a set of beliefs about *other people* that serve to justify an interaction with these persons, based on the belief that they will behave socially as expected and in doing so will provide the trusting party with its expected outcomes. Arguably, depending on the trusting party's expectations of the trusted party and how these expectations relate to the trusting party's hoped for outcomes, some trust beliefs should be more important than others in each particular context. The more important beliefs among the four trust beliefs may be those on which the trusting party depends on the trusted person or persons to obtain its expected outcomes from the interaction.

High correlations between the dimensions of trust may account for lack of significance of the ability and benevolence dimensions. For this reason, it is not possible to make too much of the lack of significance here even though the power is reasonable, given the sample size. In situations with high multicollinearity, least-squares techniques cannot hold variables constant, and this could lead to artifactual results.

With respect to the control variables, the data analyses show that, in accordance with the literature, e-Trust in both studies was affected by a general disposition to trust [55,71] and to a lesser extent by familiarity [51]. The importance of a trusting disposition is not surprising given that there is little to no personal interaction with the two e-Vendors, which forces the customers to rely on alternative, non-interpersonal interaction based, antecedents when deciding on their degree of trust in the e-Vendor. The addition of social presence as another antecedent of e-Trust in the context of e-Commerce extends previous research in showing that although a Website is typically devoid of actual human interaction, nonetheless, *the perception that there is a social presence does in itself increase e-Trust*. This tentative conclusion

means that the perception of social presence in a Website, the possible semblance of an interpersonal interaction, is probably important in e-Commerce even though consumers typically interact with a Website rather than with another person.

When the data were analyzed post hoc to differentiate between experienced and new consumers, results revealed that in both datasets benevolence decreased purchase intentions among experienced consumers (although caution is called for given the lower sample sizes in these post-hoc analyses). In retrospect these results are not so surprising. Integrity and predictability are among the expected characteristics of the way a typical vendor treats all customers, including new ones. On the other hand, showing benevolence is not. As when people interact in general, indications of benevolence when caring is not called for are often interpreted as attempts to establish superior social standing, not as showing caring. As such, these cues inhibit people's willingness to take part in an interaction with that person [4]. Consequently, it is not surprising that experienced consumers' behavioral intentions are in accordance with what would be expected of typical wary consumers. After all, even in the bricks-and-mortar world, when a salesperson shows exaggerated caring, it is treated with suspicion and is thus likely to turn customers away.

Taken together, the two studies also provide an initial verified scale of e-Trust that shows equivalent convergent and discriminant validity and reliability with regard to both service and product e-Vendors. The fact that the instrument was valid across settings, times, and persons [9] means that it might be generalizable to other B2C e-Commerce situations, although, clearly, additional research is needed in this regard. There are many instruments in the literature that develop some of the components of trust, but the present e-Trust instrument is among the most comprehensive of these attempts, to date.

5.1. Limitations and future research

Several limitations and issues need to be mentioned and discussed. The use of graduate business school students as

surrogates for e-Consumers might raise issues of external validity [32] unless the students do, in fact, represent the target population [38], which, arguably, they might in this case [20]. Although there is no reason to believe that the average profile of the MBA students does not represent typical purchasers of online products and services of the types examined, as in other cases [66], additional research should examine whether these results apply equally well to other consumers in e-Commerce situations. Related to this limitation is the possible sample bias, the selection of a sample of experienced buyers. It is quite possible that both familiarity and the trust dimensions work differently with inexperienced buyers. Additionally, even though the pattern of results was consistent in both studies, the possibility of insignificant paths may be due to statistical issues. Additional research is needed here too.

The emphasis of this study was on assessing the impact of trust beliefs on e-Commerce. The data, accordingly, examined trust and related constructs. There are, however, many other issues affecting e-Commerce aside from consumer trust, such as consumer loyalty [65], product perceptions about the available variety, price, and quality, as well as the compatibility, playfulness and effort in the shopping experience, combined with customer service and perceived risk [10,40]. These variables are clearly important in e-Commerce. However, given that the focus of the study was on the unique aspects of trust in an e-Commerce setting (unique because there is no interpersonal interaction), these aspects were not studied. Hence, although this study reports relatively high R^2 , expanding the research model to include these additional issues, which being significant in commerce in general might apply also to e-Commerce, could provide an invaluable tool to both industry and research.

There are also many contingencies that will undoubtedly affect the level of trust that e-Consumers have in e-Vendors. A short list would include: branding, the type of the item being transacted, the size of the purchase, previous history with e-Vendor, the role of trusted third parties, the use of new reputation mechanisms, the professional appearance of the Website, the speed of loading for the site, articles written about the company or its Website, word of mouth references or discussions of experiences or beliefs, the frequency, nature, and placement of ads for the site. This study did not attempt to address all these possible antecedents of trust but to examine the dimensions of trust itself in this unique e-Commerce environment, where there is a lack of interpersonal interaction but where nonetheless trust as a set of interpersonal beliefs still applies. Additional research is needed to sort out the effects of such conditions on trust-building and the trust that users develop in e-Vendors.

Of course, there is a mirror image to issues surrounding consumer trust. Vendors also have to trust, both in the integrity of the transaction and in the ability of the consumer to pay. Credit checks may help in the latter case, and encryption and third party guarantors such as certificate authorities in the former, but there is still a possibility of fraud-

ulent transactions. Cyberspace does not now permit the use of photo IDs of the consumer, as in physical retail establishments, and hackers can easily masquerade as legitimate users in the absence of digital signatures. This issue cuts both ways as consumers can also be duped by phony Websites. In short, there are many issues that need to be explored in the domain of e-Trust.

The potential importance of social presence raises the question of how a Website can be designed to increase social presence and what additional features, such as a toll-free number, it should include in order to increase its social presence. Additional research is needed to investigate these aspects.

5.2. Implications for researchers

Previous research examined trust as a single-dimension construct (e.g., [20,41,65]) dealing primarily with risk. This study takes a different view, showing that e-Trust is multi-dimensional and that its dimensions should be significant to the extent that they help reassure the customers about expected outcomes. Accordingly, the meaning and consequences of trust are better understood when each dimension is viewed separately. The potential value of this scale is increased by its robust psychometric properties over two different cases. Amazon.com sells a commodity product (mainly books), while Travelocity.com sells services (mainly airline reservations).

In the two independent forms of e-Commerce (e-Products and e-Services) where trust was examined, it consisted of the same dimensions of ability, integrity, benevolence, and predictability. The two studies also show, consistently, that integrity and predictability, together with familiarity, were significant antecedents of purchase intentions. And, in both studies, the belief in the e-Vendor's benevolence among experienced consumers reduced their purchase intentions. This suggests that although trust is important, as previous research found and as industry reports state, it is not a single monolith construct with a single effect. Rather, as revealed in this study, trust is multi-dimensional in both its measurement and its structural effects, and the significance of the effect of each dimension of trust depends on its specific applicability of the human-related expectation it represents.

Another contribution is the addition of social presence as perceived in the Website by the e-Consumer in study 2. Additionally, some trust antecedents have been identified and examined as control variables, namely, trusting disposition and familiarity. In this regard, the study justifies Morgan and Hunt's [61] claim that trust (as a set of beliefs) is a key mediating variable in relationship models and that overlooking the role of trust "results in flawed conclusions" (p. 31). Toward this end, this study has proposed and demonstrated a model of its effects.

On a broader level, the study shows that trust is a multi-dimensional construct but that—in accordance with the theory—trust being important in interpersonal

relationships because it reduces relevant aspects of social uncertainty [51]—only those dimensions of trust that are pertinent to the expected outcome of the interaction affect people's intended behavior.

The exploratory results regarding the effect of benevolence on experienced consumers is also interesting within the theory-base. As Blau [4] suggested, trust affects behavioral intentions when the trusted party behaves or indicates that it will behave in accordance with what is expected of it within the context of relevant behaviors and cues. But this does not mean that behaving in what would otherwise be generally considered a trustworthy manner, for instance by being benevolent, will necessarily encourage other people to take part in the transaction. Such behavior and cues only encourage behavior to the extent they are expected from the trusted party. And, if these exploratory results can be generalized, behaving or showing cues in such a manner may actually inhibit people from taking part in a transaction when they are not expected of the trusted party, because showing caring when it is not expected might be interpreted as indicating superior social standing and power rather than reducing social uncertainty [4].

5.3. Implications for practitioners

Although additional research is needed before definitive implications can be stated, the latter conclusion is interesting from a practitioner point of view too. One might be inclined to believe based on the literature that behavior and cues that show ability, integrity, predictability, and benevolence should be encouraged among e-Vendors because trust is a necessary precursor of online purchase [65], and may be, at least according to Fukuyama [18], the single most important factor directly affecting organizational and national prosperity and adaptability, including the acceptance of new IT.

However, to the extent that the exploratory results can be generalized, this principle should be qualified to only those cues and behaviors that are expected of the human side of the e-Vendor, probably because people are naturally suspicious of unmitigated and unexpected trustworthy cues

and behaviors. Indeed, theory [4] suggests that showing excessive caring can actually inhibit people's intentions to participate in transactions because it is might be translated as a show of superior social standing. Nonetheless, practitioners should also be aware that in other studies dealing with trustworthy behavior, the data suggested that it is the *interpretation* of the motive behind the observed cues and behaviors that might determine what people do, rather than the perceived cues or behaviors themselves [21].

As more and more e-Vendors are realizing the importance of promoting trust online [5], this study provides some guidelines on how to send such a message. e-Trust appears to result, among other factors, from familiarity, and from cues and perceptions of social presence. Does this mean that new e-Vendors should apply interfaces and procedures that consumers are already used to from other e-Vendors? Does this imply that e-Vendors should try and maintain the same interface and work procedures over time? The data tentatively seem to suggest so. The finding about social presence also might have far reaching implications for Internet-based vendors because of the noted lack of social presence in Web-sites. Given these tentative conclusions, e-Commerce vendors might wish to invest in creating and maintaining effective social presence channels with potential consumers.

6. Conclusion

Trust, according to Fukuyama [18], is the lubricant of trade and, in this way, determines the wealth of nations. The present study lends support to this assertion, but also qualifies it by showing that e-Trust is not a single monolith belief but a set of beliefs of varying importance depending on their relevance to the expected outcome. The study also hints at how e-Trust can be increased. Both findings are crucial in articulating a basic understanding of e-Trust for e-Commerce managers as well as for academics investigating this phenomenon.

Appendix A. Items used in Study 1

(Study 2 substituted “Travelocity” for “Amazon” and “flight tickets” for “books”.)

Scales and items	Code
Integrity	
Promises made by Amazon.com are likely to be reliable	IN1
I do not doubt the honesty of Amazon.com	IN2
I expect that Amazon.com will keep promises they make	IN3
I expect that the advice given by Amazon.com is their best judgment	IN4 (dropped)
Benevolence	
I expect I can count on Amazon.com to consider how its actions affect me	BEN1
I expect that Amazon.com intentions are benevolent	BEN2
I expect that Amazon.com puts customers' interests before their own	BEN3
I expect that Amazon.com is well meaning	BEN4

Ability						
Amazon.com is competent					AB1	
Amazon.com understands the market it works in					AB2 (dropped)	
Amazon.com knows about books					AB3	
Amazon.com knows how to provide excellent service					AB4	
Predictability						
I am quite certain about what Amazon.com will do					PRED1	
I am quite certain what to expect from Amazon.com					PRED2	
Intended purchase						
I am very likely to buy books from Amazon.com					USE1	
I would use my credit card to purchase from Amazon.com					USE2	
Trusting disposition						
I generally trust other people					DIS1	
I tend to count upon other people					DIS2	
I generally have faith in humanity					DIS3	
I feel that people are generally well meaning					DIS4 ^a	
I feel that people are generally trustworthy					DIS5 ^a	
I feel that people are generally reliable					DIS6	
Familiarity						
I am familiar with searching for books on the Internet					FAM1	
I am familiar with buying books on the Internet					FAM2	
I am familiar with Amazon.com					FAM3	
I am familiar with inquiring about book ratings at Amazon.com					FAM4	

^a Items DIS4 and DIS5 were dropped so the trusting disposition scale would match Gefen [20].

Appendix B. PLS confirmatory factor analysis of Amazon.com data

	Ability	Benevolence	Familiarity	Integrity	Intended purchase	Predictability	Trusting disposition
AB1	0.8574	0.5323	0.3409	0.5166	0.3084	0.4654	0.1891
AB3	0.8310	0.4395	0.1698	0.4242	0.2529	0.3463	0.1990
AB4	0.8923	0.5782	0.3086	0.5120	0.3321	0.4900	0.2013
BEN1	0.5106	0.8145	0.2239	0.5455	0.2868	0.4547	0.2678
BEN2	0.5350	0.8388	0.2391	0.5072	0.3004	0.3945	0.2725
BEN3	0.6054	0.8311	0.1849	0.5323	0.1904	0.4918	0.2508
BEN4	0.3731	0.8358	0.1753	0.4715	0.1881	0.4240	0.3306
FAM1	0.3130	0.2317	0.9041	0.2930	0.4318	0.2120	0.1142
FAM2	0.2456	0.1861	0.8900	0.2923	0.5023	0.2481	0.1299
FAM3	0.2666	0.1814	0.8251	0.1963	0.3145	0.1399	0.0713
FAM4	0.3144	0.2635	0.8489	0.3170	0.3792	0.2676	0.1912
IN1	0.5014	0.5187	0.3418	0.8843	0.4339	0.4947	0.1847
IN2	0.4952	0.5176	0.2589	0.9115	0.4449	0.5685	0.2620
IN3	0.5348	0.6335	0.2675	0.8998	0.4207	0.5186	0.3044
USE2	0.3026	0.2644	0.4285	0.4352	0.9030	0.3447	0.2144
USE1	0.3317	0.2724	0.4327	0.4378	0.9082	0.3836	0.1568
PRED3	0.4807	0.5215	0.2285	0.5608	0.3174	0.8925	0.2671
PRED4	0.4524	0.4427	0.2350	0.5075	0.4065	0.9199	0.2658
DIS1	0.1409	0.2439	0.1306	0.1929	0.1322	0.2012	0.8401
DIS2	0.1914	0.2665	0.1173	0.1878	0.1970	0.2576	0.8265
DIS3	0.1955	0.3130	0.1322	0.2901	0.1490	0.2583	0.8646
DIS6	0.2152	0.2862	0.1175	0.2368	0.1960	0.2476	0.7820

Appendix C. PLS confirmatory factor analysis of Travelocity.com data

Travelocity	Ability	Benevolence	Familiarity	Integrity	Intended purchase	Predictability	Trusting disposition	Social presence
AB1	0.8516	0.4918	0.1043	0.5787	0.3268	0.5368	0.4205	0.2821
AB3	0.8266	0.2456	0.0084	0.5745	0.3433	0.4008	0.3276	0.1078
AB4	0.7781	0.3536	0.1260	0.3798	0.2922	0.4816	0.2209	0.2321
BEN1	0.3398	0.8241	0.1854	0.5199	0.3598	0.3971	0.3158	0.3753
BEN2	0.3946	0.8356	0.0659	0.4440	0.2562	0.3394	0.2226	0.4424
BEN3	0.4782	0.8468	0.1700	0.5342	0.2389	0.4060	0.2925	0.3978
BEN4	0.2918	0.8264	0.1193	0.4655	0.2034	0.3360	0.1967	0.3875
FAM1	0.1458	0.1618	0.8794	0.1616	0.2692	0.1180	0.0072	0.0944
FAM2	0.0304	0.1700	0.9013	0.1469	0.4186	0.1750	0.0525	0.1470
FAM3	0.0536	0.0670	0.7351	0.0957	0.3167	0.1891	0.1251	0.1816
FAM4	0.1208	0.1560	0.8964	0.1341	0.2246	0.0847	0.0068	0.0574
IN1	0.5190	0.4214	0.0474	0.8012	0.2460	0.4459	0.3109	0.2571
IN2	0.5470	0.5394	0.2327	0.8704	0.4762	0.4052	0.3195	0.2791
IN3	0.4625	0.4508	0.0553	0.7384	0.3326	0.3735	0.2253	0.2010
USE1	0.3595	0.2412	0.3173	0.4296	0.9149	0.4258	0.2881	0.2707
USE2	0.3547	0.3496	0.3615	0.3984	0.9077	0.3428	0.3490	0.3303
PRED1	0.4988	0.3819	0.0439	0.4216	0.3420	0.8810	0.2675	0.2617
PRED2	0.5448	0.4200	0.2442	0.4792	0.4144	0.9223	0.2783	0.2688
DIS1	0.3447	0.2271	0.0573	0.3225	0.3185	0.2845	0.8502	0.1918
DIS2	0.2527	0.2268	0.0663	0.1665	0.1855	0.2350	0.6951	0.2125
DIS3	0.3297	0.2340	0.0677	0.2861	0.3373	0.2034	0.8479	0.2992
DIS6	0.3916	0.3297	0.0125	0.3656	0.2955	0.2711	0.8895	0.2524
SP1	0.1724	0.4266	0.1468	0.2171	0.2919	0.2042	0.1983	0.8761
SP2	0.2729	0.3530	0.1388	0.2849	0.3214	0.2263	0.1986	0.8844
SP3	0.2309	0.4793	0.1154	0.3004	0.2720	0.2761	0.2378	0.8892
SP4	0.1155	0.1769	0.1054	0.0426	0.1911	0.1781	0.2412	0.5685
SP5	0.2472	0.4777	0.1128	0.3348	0.2906	0.3178	0.3389	0.9107

Appendix D. Control variables

D.1. Trusting disposition

Despite the importance of long standing social interactions, the literature suggests that trust depends in part also on a trusting disposition. Depending on the their cultural background [4], their faith in humanity and their socialized trusting stance [56,70], individuals typically enter into relationships with a certain degree of initial trust [52,56,70]. This initial trust is not based on the specific trusted person or organization; rather, it is based on the individual's lifelong socialization and experiences that lead him/her to believe to some degree or another that people in general can be trusted. A trusting disposition is one way to overcome the "Catch 22" problem as it relates to interpersonal trust. Without trust, most interpersonal interactions cannot occur, but without these interpersonal interactions the trust that is required for these interactions cannot be built. Reliance on a trusting disposition solves this "Catch 22" problem. It is

a willingness to give a "trust credit" without justifying it on prior experience with the particular would-be trusted party. This trust is based on a trusting disposition that is the consequence of the lifelong experience of the trusting party; it is applicable, therefore, even when there is no prior experience with the specific would-be trusted party [56,70].

D.2. Familiarity

This construct is also an antecedent of trust because it enables people to place their trust beliefs about the future into a context which clarifies the specifics of what they expect of others: the what, when, where, and how [52]. This view is also in accordance with Blau [4] who explains that trust is built through successful previous interactions with the trusted party, the subsequent acquaintance with the trusted party and the knowledge gained about its trustworthiness and what to expect of it.

Extrapolating this concept to e-Commerce suggests that familiarity with an e-Vendor reduces social uncertainty

through an understanding of what is happening, the context, and what will occur next. When a user is asked to enter the credit card information that is necessary to conclude the transaction, the social uncertainty a user may feel about why the e-Vendor wants it and what the e-Vendor will do with the credit card information is, arguably, smaller when the user understands why the e-Vendor needs it. In essence, experience reduces perceived uncertainty about the actions of others. Such familiarity should also increase trust because it is more likely that the e-Vendor will behave as expected, and thus increase trust, when the trusting party is familiar with how the e-Vendor operates and thus have expectations that are grounded in actuality. Previous research supports these conclusions showing that in e-Commerce familiarity and trust are two distinct constructs, with familiarity in a trustworthy company increasing trust in the e-Vendor, and both familiarity and trust increasing online purchase intentions [20].

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Information & Management 43 (2006) 1–14

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The role played by perceived usability, satisfaction and consumer trust on website loyalty

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Received 9 April 2004; accepted 27 January 2005

Available online 14 March 2005

Abstract

We performed a study to determine the influence that perceived usability has on the user's loyalty to websites that they visit. The results of the empirical analysis confirmed that the trust of the user increases when the user perceived that the system was usable and that there was a consequent increase in the degree of website loyalty. In the same way, greater usability was found to have a positive influence on user satisfaction, and this also generated greater website loyalty. Finally, it was found that user trust was partially dependent on the degree of consumer website satisfaction.

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Keywords: Usability; Satisfaction; Trust; Loyalty

1. Introduction

Due to the influence of the Internet on economic activity [95,105] traditional areas of study, such as satisfaction and loyalty, have received a new impulse as a consequence of the incorporation of businesses in the virtual medium. Similarly, other concepts, such as trust or usability, are acquiring a particular relevance due to the especially important part they play in the provision of services through the Internet. Despite the importance of these concepts there have been few studies that have analysed the relationship between them. Our study was

initiated to provide reliable and valid scales of measurement of all the variables, especially those with of usability, since it is the only one that has been subjected to the most demanding criteria. Specifically, the objective of this study was the analysis of the influence of perceived website usability on user trust and satisfaction and the incidence of these three variables on the loyalty shown by Internet users.

2. Website usability

While the website might seem cold and distant compared to a traditional establishment, it also offers new and interesting possibilities. Because of these and the relative lack of literature on the issues involved,

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there have been many research projects centred on analysis of the consumer's perceptions of these establishments [85,97], and on studying the influence of the site attributes that affect the conduct of the potential buyer [65,21,16]. Based on these studies, it seems likely that in the new environment, *perceived website usability* is a very important part of the store's image and that it can influence shopping behaviour in a similar way to those aspects of traditional establishments [68,62]. In fact, *usability* has been shown to be a key factor when the services of an organisation use the Internet. Indeed, Kim and Eom [53] concluded that usability is of critical importance in achieving the satisfaction of the user. Ranganathan and Ganapathy [86] also referred to the importance of the concept when attempting to identify the key dimensions of website quality.

According to ISO 9241,¹ IT system usability involves the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments. In a website, usability reflects the *perceived ease of navigating the site* or making purchases through the Internet. For Nielsen [79], website usability involves the ease with which the user can learn to manage the system and memorise the basic functions, the efficiency of design of the site, the degree of error avoidance and the general satisfaction of the user. More recently, it has been suggested that website usability “*is a quality attribute that assesses how easy user interfaces are to use*” [78]. These definitions show the coincidence between the concept of “*ease of use*” and usability. However, e-commerce literature uses the term usability more frequently, so “*ease of use*” is no longer used in this paper. In addition we need to emphasise the difference between usability and usefulness. Some authors consider the influence of several website characteristics on the likelihood of use. For example, Swaminathan et al. [102] proposed that the greater the perceived usefulness of information of web vendors, the greater the likelihood of electronic exchange. However, such authors discuss the richness or relevance of the information, not its ease of use. Consequently, we propose that there is a clear

distinction between usefulness and usability. For example, Davis [22] developed and validated new scales for perceived usefulness and perceived ease of use, which are hypothesised to be major determinants of user acceptance.

Recently, several scales for quantifying the concept have been developed. These include

- The system usability scale (SUS) was developed in 1986 as part of the Digital Equipment Co. Ltd. introduction of usability engineering in back-office systems.
- The software usability measurement inventory scale (SUMI) was developed with the same objective as the SUMI questionnaire, but structured the concept of usability around different sub-scales.
- The scale of Lin et al. [63], which was intended to evaluate the global usability of a website.
- Shneiderman's ‘Questionnaire for Usability Evaluation’ [91].

In general terms, usability considers the following factors:

1. The ease of understanding the structure of a system, its functions, interface, and contents observed by the user.
2. Simplicity of use of the website in its initial stages.
3. The speed with which the users can find the item they are looking for.
4. The perceived ease of site navigation in terms of the time required and action necessary to obtain the desired results.
5. The ability of the user to control what they are doing, and where they are, at any given moment.

3. Literature background and hypothesis

3.1. Trust

This concept has received special attention in marketing literature due to the notable influence it has on the attainment of a long-lasting and profitable relationships [74,5,35,37,98]. Traditionally, trust is defined as a group of beliefs held by a person derived from his or her perceptions about certain attributes; in marketing this involves the brand, products or services,

¹ The International Organization for Standardization (ISO) is currently developing a new standard, specifically for website design, called ISO/AWI 23973 “Software ergonomics for World Wide Web user interfaces”.

salespeople, and the establishment where the products or services are bought and sold [34]. This group of beliefs has been divided into different dimensions and trust is usually considered a multidimensional construct that differentiates between honesty and benevolence perceived in the behaviour of the other party. *Honesty* is the belief that another person will keep his or her word, fulfil promises and be sincere [38]. *Benevolence* is the belief that one of the parties is interested in the well-being of the other without intention of opportunistic behaviour [58] and motivated by a search for a mutually beneficial relationship [27]. Some researchers have discussed other dimensions of trust; e.g., in the perceived competence of the second party [89]. This is concerned with the perceived dexterity and ability of the second party [69,94]. Specifically, *competence* is the degree with which the consumer perceives that the supplier is in possession of the necessary knowledge and skills to complete an agreement or exchange. [19]. *Perceived competence* is especially relevant in an analysis of consumer Internet behaviour [83,88]; lack of knowledge about a relation can adversely affect the process. To this we must add a lack of knowledge of the medium itself. Little-known brands, insecurity about online payments, concern about order processing or conditions of delivery are all factors that oblige the business owner to show that the online business has financial, technical, and human resources necessary to satisfy the terms and conditions of the exchange agreement. Thus trust will be considered here as a construct made up of three dimensions: honesty, benevolence and competence perceived in a website.

Some authors have analysed the role of trust in online relationships by distinguishing different stages [72]. McKnight et al. [73] state that the consumer of a website overcomes a prior exploratory stage before being ready to carry out commercial transactions with it. In the exploration stage, the consumer has no direct experience with it, and thus trust is based on aspects such as perceived reputation, propensity to trust others, or presence of structural guarantees (such as independent testimonials). Once this first phase has been overcome, the consumer will decide to carry out riskier operations (e.g. make an order). This phase is the “*commitment stage*”. It is the individual’s experience with the website that determines the levels of trust at any moment. The present work deals with this second phase, since consumers who were

interviewed in our study already had experience in the use of the websites. Such experience allows the individual to create expectations about the events that may occur in future, and therefore decide whether to continue with the relationship. Consequently, trust is generated as a result of knowledge accumulation. The development of new exchanges broadens the information that the consumer has of the website’s qualities. This is added to the previous information and may even modify the trust between the parties.

Some research projects have analysed the importance of trust in Internet relationships [67,40,71, 59,14,32]. Insecurity of the consumer when shopping online has become one of the most important obstacles to the growth of e-commerce [56,106]. This is because a brick-and-mortar business gives the consumer a sense of privacy or reliability of communication that protects any exchange of financial information [55]. It has been argued [52,18,77] that website attributes (particularly usability) may influence the perceptions of the consumer about the website and thus of the expected degree of trust.

The ease of use of a computer system favours more complete learning and a greater capacity to infer how the system will act. Thus, usability may improve trust levels [29]. From a global perspective, we can establish several arguments about the influence of usability on trust:

- Greater usability favours a better comprehension of the contents and tasks that the consumer must realise to achieve an objective (e.g. make an order). This reduces the likelihood of error and improves consumer trust levels [75].
- Usability is related to consumer ability to know where he or she is at any time and what can be done. Self-confidence may be defined as a consumer feeling of security and ability about his or her decisions and behaviours [12]; thus we may establish a clear relationship between usability and self-confidence. Greater usability offers more security to website users. In addition, greater self-confidence might improve consumer trust in the website. Indeed, it has been proposed that familiarity and self-confidence favour greater trust in technology [49].
- Suitable design favours feelings of pleasure in use of the website. Consequently, greater usability

offers a comfortable atmosphere that might favour a more positive consumer disposition. Indeed, in traditional channels several authors have contrasted the influence of aspects such as colour on the feelings of pleasure of the buyer [13].

Furthermore, considering the multidimensional structure of trust we offer additional arguments:

- Honesty is related to information transparency. Given that greater usability favours greater transparency, we assume that honesty (trust) might be improved.
- Greater usability may be perceived as a signal of benevolence. Thus, greater ease of use would be interpreted as the desire to adjust to consumer needs.

Low levels of usability may generate errors on order processing, such as ordering undesired products or problems in the payment. Such errors increase feelings of distrust and discourage future transactions. We believe that usability may influence perceived competence significantly.

Based on this, we state the following hypothesis:

H1. The degree of website usability perceived by the consumer has a direct and positive influence on the degree of trust shown in that same website.

3.2. Satisfaction

In general terms, we define satisfaction as an affective consumer condition that results from a global evaluation of all the aspects that make up the consumer relationship [7]. The development of satisfaction follows a similar process to that of trust. Satisfaction shows a favourable attitude of the consumer. This is a response to long-term consistency of company behaviour [26]. With each new interchange, the individual's perception is fed by new information. It is this that determines the level of satisfaction at any given time [23].

Research into parameters that influence levels of Internet consumer satisfaction are in their early stages and are still scarce [17,51]. Some work has looked at factors that affect satisfaction among website users [76]. Spiller and Loshe [100] point to the influence of website design on the degree of

Internet consumer satisfaction. As a consequence, we assume that though website design may not guarantee consumer satisfaction (there are other factors) it does have a direct influence. Therefore our second hypothesis is:

H2. Greater perceived website usability has a direct and positive influence on the degree of satisfaction of the user of that same website.

Satisfaction has been linked to the trust in a relationship [50,11]. This should be greater when the satisfaction that the business or product gives the consumer is greater. Consequently, the degree of trust is a consequence of the capacity of a business to satisfy the needs of its clients.

Selnes [93] stated that satisfaction and trust were concepts that refer to global evaluations, feelings, or attitudes by one party with respect to another, and, although related, these are different variables. One of the models put forward to explain the process by which satisfaction is generated is the expectation/disconfirmation theory [82]; it arose from Helson's theory of the degree of adaptation and states that the degree of an individual's satisfaction depends on the relationship between the initial expectations created and the results obtained. Satisfaction therefore depends on the difference between what a consumer wants and what he or she obtains; there may also be other tangible aspects, such as delivery time or system security. However, according to Johnson and Grayson [44] expectation may be linked to intangible questions, such as: feelings of joy, fear, and anger associated with the service experience or the fulfilment of certain standards. The consumer will feel satisfied if he perceives the fulfilment of the required level of honesty, benevolence and competence in the website. Therefore, as satisfaction can act as an instrument to engender greater trust, we formulate our third hypothesis:

H3. Greater website user satisfaction has a direct and positive influence on the degree of trust shown in that same website.

3.3. Loyalty

As a consequence of the growing importance of Internet services, a number of researchers have

attempted to find ways to improve website fidelity and increase the consumer's intention to buy [1]. Going further, as website loyalty seems to depend on consumer skills in managing and controlling the website, cognitive lock-in [45], supposes that the consumer's familiarity with a website (and acquisition of the skills to manage and control it), lessens the likelihood of the consumer changing to another website [2,46]. Therefore, even when the cost of searching the Internet is low and when that search could yield a cheaper product, individuals limit their options and stick with websites with which they are familiar [24,61]. The acquisition of the necessary skills will not only depend on the time dedicated by the consumer to managing the website, but also on the facilities that the website offers its users. We therefore formulate the hypothesis:

H4. Greater perceived website usability has a direct and positive influence on the degree of user loyalty to that same website.

One study suggested that 49% of consumers are opposed to making purchases on the Internet due to lack of trust [104]. Lee et al. [60] stated that loyalty directly depends on the degree of trust. Similarly, Quelch and Klein [84] and Jarvenpaa et al. [43] pointed out that trust is a critical factor in stimulating purchase. Lack of technical knowledge, lack of knowledge of the agents operating in the digital market, a feeling of vulnerability, and the risk assumed by the individual all make trust a key factor; but the consumer shows opposition to distance shopping when it is associated with high levels of risk [103,28]. In fact, purchases made from home, by telephone [20] or mail [4] are considered high risk. We therefore postulate that:

H5. Greater website consumer trust leads to greater consumer loyalty to that same website.

Higher consumer satisfaction leads to greater individual loyalty [7,107]. More specifically, if the consumer believes that the organisation will fulfil the agreed conditions, they believe that this behaviour will continue and their predisposition to develop the relationship will increase [36]. At the same time, the alternatives in the market will be less attractive. Thus we hypothesise that fulfilment of the expectations of the website user will lead to an increase in intention to

buy in future, the user will visit the site more frequently, and spend more, as in other contexts [64].

H6. Greater consumer satisfaction with the services offered by a website will lead to a greater degree of loyalty towards that website.

4. Data collection

Following the suggestions of other researchers [92], a single dimension was used to quantify the variables of usability and satisfaction, measured using a multi-item scale. Quantifying satisfaction did not present difficulties, as reference could be made to many papers published. The measurement of usability, however, was a little more complex. Although a number of efforts made to quantify usability, most of the instruments (e.g. the SUS or SUMI scales) have not been submitted to adequate validation. Nevertheless, we developed our measure by considering the WAMMI scale. This has been analysed from a statistical perspective, though using a relatively simple factor (Cronbach alpha) and it has been the most frequent usability measurement in website design in several well-established firms, such as Compaq, Nokia, and Ericsson.

Trust was measured in terms of perceived website honesty, benevolence, and competence. Website loyalty was measured on two dimensions that reflected the consumer's behaviour at a specific website (see Appendix A, the LOY_A dimension) and also at a competitor's website (see Appendix A, the LOY_B dimension). This therefore considers the influence of website competitors and their power to modify consumer behaviour.

In order to guarantee the content validity of the questionnaire we first analyse previous literature. The trust scale was developed using the works of Kumar et al. [57], Siguaw et al. [96], Doney and Cannon [27], and Roy et al. [88]; the proposals of Brockman [15], Janda et al. [42] and Smith and Barclay [99] were used for satisfaction; while perceived website usability used Roy et al. [88], Lin et al. [63] and Kirakowski et al. [54]; while the concept of loyalty made reference to the work of Rowley and Dawes [87], Yoon and Kim [107], and Flavián et al. [30]. The initial scales had to be adapted to the context and framework of the research. The scales of trust, loyalty and satisfaction were adapted because prior scales were developed based on literature dealing

with traditional distribution channels. However, the WAMMI scale has been mainly used by professional projects, so that its utility for academic studies is not guaranteed. Following the recommendations of De Wulf and Odekerken-Schröder [25], this adaptation was based on opinions expressed in a Delphi process by various experts in e-marketing and website design, as well as a series of in-depth interviews with about a dozen Internet consumers. Moreover, a quantitative pre-test was conducted with a sample of 30 users, based on exploratory factor and Cronbach alpha analyses. The aim of these initial siftings was to ensure that the questions posed were understood correctly, as well as to include the most pertinent aspects in the measuring of concepts. The final version of the scales that were used can be seen in [Appendix A](#).

Once the initial questionnaire had been constructed, it was published on a website that was designed specifically for our project; subjects were provided with all the information about the research project. Those who wished to complete the questionnaire could make a hard copy or complete it on their PCs; it could then be returned via e-mail, fax or mail. To increase the response rate, two extra activities were carried out. Firstly, we used a publicity campaign by inserting banners on well-known, heavy traffic online media sites, as well as on discussion forums, Usenet and mailing lists that were collaborating in the project. This effort was accomplished in March 2003. Secondly, we provided a prize, selected by drawing randomly from among participants. The variables were measured using a Likert scale of 1–7 points.

Once refined, excluding repeat questionnaires and atypical or missing data, there were 351 valid samples. This gave us a sample error of 5.2% (95% degree of confidence).

Internet users who responded could choose a website to be analysed provided that they had habitually made acquisitions there (several times per month during the previous year) and that the website selected was popular or well known to Internet users. To check that this was true, they were asked control questions, such as: What operations had they carried out at the website?

In qualitative terms, the representativity of the sample was high; most of the websites had a high volume of users and a large variety of product categories. Specifically, websites analysed were very well known Internet servers offering financial services

(e.g. BBVA or ING); book and music retailers (e.g. Amazon or Fnac) and travel or tourist services (e.g. Virgin Express).

Good representation occurred: the data showed that the profile of the user that completed our questionnaire was very similar to that of the average Internet user, as defined by various studies [3]. The majority were between 25 and 34 years old (53%), males (67%), incomes between 1200 and 1800 euros per month (40%); in general they had a good educational level (81% higher education); 87% had more than 5 years experience using computers, although there were fewer with the same experience of the Internet (44%); they showed a high frequency of Internet access with 83% logging on several times a day; 94% said that they accessed the Internet “yesterday”.

5. Reliability, dimensionality, and validity of scales

5.1. Analysis of initial reliability

All the scales used were above the recommended 0.7 for Cronbach alpha [80] and 0.3 on the item-total correlation [81]. The minimum value of the item-total correlation in all fields was well over the minimum recommended. The uni-dimensionality of the scales was analysed using a factorial exploratory analysis of the principal components, and, where necessary, with a varimax rotation [70]. In all cases, the results obtained were clearly satisfactory (see [Table 1](#)).²

5.2. Confirmatory analysis of reliability and dimensionality

The measurement scales were refined through the development of a strategy of confirmatory models [39]. Statistical software EQS version 5.7b was used for this analysis. We used Robust Maximum Like-

² As an estimation method, we decided on Robust Maximum Likelihood, as it operates with greater security in samples that do not unequivocally overcome the multivariate normality test. Nevertheless, it is worth noting that this methodology is especially recommendable for samples of less than 300. The results obtained should be analysed considering that some adjustment indicators might give relatively unsatisfactory results as a consequence of the sensitivity of the estimation method and the sample size.

Table 1
Analysis of initial reliability

	HON	BEN	COM	SAT	USAB	LOY_A	LOY_B
Cronbach alpha	0.9104	0.8296	0.8849	0.9345	0.9011	0.7667	0.8190
No. of factors	1	1	1	1	1	1	1
Variance explained (%)	74.221	67.563	63.677	83.600	61.895	69.198	74.670
Factorial loadings	>0.5	>0.5	>0.5	>0.5	>0.5	>0.5	>0.5

Table 2
Ave and composite reliability coefficient. Convergent and discriminatory validity

	Correlations	Confidence interval	Differential χ^2	AVE	Composite reliability	
HON-BEN	0.74*	(0.68; 0.80)	209*	HON	0.55	0.86
HON-COM	0.66*	(0.57; 0.74)	142*	BEN	0.46	0.84
HON-USAB	0.71*	(0.37; 0.58)	78*	COM	0.47	0.78
HON-SAT	0.48*	(0.65; 0.78)	203*	USAB	0.51	0.88
HON-LOY_A	0.11*	(0.03; 0.22)	6*	SAT	0.64	0.88
HON-LOY_B	0.34*	(0.21; 0.47)	34*	LOY_A	0.52	0.76
BEN-COM	0.83*	(0.77; 0.88)	247*	LOY_B	0.61	0.76
BEN-USAB	0.50*	(0.40; 0.59)	84*			
BEN-SAT	0.59*	(0.49; 0.68)	121*			
BEN-LOY_A	0.14*	(0.03; 0.24)	8*			
BEN-LOY_B	0.35*	(0.22; 0.48)	36*			
COM-USAB	0.53*	(0.43; 0.63)	90*			
COM-SAT	0.52*	(0.42; 0.62)	86*			
COM-LOY_A	0.09	(−0.01; 0.19)	4*			
COM-LOY_B	0.32*	(0.19; 0.44)	28*			
USAB-SAT	0.50*	(0.39; 0.61)	91*			
USAB-LOY_A	0.08	(−0.03; 0.20)	1*			
USAB-LOY_B	0.28*	(0.17; 0.39)	27*			
SAT-LOY_A	0.14*	(0.03; 0.24)	8*			
SAT-LOY_B	0.42*	(0.29; 0.54)	48*			
LOY_A-LOY_B	0.55*	(0.44; 0.66)	80*			

*d.f. = 1; $p < 0.01$.

lihood, as it operates well in samples that do not unequivocally overcome the multivariate normality test. Any indicators that did not fulfil one of the three criteria proposed by Jöreskog and Sörbom [47]³ were eliminated. Specifically, two items, USAB8 and LOY_A1 did not reach a high enough R^2 and were discarded. Later work with the goodness-of-fit test found that all the confirmatory models were acceptable. Finally, the scales that had changed their

structure since the initial exploratory analysis were put to a new reliability valuation using the Cronbach alpha criteria and the item-total correlation. At the same time, all the scales fulfilled the two validity confirmation indicators normally used (see Table 2); composite reliability coefficient [48] and the average variance extracted or AVE [33].

In order to contrast the presence of a multidimensional structure in the two existing multidimensional constructs (trust and loyalty), a rival model strategy was developed; it consisted of a comparison of two alternative models [6]: a first order factorial model in which the dimensions were not differentiated, and a second order model [101] with two dimensions for loyalty and three for trust. The results showed a higher fit in the second order model, which allowed us to confirm the multidimensionality of the variables.

³ (1) Criteria of weak convergence, would eliminate indicators that did not have a significant factorial regression coefficient (Student's $t > 2.58$; $p = 0.01$). (2) Criteria of strong convergence would eliminate those indicators that were not substantial, i.e. those whose standardised coefficient is less than 0.5 [41]. (3) Lastly, it has been proposed the elimination of those indicators that least contribute to the explanation of the model, considering the cut-off point as $R^2 < 0.3$.

5.3. Validation analysis

This validation consists of convergent and discriminant validity [31]. For uni-dimensional variables (satisfaction and usability), convergent validity was confirmed by checking that the weight of the different indicators in the confirmatory model was statistically significant (to 0.01) and more than 0.5 points [90]. For the multi-dimensional variables (trust and loyalty), in addition to testing the significance and size of the indicators of each dimension, the correlations between the different proposed dimensions was also verified and they were found to be significant (to 0.01) and high [66]. The discriminatory validity was confirmed through three distinct criteria. Firstly, the correlation between the different variables in the confirmatory models was tested to make sure that they did not exceed 0.8 points, as this would indicate a low discrimination between them [9]. Secondly, we checked that a value of 1 did not show that it was in the confidence interval of the correlations between the different variables of the confirmatory model. Finally, the correlation between each pair of confirmatory model variables was fixed at 1 and a Chi-squared difference test was carried out [10]. The evaluation of all the discrimination criteria gave us sufficient discriminant validity. The data corresponding to convergent and discriminatory validity can be seen in Fig. 1 and Table 2.

6. Structural model analysis

Once the measurement scales were designed and validated, we contrasted the hypotheses that made up the structural model [8]; see Fig. 1. For the multi-dimensional variables (trust and loyalty), the indicators that were taken for causal analysis were derived from the arithmetical average of the items that made up each of the dimensions. This common research practice allowed us to reduce the number of parameters to be estimated and therefore made model adjustment and understanding easier. Nevertheless, these measurements could not have been used without the guarantee of reliability, dimensionality, and validity, based on the second order factorial models that confirmed the existence of robust multi-dimensional structures.

The goodness-of-fit was greater than or close to the recommended limits (see Fig. 1). With regard to the proposed hypotheses, it was noted that consumer trust and satisfaction positively and directly depended on perceived usability, as shown by the significance and sign of the parameters. Therefore, it was not possible to reject hypotheses H1 and H2. It was also observed that as levels of consumer satisfaction improved, as did website trust, and this meant that we could not reject hypothesis H3. On the other hand, hypothesis H4 had to be rejected as it did not show sufficient statistical significance. It was found however, that higher levels of trust and satisfaction have a significant effect on website loyalty, so it was not possible to reject hypotheses H5 and H6. In conclusion, the effect of usability on loyalty seems to be conditioned by consumer trust and satisfaction.

7. Recommendations and limitations

The high costs involved in increasing the client base of a business are forcing companies to look for ways to retain their consumers. Gaining a higher level of customer fidelity has become a key objective. Our research has confirmed that perceived usability has a direct and positive relationship on the degree of consumer trust and satisfaction. Moreover, it has shown that the effect of the degree of usability on the degree of consumer loyalty does not follow a direct path but is conditioned by the role that trust and satisfaction play with respect to the individual's fidelity. Finally, website user satisfaction favours trust in that website.

Company strategies should be designed to achieve two basic objectives: a higher level of usability and a higher level of customer satisfaction. User satisfaction depends on the fulfilment of their expectations. Therefore, a detailed analysis of the needs of the website user should be undertaken, with the aim of developing more adequate strategies and assigning the necessary resources in the most efficient way possible. The focus should be on giving the customer an adequate system that eases the acquisition of the necessary knowledge and a more personalised, closer customer attention which increases the level of individual satisfaction. Moreover, management should concentrate on designs and structures that are simple and easy for the user to understand.

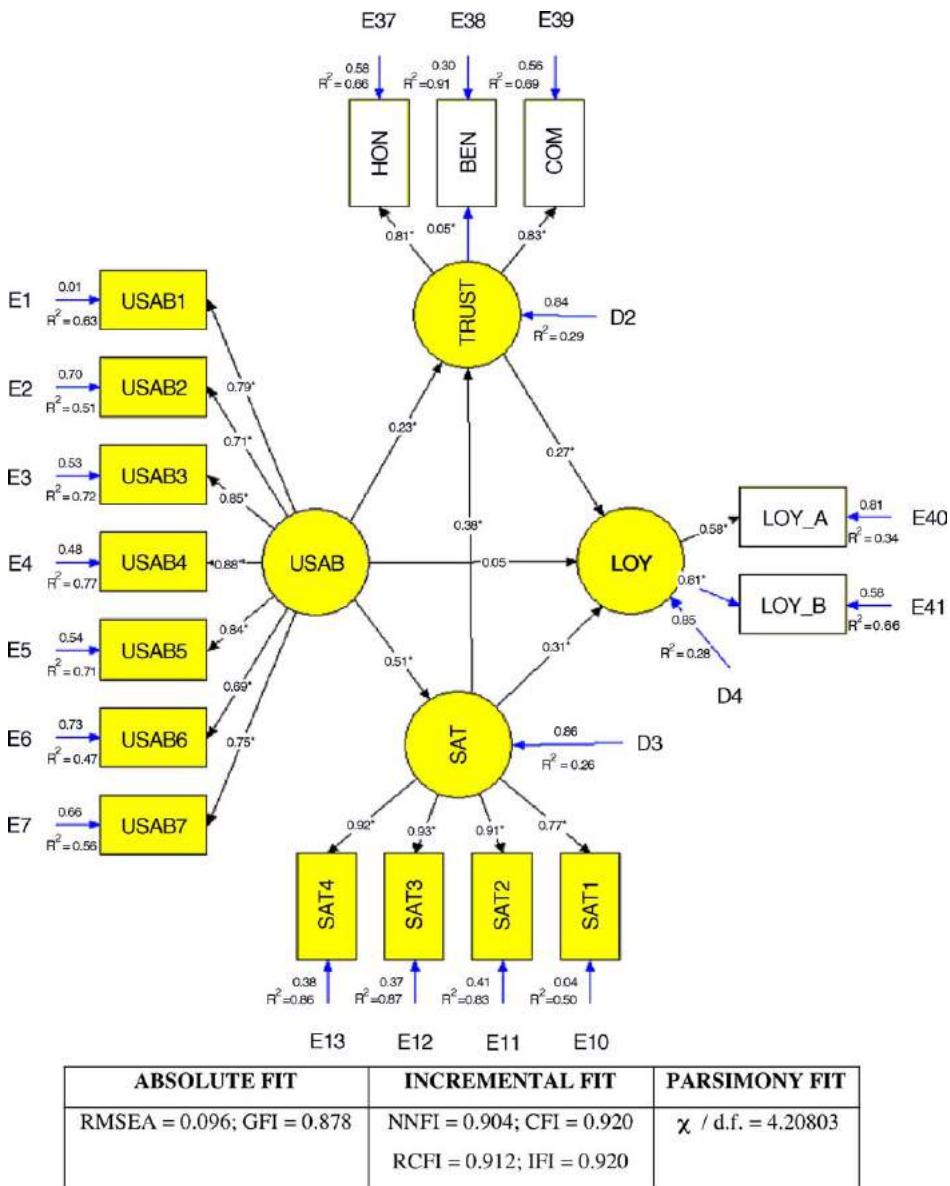


Fig. 1. Structural model of the relationship between perceived website usability, trust, satisfaction and loyalty. (*) Coefficients significant to level 0.01.

Turning to the limitations of our work, we first must point out that the majority of individuals who participated were Spanish speaking. While the sample size and variety of websites analysed enabled us to make generalisations, it may not hold for different nationalities. Secondly, although the

majority of the proposal relationships were validated, particularly noticeable are the relative low levels of R^2 obtained for trust, satisfaction and loyalty (0.29, 0.26 and 0.28, respectively). These levels show that there are other variables that may influence our results.

Acknowledgements

The authors are grateful for the financial support received from the Aragon Regional Government

(S-46; PM-034), FUNDEAR and the University of Zaragoza (UZ2002-SOC-06). The authors are grateful to Professor Sibley for its useful comments.

Appendix A. Measurement scales used

The individual is asked to grade from 1 to 7 their level of agreement or disagreement with the following statements in relation to the selected website or a website with which they have substantial experience.

Scale for measuring perceived website usability

		Adapted from
USAB1	In this website everything is easy to understand	[54,63,88]
USAB2	This website is simple to use, even when using it for the first time	[54,63,88]
USAB3	It is easy to find the information I need from this website	[54,63,88]
USAB4	The structure and contents of this website are easy to understand	New item
USAB5	It is easy to move within this website	[54,63,88]
USAB6	The organisation of the contents of this site makes it easy for me to know where I am when navigating it	New item
USAB7	When I am navigating this site, I feel that I am in control of what I can do	[54,63,88]
USAB8	Downloading pages from this website is quick	[54,63,88]

Scale for measuring website user trust

HON1	I think that this website usually fulfils the commitments it assumes	[27,57,88,96]
HON2	I think that the information offered by this site is sincere and honest	[27,57,88,96]
HON3	I think I can have confidence in the promises that this website makes	[27,57,88,96]
HON4	This website does not make false statements	[27,57,88,96]
HON5	This website is characterised by the frankness and clarity of the services that it offers to the consumer	[27,57,88,96]
BEN1	I think that the advice and recommendations given on this website are made in search of mutual benefit	[27,57,88,96]
BEN2	I think that this website is concerned with the present and future interests of its users	[27,57,88,96]
BEN3	I think that this website takes into account the repercussions that their actions could have on the consumer	[27,57,88,96]
BEN4	I think that this website would not do anything intentional that would prejudice the user	[27,57,88,96]
BEN5	I think that the design and commercial offer of this website take into account the desires and needs of its users	[27,57,88,96]
BEN6	I think that this website is receptive to the needs of its users	[27,57,88,96]
COM1	I think that this website has the necessary abilities to carry out its work	[27,57,88,96]
COM2	I think that this website has sufficient experience in the marketing of the products and services that it offers	[27,57,88,96]
COM3	I think that this website has the necessary resources to successfully carry out its activities	[27,57,88,96]
COM4	I think that this website knows its users well enough to offer them products and services adapted to their needs	[27,57,88,96]

Scale for measuring website user satisfaction

SAT1	I think that I made the correct decision to use this website	[15,42,94,99]
SAT2	The experience that I have had with this website has been satisfactory	[15,42,94,99]
SAT3	In general terms, I am satisfied with the way that this website has carried out transactions	[15,42,94,99]
SAT4	In general, I am satisfied with the service I have received from the website	[15,42,94,99]

Scale for measuring website user loyalty

LOY_A1	I visit this website more frequently than others of the same category	[30,87,107]
LOY_A2	This is the website where I purchase the majority of the products and services in this Internet category	[30,87,107]
LOY_A3	This is my favourite site for purchasing the products and services in this Internet category	[30,87,107]
LOY_B1	Not counting this website, in the last few months I have visited very few sites that offer similar products and services	[30,87,107]
LOY_B2	The frequency with which I visit other websites that offer similar products and services is much less	[30,87,107]
LOY_B3	I don't usually purchase products and services from this category from other websites	[30,87,107]

Note: The questions in italics were eliminated in the refinement process. These scales were presented in Spanish due to the interviewee's nationality.

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Sharing economy and peer-to-peer accommodation – a perspective paper

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Abstract

Purpose – *This paper aims to provide a snapshot of key learnings about paid online peer-to-peer accommodation trading, as it relates to tourism and hospitality, and to identify future research questions.*

Design/methodology/approach – *The paper paints a picture and discusses research conducted in the past, which relates to paid online peer-to-peer accommodation, in brief. It also lists a number of specific research questions which should be investigated in future.*

Findings – *Some of the key topics, such as the business model of facilitators of peer-to-peer trading and the necessary regularly responses, have been extensively studied. The focus should now turn on how peer-to-peer trading of travel-related services can best be leveraged to the benefit of economies, communities and people.*

Originality/value – *The main value of this perspective paper lies in offering a succinct overview of research into paid online peer-to-peer accommodation and pointing to key questions for future research.*

Keywords Collaborative consumption, Airbnb, Sharing economy, Peer-to-peer accommodation, Peer-to-peer trading, Tourism accommodation

Paper type Conceptual paper

Introduction

Understanding the new phenomenon of trading travel-related services among peers is critically important: it has immediate implications on the profitability of the hospitality sector and is causing wide-reaching structural changes across the entire tourism industry.

The trading of goods among non-commercial partners (“ordinary” people) is nothing new, of course. In the past, people used public notice boards or the classified section of the local newspaper. Today, the internet is the trading platform of choice, dramatically increasing the efficiency of transactions. Online trading of space has attracted by far the most attention. Trading space is not “sharing” (as in “sharing economy”) because buyers pay to be able to stay at someone else’s place. Trading space is also not a “collaboration” (as in “collaborative consumption”) because no joint work, no collaboration, occurs in the process. Rather, paid online peer-to-peer accommodation trading consists of a non-commercial provider (host) *selling* space suitable for short-term accommodation to an end user (guest) in a direct interaction (Dolnicar, 2019, p. 248). Many companies have attempted to successfully facilitate paid online peer-to-peer accommodation trading, but only three – Airbnb, Homeaway and Booking.com – have established themselves as key players globally (Hajibaba and Dolnicar, 2018).

The aim of this perspective paper is to provide a snapshot of key learnings about paid online peer-to-peer accommodation trading, as it relates to tourism and hospitality, and to identify future research questions.

Received 29 May 2019
Revised 13 August 2019
3 September 2019
Accepted 3 September 2019

Past perspective 75 years of developments (1946–2020)

Figure 1 offers an overview of research into peer-to-peer accommodation. The middle section relates directly to tourism and hospitality; the sides show topics studied in other fields. Darker areas have been studied more extensively than lighter areas. The frequencies underlying the shading in Figure 1 have been taken from Dolnicar (2019).

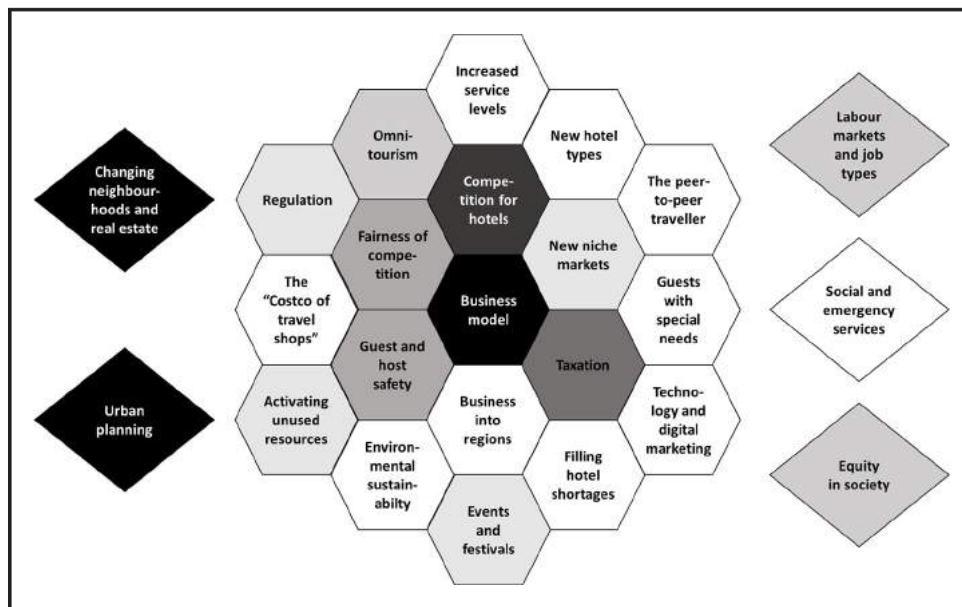
At the centre of Figure 1 stands the business model of peer-to-peer accommodation facilitators and all (micro)entrepreneurs participating in the sector. While full analyses of business models are rare (Reinhold and Dolnicar, 2018), much tourism and hospitality research offers descriptions and illustrations of parts of the business model.

The normalisation of peer-to-peer accommodation is creating competition for the established accommodation sector (Zervas et al., 2017), most critically for providers at the lower end of the service spectrum (Guttentag and Smith, 2017). Consequently, competition and fairness of competition (Gurran, 2018) have been extensively studied, with fairness closely related to discussions about guest and host safety (Kennedy et al., 2019).

Tax implications have also received a reasonable amount of attention, as has the potential of peer-traded spaces to attract new market segments or better cater to the need of existing market segments, such as the increasing number of families engaging in multi-generational travel (Kleeman, 2014). The need for regulation and the optimal nature of regulation has been debated publicly and among academics, with most destinations moving towards location-specific regulations to protect residents without sacrificing all the economic benefits of peer-to-peer accommodation.

The term *omnitourism* is used in Figure 1 to indicate that the use of residential properties leads to visitors no longer being confined to tourist areas at the destination, but rather being omnipresent, much to the dismay of some residents. Omnitourism can, but does not necessarily, go hand in hand with overtourism.

Figure 1 Research topics relating to paid online peer-to-peer accommodation



The activation of unused resources is frequently mentioned, but rarely the main focus of investigation. Event organisers have already discovered the value of unused space made available by residents: it represents a low-cost approach to temporarily increasing much needed accommodation capacity ([Fairley and Dolnicar, 2018](#)).

Future perspective 75 years (2020–2095)

As [Figure 1](#) shows, peer-to-peer trading in tourism offers a wide array of future topics for investigation, including the following:

1. Will the normalisation of peer-traded spaces increase service expectations?
2. Will hotels diversify to defend their market share?
3. Will new trading platform facilitators emerge that will focus on genuine peer-to-peer trading only, rather than doubling up as a distribution channel for commercial accommodation and real estate investors?
4. Will residents be able to find areas protected from omnitorism?
5. Can we protect hospitality workers from the risk of non-permanent employment?
6. What is the comparative environmental footprint of peer-to-peer accommodation ([Chenoweth, 2009](#))? Can we make it even more environmentally friendly?
7. How can we best leverage peer-traded spaces to do the following:
 - meet the needs of travellers with impairments ([Randle and Dolnicar, 2019](#))?
 - strengthen rural/regional economies?
 - fill structural or temporary accommodation shortages?
 - assist people in need (e.g. victims of domestic violence)?
 - assist people displaced by natural disasters?
 - strengthen social tourism?

At a broader level, it will be interesting to see if Airbnb, Homeaway and Booking.com will leverage their current market power as preferred providers of peer-to-peer accommodation to develop into the “Costcos of travel services” by selling anything travel-related ([Gardiner and Dolnicar, 2018](#)). Equally interesting is the prospect of a new type of traveller developing: a traveller who purchases all travel-related services from peers only. A large-scale shift from tourism service provision by professionals to service provision by “amateurs” would mean a fundamental change of the very nature of the tourism industry as we know it.

Conclusions

Peer-to-peer trading of tourism-related products and services has the potential to radically alter how the tourism industry and the hospitality sector operate. An increase of non-professional service providers has a number of consequences: it opens entrepreneurial opportunities, while putting at risk reliable long-term employment with social benefits; increases choice for tourists and puts commercial providers under pressure to differentiate or improve their services; impacts on society through changes to residential neighbourhoods, changes in real estate markets, but also through the opportunity for increased inter-cultural understanding, potential for more social tourism, and the provision of emergency shelter for the most vulnerable members of society, including people displaced from their own homes by natural disaster and victims of domestic violence. More

research is needed to ensure that the opportunities presented by peer-trading of travel-related services can be harvested to the benefit of economies, communities and people.

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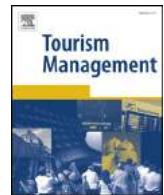
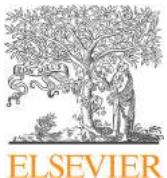
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Research note

Adding evidence to the debate: Quantifying Airbnb's disruptive impact on ten key hotel markets

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ARTICLE INFO

ABSTRACT

Keywords:

Sharing economy
Airbnb
Disruptive innovation
Hotel
RevPAR
ADR
Occupancy rate

Airbnb's entry into the lodging landscape has dramatically increased the available supply of rooms for accommodating prospective visitors at a destination. In a competitive market, an increase in supply while keeping demand relatively constant would decrease prices and revenues. While Airbnb is expected to negatively impact the hotel industry, the effects of Airbnb on the performance of the hotel industry have not been extensively quantified. Also, existing studies on Airbnb's economic impacts are limited in their inferential, temporal, and/or geographical scope. In view of this gap in the literature, the present study examines the effects of Airbnb supply on key hotel performance metrics: room revenues (RevPAR), average daily rates (ADR), and occupancy rates (OCC) in ten major U.S. hotel markets for the period between July 2008 and June 2017. The results demonstrate that an increasing Airbnb supply negatively impacts all three performance metrics within the hotel industry. Moreover, while previous research has demonstrated a negative impact on lower-end hotels, our findings provide evidence of Airbnb's growing impact on the mainstream market across hotel class segments, signaling a high level of consistency with the tenets of the theory of disruptive innovation. The magnitude of these effects is not only statistically but also economically significant. Theoretical and practical implications are discussed.

1. Introduction

The rise of the sharing economy in recent years has been well documented. Consumers have enthusiastically adopted the services offered by companies such as Airbnb, Uber, Zipcar, and Zaarly, among others. Of the various sharing economy providers in the hotel industry, Airbnb is the focus of the present study. Airbnb is the largest alternative accommodations provider, with more than three million listings in over 191 cities, including entire homes, shared rooms, and private rooms, an inventory that is larger than the world's three biggest hotel chains combined (together, IHG, Marriott, and Hilton have 2.58 million listings). Airbnb has hosted over 200 million guests since its inception ("About Us," n.d.). Furthermore, given its size, market share, and value at around \$31 billion, Airbnb has been at the heart of discussions among hoteliers, mainly due to its potential and uncalculated impacts on the hotel industry (Dogru, Mody, & Suess, 2017a; Zervas, Proserpio, & Byers, 2017).

Consequently, the remarkable volume of listings and exponential growth in number of guests has made Airbnb the foremost "disruptor"

to the hotel industry (Guttentag, 2015). In a recent study, Smith Travel Research (STR) showed that Airbnb's market share ranges between 1.8% and 8.9% in top hotel markets in the world (Haywood, Mayock, Freitag, Owoo, & Fiorilla, 2017). Airbnb's room supply dynamics are much more flexible than those of conventional hotel accommodations; thus, such a large supply might create a substantial threat to the hotel industry, now and into the future (Haywood et al., 2017). The hotel industry, however, has mainly shrugged off the threat of the sharing economy, highlighting that it is a fundamentally different business model, serving a whole new set of customers and thus not directly competing with the hotel industry (Trejos, 2016; Varma, Jukic, Pestek, Shultz, & Nestorov, 2016). Similarly, Airbnb founder Brian Chesky has argued that the company does not directly compete with the hotel industry and that Airbnb guests are not typical hotel customers, but rather those who belong to alternative market segments, such as travelers visiting friends and family (Intelligence, 2017). However, other critics of peer-to-peer accommodations (P2P) providers have argued that if Airbnb and other sharing economy platforms did not exist, or if hosts were to operate by the same rules that conventional hotel companies

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do, most, if not all, room nights would be booked in conventional hotels (Dogru et al., 2017a).

Researchers have attempted to assess the impact of Airbnb on the performance of the hotel industry. However, the results of these studies have been inconclusive. Also, most studies have been limited in their inferential, temporal, and/or geographical scope. Consequently, the jury is still out on whether and to what extent Airbnb impacts the hotel industry, with hoteliers mulling the question: “Does it or does it not impact our performance?” We postulate that the theory of disruptive innovation provides a relevant contextual lens to frame an examination of the impact of Airbnb on hotel industry performance. Therefore, we hypothesize that the company has a significant negative impact on key hotel performance metrics: RevPAR, ADR, and OCC. Moreover, given the company’s efforts to expand beyond their current niche in order to attract consumer segments across the mainstream hotel market, including business travelers, we postulate that Airbnb has a significant negative impact on hotel performance across various hotel class segments.

To validate this hypothesis, we examined the impact of Airbnb supply on key hotel performance metrics in ten major U.S. hotel markets: Boston, Chicago, Denver, Houston, Los Angeles, Miami, Nashville, New York, San Francisco, and Seattle, for the period between July 2008 and June 2017. In so doing, the present study contributes to the emerging debate on the economic implications of sharing economy to the incumbent hotel industry. The findings have important implications for managers in the hotel industry and for destinations and policy makers about the importance (or lack thereof) of regulating sharing economy platforms.

2. Literature review

Airbnb’s exponential growth has attracted interest from both the hotel industry and academia alike. While researchers from across a variety of fields have begun to investigate the social, cultural, environmental, and economic implications of Airbnb, and the sharing economy at large, our understanding of the phenomenon is still in its nascent stages. Studies have ranged from topics including, but not limited to, understanding why people participate in Airbnb as consumers, suppliers, or both (see e.g., Kim, Yoon, & Zo, 2015; Lampinen & Cheshire, 2016; Möhlmann, 2015); consumer experiences of Airbnb (see e.g., Mody, Suess, & Lehto, 2017); economic impacts of Airbnb on a destination (see e.g., Levendis & Dicle, 2016); pricing on Airbnb (see e.g., Dogru & Pekin, 2017; Wang & Nicolau, 2017); Airbnb supply and demand dynamics (see e.g., Dogru et al., 2017a; Haywood et al., 2017); racial discrimination on Airbnb (see e.g., Edelman & Luca, 2014); the effects of Airbnb on gentrification (see e.g., D. Lee, 2016); and the regulation of Airbnb (see e.g., Kaplan & Nadler, 2015; Miller, 2014). Of these various topics, the hotel industry is particularly interested in understanding the direct impact of Airbnb on its performance. While the debate on this topic rages on, there is little and mixed empirical evidence to inform researchers and hotel practitioners. In the present study, we propose that the process-based perspective of the theory of disruptive innovation provides a relevant contextual lens to frame an examination of the impact of Airbnb on hotel industry performance.

2.1. Airbnb as a disruptive innovation

There has been little discussion of disruptive innovation in the hospitality and tourism literature, given that incremental improvements (e.g., ecotourism and special interest tourism) are the norm in the tourism sector and that radical innovation is an abnormality (Brooker & Joppe, 2014). This observation is consistent with the general consensus that “much remains to be done in the development of the theory of innovation in [hospitality and] tourism” (Gomezelj, 2016, p. 516). The theory of disruptive innovation, introduced by Bower and Christensen (1995), represents one of the formative lenses through

which the sharing economy has been examined, in the context of grassroots social innovation (Martin & Upham, 2016) and the business of Airbnb (Cheng, 2016).

The theory of disruptive innovation “describes how products that lack in traditionally favored attributes but offer alternative benefits can, over time, transform a market and capture mainstream consumers” (Guttentag, 2015, p. 1192). While proven to be a powerful way of thinking about innovation-driven growth, and despite its broad dissemination, the theory has often become the victim of its own success. Its “core concepts have been widely misunderstood and its basic tenets frequently misapplied. Furthermore, essential refinements in the theory over the past 20 years appear to have been overshadowed by the popularity of the initial formulation” (Christensen, Raynor, & McDonald, 2015). Its most popular opponent, Jill Lepore, has criticized it as “a theory of change founded on panic, anxiety, and shaky evidence” (Lepore, 2014). Of relevance to the present context, some have even questioned whether the sharing economy, including Airbnb, is indeed a disruptive innovation that could transform established socio-technical and -economic structures, or simply a reinforcement of the prevailing neoliberal economic paradigm (Martin, 2016). Interestingly, many of these counter-arguments often arise from the established regime actors themselves, i.e., the incumbents that disruptive innovations are meant to disrupt (Gilbert, 2014; Guttentag, 2015).

Much of the opposition to the theory of disruptive innovation emerges from an unclear understanding of the definition of the term—i.e., what constitutes disruptive innovation (Markides, 2006). However, we postulate that an understanding of the process of disruptive innovation—an assessment of the potential diffusion pattern and impact of an innovation—can help determine the threat or opportunity that an innovation represents (Guttentag, 2015; Schmidt & Druehl, 2008). Under this perspective, disruptive innovation is not a theory of change, as Lepore suggests, but rather a theory of competitive response. Such a conceptualization places Airbnb squarely as a disruptor to the hotel industry (Bailey, 2017).

2.1.1. The process of disruptive innovation

Cellphones serve as a classic example of a disruptive innovation. They were initially attractive to niche markets (such as executives and doctors) for their portability, but did not have mainstream appeal due to their high cost and lack of reliability and coverage (Govindarajan, Kopalle, & Danneels, 2011). As the technology evolved, cellphones became smaller, cheaper, faster, and smarter, thus appealing to the mainstream market and effectively putting the pager industry out of business. However, the theory of disruptive innovation does not posit that an innovation is inherently disruptive; rather, what is disruptive is the process through which it transforms a market, sometimes to the point of upending previously dominant companies. As Guttentag (2015) explains:

A disruptive product will generally underperform with regards to the prevailing products’ key performance attribute(s), but will offer a distinct set of benefits, typically focused around being cheaper, more convenient, or simpler. Consequently, the disruptive product appeals to the low-end of the market or creates a completely new market. This initial market is limited in size and profit margins, so it is unappealing to leading companies that are content to focus on their more profitable markets and continue marginally improving their products through ‘sustaining innovations’. Nonetheless, over time the disruptive product improves, thereby making it appealing to greater numbers of customers and attracting increasing levels of the mainstream market. This shift may eventually attract attention from the leading companies, but by then the disruptive product may be so entrenched that the previously leading companies struggle to compete. In other words, disruptive innovation theory describes how companies may falter not by falling behind the pace of advancement or ignoring their core consumers, but rather by

disregarding the upward encroachment of a disruptive product that lacks in traditionally favored attributes but offers alternative benefits (p. 1194).

This process of disruptive innovation encapsulates the Airbnb story, as indicated by evidence that counters the three primary arguments against disruption (Guttentag, 2015). First, while Airbnb may have enjoyed limited initial popularity, it has grown considerably in size as it enters the mainstream market. After several years of marginal popularity, where it took the company about three years to book its first million room nights (Guttentag, 2015), Airbnb booked over 200 million room nights by 2017, a compound annual growth rate (CAGR) of approximately 142%. Second, while this exponential growth pattern in itself provides evidence of the process of disruptive innovation in the Airbnb context, other studies have debunked the proposition that Airbnb's unique attributes only appeal to a niche market of young, technologically comfortable, adventurous, and budget-conscious tourists (Guttentag, 2015). For example, research by Mody et al. (2017) found that the average Airbnb customer, while younger, had a higher income than the average hotel customer and was also more likely to be married and travel with children. Research by Morgan Stanley, which also found an Airbnb consumer profile similar to that of Mody et al. (2017), further demonstrated rising Airbnb adoption among both leisure and business travelers, with demand increasingly coming from hotels (Ting, 2017a). Morgan Stanley predicts a growing competitive threat to hotels if Airbnb can grow its usage by business travelers, a segment in which the company is increasingly wooing with a newly launched Airbnb For Work dashboard, "Business Travel Ready" listings, and shifting business traveler demands for more authentic and customizable journeys (Demystifying Airbnb For Corporate Travel Managers, 2017). Also, with more airlines allowing their customers to earn miles on their Airbnb bookings worldwide, the company's integration into the various touchpoints of the business traveler's journey is likely to make it a growing force in a segment on which the hotel industry relies heavily (Ting, 2016a).

Third, and further refuting the proposition that Airbnb operates in parallel with the conventional accommodations sector and thus does not "take a slice of the pie" (Guttentag, 2015), Guttentag and Smith (2017) found that nearly two-thirds of their sample had used Airbnb as a hotel substitute. Similarly, Hajibaba and Dolnicar (2017) found that Australian consumers considered P2P networks as a substitute to established commercial accommodations providers; also, while providers at the lower price range are already under pressure from the sharing economy, higher-end hotels are likely to face increasing competition as P2P providers such as Airbnb take measures to make accommodations offered by them more attractive to this market. Research by Morgan Stanley showed that 37% and 26% of Airbnb guests in their sample switched from bed and breakfasts and extended stay hotels respectively (Ting, 2017a), thus countering claims that Airbnb brings new customers to the market (those who would not have traveled at all in the absence of Airbnb). Kaplan and Nadler (2015) argue that Airbnb can provide affordable options to tourists visiting cities in which hotels are disproportionately high-priced. Moreover, Airbnb's unique alternative benefits—it is cheaper than conventional hotels, allows access to home benefits (e.g., kitchen facilities), and offers more local, authentic destination experiences and intimate social interaction (Guttentag, Smith, Potwarka, & Havitz, 2017; Sigala, 2017; Tussyadiah & Pesonen, 2016)—are probably reflective of the service's appeal to particular market segments, and "not evidence that Airbnb merely provides a complement to hotels" (Guttentag, 2015, p. 1206). Also, Mody et al. (2017) found that Airbnb outperformed hotels on both its unique and its more conventional hospitality experiential attributes, while customers in Guttentag and Smith's (2017) study expected Airbnb to outperform budget hotels/motels and have mixed outcomes versus mid-range hotels in relation to traditional hotel attributes. These findings are indicative of Airbnb's growing potential within the mainstream

market and signal consistency with the concept of disruptive innovation.

While there is no compelling reason to discount Airbnb's ability to disrupt the accommodations sector, a determination of whether the theory of disruptive innovation explains the Airbnb case requires assessing the extent to which this disruptor is impacting the performance of the incumbent hotel industry, particularly in light of the company's exponential growth (Guttentag, 2015).

2.2. Airbnb's disruption of hotel industry performance

Several studies have examined the economic impacts of Airbnb on the hotel industry in a variety of contexts. In a recent study, Dogru, Mody, and Suess (2017b) showed that a 1% increase in Airbnb supply decreases hotel RevPAR by 0.025% and ADR by 0.02% in Boston. Analyzing the impact of Airbnb supply on hotel revenues in Texas, Zervas et al. (2017) showed that a 1% increase in Airbnb supply decreases hotel revenue by 0.04%. In a similar study, Neeser, Peitz, and Stuhler (2015) examined the impact of Airbnb supply in the Nordic countries and reported negative impacts on hotel room prices. Xie and Kwok (2017) found that an increasing Airbnb supply in the Austin, Texas, hotel market substitutes the demand for the hotel product and brings down RevPAR. Lane and Woodworth (2016) calculated an Airbnb competition index to identify key hotel markets in the U.S. that are at risk from the growth of Airbnb. They concluded that Airbnb has encroached, and will continue to encroach, on the business of the conventional hotel industry by curtailing the growth of ADRs and mitigating the historic price premiums realized during peak demand periods.

However, other evidence in different settings indicates that Airbnb supply does not impact hotel performance. Using a panel regression model, Choi, Jung, Ryu, Do Kim, and Yoon (2015) found that Airbnb does not impact hotel revenues in Korea; while tourist numbers are increasing, most of them prefer to use hotels rather than Airbnb. Comparing Airbnb demand, supply, market share, revenue, and price dynamics with those of the hotel industry across 13 global markets, Haywood et al. (2017) have suggested that Airbnb is not quite the threat to conventional hotels that reports seem to suggest; while Airbnb's share of total accommodations supply was growing, U.S. hotel performance continued to show strength in terms of occupancy, ADR, and RevPAR. O'Neill and Ouyang (2016) suggest that while the expansion of the sharing economy is not yet handicapping hotel performance at a macro level, a majority of the revenue generated by Airbnb comes from "illegal" hotels, i.e., multiple-unit operators who rent out two or more units, and full-time operators who rent their unit(s) 360 or more days per year. With research by Morgan Stanley indicating a higher than expected and increasing acceptance and usage of Airbnb, as well as the cannibalization of conventional hotels (Ting, 2017a), the hotel industry cannot afford to dismiss the current and future impact of Airbnb, particularly given its extremely high and flexible supply dynamics (Dogru et al., 2017b; Guttentag, 2015; Haywood et al., 2017).

Thus, although several studies have investigated the effects of Airbnb on the hotel industry, these studies have reported mixed results, which, in the context of the following limitations of these formative studies, leaves a critical gap in the literature on this emerging, disruptive phenomenon. First, some studies are specific to geographical markets—for example, Zervas et al. (2017) to Texas hotels, Xie and Kwok (2017) to Austin, and Dogru et al. (2017b) to Boston—and thus lack generalizability beyond these contexts. Second, studies that are more geographically comprehensive, i.e., those that address multiple markets in the U.S. (e.g., Haywood et al., 2017; Lane & Woodworth, 2016; O'Neill & Ouyang, 2016) are mainly descriptive in nature—they compare Airbnb supply and demand dynamics with those of the hotel industry—and thus do not draw causal inferences about the impact of Airbnb on the hotel industry. Third, and more critically, the most recent data point in most studies (e.g., Choi et al., 2015; Neeser et al., 2015) is

limited to 2014/15. Airbnb has enjoyed exponential growth in the last three years, so these outdated snapshots of Airbnb's size need to be updated to truly assess its impact on the conventional hotel industry.

In view of these gaps in our understanding of Airbnb's impact on the hotel industry, we draw on the process-based perspective of Airbnb's potential disruption of the conventional hotel industry to propose the following hypotheses pertaining to its impact on the industry's key performance metrics:

H1. *Airbnb supply negatively impacts hotel room revenues (RevPAR), i.e., with increased Airbnb supply, hotel RevPAR decreases.*

H2. *Airbnb supply negatively impacts hotel average daily rates (ADR), i.e., with increased Airbnb supply, hotel ADR decreases.*

H3. *Airbnb supply negatively impacts hotel occupancies (OCC), i.e., with increased Airbnb supply, hotel OCC decreases.*

In testing these hypotheses, we assess whether Airbnb's diffusion pattern and impact on the conventional hotel industry is consistent with the tenets of disruptive innovation theory, and, in so doing, quantify the threat that this innovation presents to the incumbent (Guttentag, 2015).

3. Methodology

3.1. Sample and data

The sample for this study comprises ten major cities in the United States, namely Boston, Chicago, Denver, Houston, Los Angeles, Miami, Nashville, New York, San Francisco, and Seattle for the period between July 2008 and June 2017. The study period covers the dates from the founding of Airbnb to the most recent time the data was available. The motivation for choosing these ten major U.S. hotel markets is twofold. First, the cities included in the sample are top performing cities in the U.S. in terms of both hotel room supply and Airbnb supply. Although our sample does not represent the entire U.S. hotel and Airbnb supply, it closely represents the major U.S. hotel and Airbnb markets. Second, the selected markets allow for the comparison of our findings with those of previous studies (e.g., Dogru et al., 2017b, 2017a; Haywood et al., 2017).

Monthly hotel room revenue per available room (RevPAR), which is a widely accepted measure of hotel performance, is our main dependent variable. We also used the monthly average daily rate (ADR) and monthly occupancy rate (OCC) as additional dependent variables to provide robust estimates of the impact of Airbnb on hotel performance. Hotel data were provided by Smith Travel Research (STR) for the period between January 2000 and June 2017.

Airbnb supply (i.e., *total cumulative listings*) is the main independent variable, which is measured as the cumulative number of listings created (including entire homes and private and shared rooms) since the introduction of Airbnb. We also used an alternative measure of Airbnb supply: the cumulative number of listings created (including entire homes and private and shared rooms) since the introduction of Airbnb and still active within the past twelve months. Airbnb units must have been booked for one or more days to be included in our alternative measure of Airbnb supply (i.e., *active cumulative listings*). In other words, an Airbnb unit is considered to be active if it is rented at least once within the preceding twelve months. In addition to the active cumulative listings that includes entire homes and both private and shared rooms, we created the variable *active cumulative listings of entire homes*, which includes Airbnb units listed as entire home and had been active within the preceding twelve months. This third independent variable was created since one could argue that private and shared room listings on Airbnb might not be directly competing with conventional hotels and should thus be excluded from the analyses.

The Airbnb data were obtained from Airdna, a company that provides data and analytics to entrepreneurs, investors, and academic researchers, for the period between July 2008 and June 2017. Due to the

nature of data collection by Airdna and STR, both Airbnb and hotel data go beyond the cities included in the sample of this study and include Airbnb units and hotels within the respective metropolitan statistical areas (MSA). For example, Airbnb and hotel data in New York comprise information from New York City, Newark, and Jersey City.

Following the studies Zervas et al. (2017), S. K. Lee and Jang (2012), Tsai, Kang, Yeh, and Suh (2006), and Canina and Carvell (2005), we included a number of control variables in the model to account for possible macroeconomic and industry factors that might impact hotel performance regardless of the Airbnb's disruptive entry into the hospitality landscape. First, hotel room supply, which is measured as number of rooms available within the city in the entire year, was included to control for industry-specific supply dynamics that might adversely impact hotel room revenues. The hotel room supply data was provided by STR. Second, the number of passenger arrivals to major airports within the cities in our sample was included to control for tourism demand dynamics. Airport arrivals data were obtained from the Bureau of Transportation Statistics. Third, we included the number of hospitality employees and the unemployment rate to control for the effects of macroeconomic conditions on hotel performance. The data on hospitality employees and unemployment were obtained from the Bureau of Labor Statistics. Lastly, we controlled for the possible effects of change in demographic dynamics by including population, which we obtained from the Federal Reserve Bank of St. Louis. Hotel RevPAR and ADR variables were adjusted for inflation utilizing consumer price index (CPI Year 2000 = 100). We obtained the CPI data from the Bureau of Labor Statistics.

3.2. Empirical approach

We utilized the panel data fixed effect regression model to examine the effects of Airbnb supply on hotel key performance metrics (i.e. RevPAR, ADR, and OCC). Similar to the methodology employed in Zervas et al. (2017), we treated Airbnb supply as a variable intervention in time against hotel performance metrics in the ten major cities, which allows the examination of before and after effect of Airbnb supply on the hotel performance metrics in these ten markets. Our dataset covers the pre-Airbnb period between January 2000 and June 2008, where Airbnb supply takes the value of zero, and the post-Airbnb period between July 2008 and June 2017, where Airbnb supply takes the value of the number of cumulative listings created (total and active). The empirical specification takes the following forms:

$$\log \text{RevPAR}_{it} = \beta_0 + \beta_1 \log \text{Airbnb supply}_{it} + \sum_{k=1}^n \beta_k X_{it} + e_{it} \quad (1)$$

$$\log \text{ADR}_{it} = \beta_0 + \beta_1 \log \text{Airbnb supply}_{it} + \sum_{k=1}^n \beta_k X_{it} + e_{it} \quad (2)$$

$$\text{OCC}_{it} = \beta_0 + \beta_1 \log \text{Airbnb supply}_{it} + \sum_{k=1}^n \beta_k X_{it} + e_{it} \quad (3)$$

The dependent variables are log RevPAR, log ADR, and OCC of hotel markets in city i at time t . The independent variable is Airbnb supply in city i at time t , and takes the forms of total cumulative listings, active cumulative listings, and active cumulative listings of entire homes. X represents a set of control variables of the city i at time t that includes log hotel room supply, log airport arrivals, log population, log hospitality employees, and unemployment rate. The variable e is the error term, and β_0 and β_{1-k} are the model parameters. All models include year-month effects to control for time-specific economic and other conditions over time, and city-fixed effects to control for city-specific characteristics and dynamics. We used logarithmic transformation to account for data-skewness in the study variables, with the exception of OCC and unemployment rates. The central focus of the empirical specification detailed above is the coefficient of log Airbnb supply (i.e. β_1),

Table 1

Total number of listings created from the introduction of Airbnb as of June 2017.

City	Total cumulative listings				Active cumulative listings ^a			
	All Listings	Entire Home	Private Room	Shared Room	All Active Listings	Entire Home	Private Room	Shared Room
Boston	28,957	14,288	13,798	834	16,160	8152	7593	395
Chicago	28,940	16,881	10,640	1383	15,709	9191	5843	646
Denver	14,447	8329	5493	607	9031	5331	3381	308
Houston	23,202	16,570	6075	484	12,058	8545	3231	238
Los Angeles	107,456	62,665	38,649	5989	56,053	33,240	19,731	2998
Miami	59,616	40,897	16,472	2129	32,016	22,312	8627	994
Nashville	11,410	8100	3105	182	7513	5610	1808	90
New York	175,916	93,807	75,543	6359	80,588	42,902	34,805	2756
San Francisco	55,217	29,337	22,750	3061	26,194	14,144	10,820	646
Seattle	20,774	12,642	7426	676	12,920	7989	4560	351

^a Listings with at least one booking within the past 12 months as of June 2017.

which shows the effect of Airbnb supply on hotel performance metrics (i.e., RevPAR, ADR, and OCC).

4. Results

4.1. Summary statistics

Table 1 shows the yearly cumulative Airbnb supply together and separately for entire homes, private rooms, and shared rooms as of June 2017.

Column 1 (All Listings) of **Table 2** presents the annual cumulative total number of listings (i.e., Airbnb supply) as of June 2017, including entire homes, private rooms, and shared rooms created from the time Airbnb was introduced to the market. The number of listings created vary between 11,410 and 175,916 across the cities. While New York and Los Angeles are the cities with the highest number of listings created, Nashville and Denver are the cities with the lowest number of listings created, both in terms of total and active listings. Columns 2, 3, and 4 of **Table 2** present cumulative Airbnb supply separately for entire homes, private rooms, and shared rooms, while Columns 6, 7, and 8 present the respective figures that were still active within the preceding 12 months (i.e., active supply). Entire home listings comprised the majority of the total Airbnb listings in most years, a finding that is consistent with previous studies. Although the shared room supply appears to be negligible in most markets, private room supply constitutes the second largest Airbnb supply in these markets. While the number of listings has reached a remarkable amount within a relatively short period of time, the rate at which new properties are being added to the market as Airbnb accommodations is even more striking.

To put these statistics in perspective, we presented the percentages of entire homes, private rooms, and shared rooms since the introduction of Airbnb in **Table 1**. **Fig. 1** presents the year-over-year changes in

Airbnb supply in the ten major cities. The percent changes presented in **Fig. 1** highlights the year-over-year changes in Airbnb listings that remained active within the preceding 12 months in ten major U.S. cities.

Accordingly, the number of total listings that were still active as of June 2017 has increased dramatically by more than 100% each year. Adding properties at a rate of (at least) 100% every year can make hotels highly vulnerable to the adverse economic effects of Airbnb. However, as indicated in section 2.2. of the literature review, the extent to which Airbnb impacts the hotel industry is still unclear. Thus, we further examined the effects of Airbnb on key hotel performance metrics for the major U.S. hotel markets.

4.2. Impact of Airbnb supply on hotel performance metrics

This section presents the results from our analysis of the effects of Airbnb supply on hotel performance metrics (i.e., RevPAR, ADR, and OCC). The analyses were conducted utilizing the panel data fixed effect regression analysis. **Table 2** presents the results from the regression analysis of the effects of Airbnb supply on the entire sample of hotels, and for each hotel class segment separately, controlling for hotel industry-specific and macroeconomic factors. Column 1 of **Table 3** shows the effects of all Airbnb supply (i.e., total cumulative listings) on hotel RevPAR.

The results show that hotel RevPAR is negatively impacted by Airbnb. Specifically, a 1% increase in Airbnb supply decreases hotel RevPAR by 0.02%. This effect might be considered marginal if Airbnb were increasing at a 1% rate. However, our data showed that Airbnb supply has been growing by more than 100% year-over-year. Thus, a 100% increase in Airbnb supply (as has been the case consistently since 2008) decreases hotel RevPAR by 2%.

Columns 2 to 6 of **Table 2** present the effects of all Airbnb supply (i.e., total cumulative listings) on hotel RevPAR across the various hotel

Table 2

The effects of Airbnb supply (all) on RevPAR.

	All Hotels	Economy Scale	Midscale Hotels	Upscale	Upper Upscale	Luxury	Independent
Log Airbnb Supply	-0.02 ^a (-4.77)	-0.04 ^a (-8.03)	-0.02 ^a (-3.96)	-0.03 ^a (-5.44)	-0.03 ^a (-4.88)	-0.04 ^a (-5.50)	-0.02 ^b (-2.35)
Log Hotel Supply	-1.64 ^a (-17.45)	-2.24 ^a (-24.65)	-1.69 ^a (-16.61)	-1.58 ^a (-18.31)	-1.50 ^a (-15.27)	-1.27 ^a (-10.04)	-1.64 ^a (-15.00)
Log Population	-7.59 ^a (-10.12)	-5.01 ^a (-6.90)	-9.27 ^a (-11.39)	-7.05 ^a (-10.22)	-9.32 ^a (-11.86)	-8.92 ^a (-8.09)	-7.56 ^a (-8.30)
Log Hospitality Employees	2.78 ^a (20.29)	2.69 ^a (20.27)	3.29 ^a (22.12)	2.39 ^a (18.95)	2.78 ^a (19.31)	3.62 ^a (18.23)	2.66 ^a (16.53)
Log Airport Arrivals	0.98 ^a (20.17)	0.88 ^a (18.74)	0.82 ^a (15.42)	0.95 ^a (21.14)	0.91 ^a (17.67)	0.97 ^a (13.92)	1.06 ^a (18.44)
Unemployment Rate	-1.19 ^b (-2.24)	-3.56 ^a (-6.90)	-1.17 ^b (-2.02)	-2.97 ^a (-6.06)	-2.11 ^a (-3.78)	-1.17 (-1.55)	-0.17 (-0.26)
Constant	127.22 ^a (8.86)	87.51 ^a (6.30)	156.39 ^a (10.04)	121.32 ^a (9.20)	160.65 ^a (10.69)	137.89 ^a (6.50)	126.72 ^a (17.48)
Within R-Square	0.75	0.77	0.73	0.76	0.69	0.65	0.72
Between	0.40	0.44	0.39	0.22	0.26	0.63	0.49
Overall	0.32	0.37	0.29	0.17	0.18	0.40	0.37
F-Test	27.06 ^a	29.34 ^a	24.26 ^a	28.96 ^a	20.24 ^a	13.62 ^a	22.72 ^a
Number of obs.	1710	1710	1710	1710	1710	1446	1659

a and b denote 1% and 5% statistical significance levels, respectively. t statistics are in parenthesis.

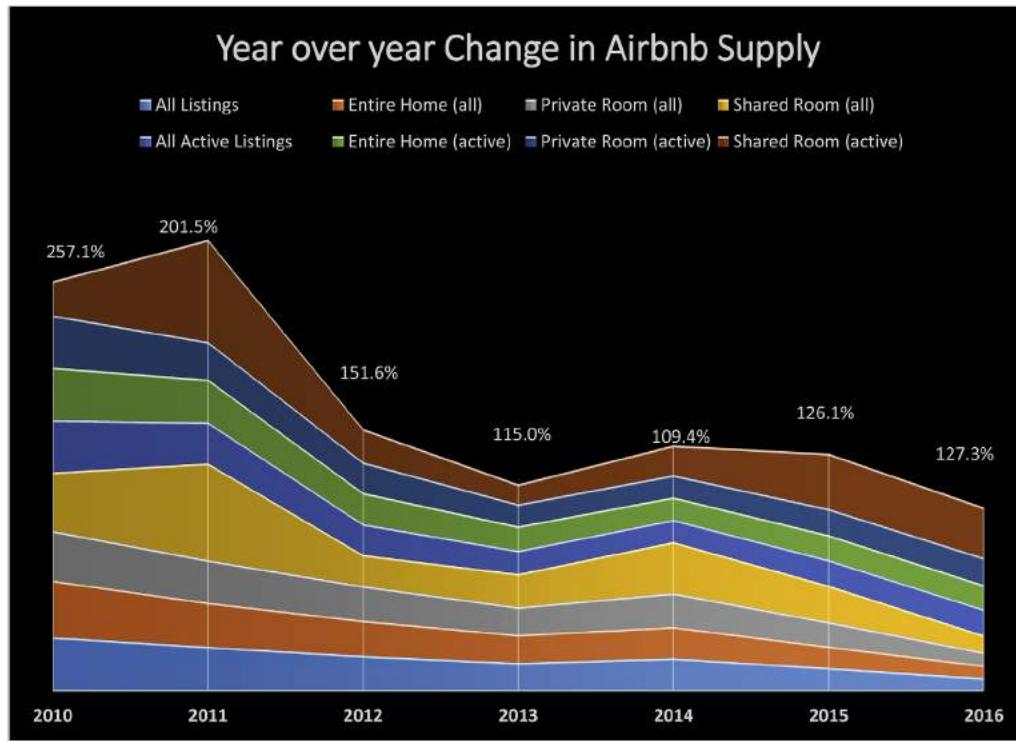


Fig. 1.

class segments. The results show that all class segments are negatively impacted by Airbnb. Specifically, a 1% increase in Airbnb decreases hotel RevPAR by 0.04%, 0.02%, 0.03%, 0.03%, 0.04%, and 0.02% in the economy, midscale, upscale, upper upscale, luxury, and independent hotel categories, respectively. Again, these effects might be considered minimal if Airbnb supply was increasing at a 1% rate. However, Airbnb supply has been increasing by over 100% year-over-year. Thus, a 100% increase in Airbnb supply (as has been the case consistently since 2008) decreases hotel RevPAR by 4%, 2%, 3%, 3%, 4%, and 2% in the economy, midscale, upscale, upper upscale, luxury, and independent hotel categories, respectively. Interestingly, Airbnb impacts luxury hotels to the same extent that it impacts economy scale hotels. While the upscale and upper upscale hotel class segments are the second most impacted categories, midscale and independent hotels are the least impacted by Airbnb supply increases.

We further examined the effects of Airbnb supply that were still active in the 12 months preceding June 2017 (i.e., active cumulative listings) on hotel RevPAR, since some existing listings might be inactive

and thus might not necessarily hurt hotel performance. As for the total cumulative listings, we analyzed the entire sample of hotels, as well as each hotel class segment separately. Table 3 presents these results.

The findings were similar to those of the total cumulative Airbnb supply. The results show that all hotels and all hotel class segments are negatively impacted by Airbnb. These effects are not only statistically but also economically significant. For example, in the city of New York, the 1%–4% decrease in RevPAR would amount to a decrease of between \$2.22 and \$8.86 in RevPAR in 2016. Based on these results, the total potential revenue lost to Airbnb in New York city alone ranged between \$91 and \$365 million in 2016.

Furthermore, we examined the effects of Airbnb supply on alternative hotel performance metrics to assess the robustness of the results from the effects of Airbnb supply on hotel room revenues. To this end, the extent to which Airbnb supply impacts hotel room prices (i.e., ADR) and occupancies (i.e., OCC) were examined. Tables 4 and 5 present the results from the analyses of the effects of the total cumulative and active Airbnb supply on ADR for the entire sample of hotels, and for each

Table 3
The effects of Airbnb supply (active) on RevPAR.

	All Hotels	Economy Scale	Midscale Hotels	Upscale	Upper Upscale	Luxury	Independent
Log Airbnb Supply	-0.02 ^a (-3.69)	-0.03 ^a (-6.48)	-0.02 ^a (-2.68)	-0.02 ^a (-4.06)	-0.02 ^a (-4.16)	-0.04 ^a (-5.19)	-0.01 ^c (-1.74)
Log Hotel Supply	-1.63 ^a (-17.35)	-2.24 ^a (-24.42)	-1.69 ^a (-16.51)	-1.58 ^a (-18.18)	-1.50 ^a (-15.21)	-1.28 ^a (-10.11)	-1.64 ^a (-14.96)
Log Population	-8.11 ^a (-10.90)	-5.73 ^a (-7.93)	-9.91 (-12.27)	-7.65 ^a (-11.17)	-9.71 ^a (-12.47)	-9.50 ^a (-8.96)	-7.95 ^a (-8.91)
Log Hospitality Employees	2.75 ^a (20.05)	2.65 ^a (19.83)	3.26 ^a (21.89)	2.36 ^a (18.65)	2.75 ^a (19.13)	3.61 ^a (18.17)	2.64 ^a (16.44)
Log Airport Arrivals	0.97 ^a (19.93)	0.87 ^a (18.33)	0.81 ^a (15.18)	0.94 ^a (20.82)	0.90 ^a (17.51)	0.95 ^a (13.75)	1.05 ^a (18.34)
Unemployment Rate	-1.44 ^a (-2.72)	-3.92 ^a (-7.61)	-1.46 ^b (-2.54)	-3.25 ^a (-6.67)	-2.31 ^a (-4.17)	-1.43 ^c (-1.93)	-0.35 (-0.56)
Constant	137.71 ^a (9.71)	102.29 ^a (7.42)	169.26 ^a (11.00)	133.46 ^a (10.22)	168.65 ^a (11.36)	149.81 ^a (7.37)	134.64 ^a (7.89)
Within R-Square	0.75	0.76	0.73	0.76	0.69	0.65	0.72
Between	0.40	0.44	0.39	0.22	0.26	0.64	0.49
Overall	0.32	0.37	0.30	0.17	0.18	0.40	0.37
F	26.85 ^a	28.80 ^a	24.08 ^a	28.65 ^a	20.12 ^a	13.56 ^a	22.67 ^a
Number of obs.	1710	1710	1710	1710	1710	1446	1659

a, b and c denote 1%, 5% and 10% statistical significance levels, respectively. t statistics are in parenthesis.

Table 4

The effects of Airbnb supply (all) on ADR.

	All Hotels	Economy Scale	Midscale Hotels	Upscale	Upper Upscale	Luxury	Independent
Log Airbnb Supply	−0.02 ^a (−5.89)	−0.03 ^a (−9.90)	−0.02 ^a (−7.28)	−0.02 ^a (−6.58)	−0.02 ^a (−5.60)	−0.02 ^a (−5.23)	−0.003 (−0.80)
Log Hotel Supply	−1.07 ^a (−19.28)	−1.35 ^a (−27.64)	0.94 ^a (−16.40)	−0.93 ^a (−16.08)	−1.05 ^a (−18.73)	−0.70 ^a (−9.26)	−1.11 ^a (−15.58)
Log Population	−3.51 ^a (−7.87)	−2.06 ^a (−5.29)	−3.32 ^a (−7.27)	−4.78 ^a (−10.29)	−3.57 ^a (−7.92)	−5.46 ^a (−8.25)	−4.16 ^a (−7.02)
Log Hospitality Employees	1.74 ^a (21.29)	1.53 ^a (21.49)	1.68 ^a (20.12)	1.74 ^a (20.48)	1.53 ^a (18.64)	2.25 ^a (18.94)	1.66 ^a (15.82)
Log Airport Arrivals	0.53 ^a (18.15)	0.45 ^a (17.70)	0.39 ^a (13.14)	0.45 ^a (14.97)	0.49 ^a (16.99)	0.55 ^a (13.14)	0.59 ^a (15.91)
Unemployment Rate	−0.14 (−0.45)	−0.91 ^a (−3.30)	−0.40 (−1.23)	−1.89 ^a (−5.73)	−2.25 ^a (−7.03)	−0.43 ^a (−0.96)	0.97 ^b (2.33)
Constant	59.49 ^a (6.97)	38.21 ^a (5.12)	56.22 ^a (6.41)	83.66 ^a (9.41)	63.33 ^a (7.35)	85.74 ^a (6.74)	72.40 ^a (6.36)
Within R-Square	0.69	0.74	0.59	0.61	0.69	0.59	0.61
Between	0.46	0.47	0.48	0.29	0.32	0.74	0.55
Overall	0.41	0.44	0.41	0.24	0.26	0.58	0.47
F	19.45 ^a	25.78 ^a	13.03 ^a	15.54 ^a	19.60 ^a	10.70 ^a	13.68 ^a
Number of obs.	1710	1710	1710	1710	1710	1446	1659

a and b denote 1% and 5% statistical significance levels, respectively. t statistics are in parenthesis.

hotel class segment separately.

The results show that ADR is negatively impacted by Airbnb. Specifically, a 1% increase in Airbnb supply (both total cumulative and active supply) decreases ADR by 0.02%. Also, the results for each class segment show that a 1% increase in Airbnb supply decreases ADR by between 0.02% and 0.03% across the economy, midscale, upscale, upper upscale, luxury, and independent hotel categories.

Tables 6 and 7 present the results from the analyses of the effects of total cumulative and active Airbnb supply on OCC for the entire sample of hotels, and for each hotel class segment separately.

The results show that Airbnb supply (both total cumulative and active supply) negatively impacts hotel OCC. In particular, a 1% increase in Airbnb supply decreases hotel OCC by between 0.001% and 0.004%. Moreover, the results for each class segment show that a 1% increase in Airbnb supply decreases OCC by between 0.005% and 0.01% across the economy, midscale, upscale, upper upscale, luxury, and independent hotel categories. While the impact of the total cumulative Airbnb supply on hotel OCC is greater than the impact of active Airbnb supply on hotel OCC, hotel occupancies appear to be the least impacted hotel performance metric.

Although the empirical analyses presented in this section provide robust evidence that Airbnb has a consistent negative impact on hotel RevPAR, ADR, and OCC, and that the effect is both statistically and economically significant, critics could argue that private and shared room listings on Airbnb might not be directly competing with conventional hotels and should thus be excluded from the analyses. Thus, the impact of Airbnb supply on hotel RevPAR, ADR, and OCC were further examined using an alternative measure of Airbnb supply—i.e., we analyzed the extent to which active cumulative listings of entire homes, which includes the total cumulative number of entire homes created in Airbnb and were still active within the 12 months preceding June 2017, impact hotel RevPAR, ADR, and OCC to assess the

robustness of our findings. Table 8 presents these results.

The results show that the Airbnb supply of active cumulative listings only of entire homes negatively impacts all three hotel performance metrics. Specifically, a 1% increase in active cumulative listings of entire homes decreases hotel RevPAR, ADR, and OCC by 0.02%, 0.01%, and 0.01%, respectively. In the same vein, these effects might be considered marginal if the supply of entire homes were increasing at a 1% level.

5. Discussion and conclusions

The sharing economy has disrupted many industries, including hospitality and tourism. Airbnb, an accommodations provider in the sharing economy that does not abide by conventional rules (i.e., Airbnb does not ensure safety and security of guests, is not taxed in many jurisdictions, and so on), has become a major alternative platform for potential hotel guests. The flexibility and ease of adding new supply, owing to a lack of regulation, as evidenced in Fig. 1, gives Airbnb a significant competitive advantage against the hotel industry, because adding a new hotel to the market can often take several years.

Thus, determining the impact of the sharing economy, particularly Airbnb, on the hotel industry to assess the magnitude of its disruptive potential is germane to the formative literature on this topic. Indeed, Airbnb's entry into the hotel landscape, regardless of how the company positions itself, increases the available supply of rooms for accommodating prospective visitors to a destination. In a competitive market, an increase in supply while keeping demand relatively constant would decrease prices and revenues. Thus, Airbnb is likely to take a slice of the existing hotel consumer base and thus adversely impact the hotel industry. Despite the importance of this issue, there is limited empirical work that assesses Airbnb's impact on the hotel industry across an extended geography, using comprehensive data points, and based on a

Table 5

The effects of Airbnb supply (active) on ADR.

	All Hotels	Economy Hotels	Midscale Hotels	Upscale	Upper Upscale	Luxury	Independent
Log Airbnb Supply	−0.02 ^a (−5.70)	−0.03 ^a (−9.07)	−0.02 ^a (−7.18)	−0.01 ^a (−4.99)	−0.02 ^a (−6.41)	−0.02 ^a (−5.11)	−0.006 (−1.60)
Log Hotel Supply	−1.07 ^a (−19.26)	−1.30 ^a (−27.48)	−0.94 ^a (−16.39)	−1.05 ^a (−18.67)	−0.93 ^a (−16.07)	−0.71 ^a (−9.35)	−1.11 ^a (−15.62)
Log Population	−3.61 ^a (−8.19)	−2.31 ^a (−5.97)	−3.42 ^a (−7.56)	−3.77 ^a (−8.45)	−4.89 ^a (−10.64)	−5.73 ^a (−9.01)	−3.91 ^a (−6.75)
Log Hospitality Employees	1.72 ^a (21.18)	1.51 ^a (21.13)	1.67 ^a (19.99)	1.52 ^a (18.46)	1.72 ^a (20.35)	2.25 ^a (18.92)	1.66 ^a (15.97)
Log Airport Arrivals	0.52 ^a (18.07)	0.44 ^a (17.42)	0.39 ^a (13.07)	0.49 ^a (16.83)	0.45 ^a (14.89)	0.54 ^a (13.01)	0.59 ^a (16.06)
Unemployment Rate	−0.22 ^a (−0.69)	−1.06 ^a (−3.85)	−0.48 (−1.49)	−2.36 ^a (−7.44)	−1.97 ^a (−6.03)	−0.56 (−1.26)	1.06 ^b (2.59)
Constant	61.68 ^a (7.33)	43.41 ^a (5.88)	58.28 ^a (6.74)	67.50 ^a (7.94)	85.94 ^a (9.81)	91.26 ^a (7.50)	67.43 ^a (6.08)
Within R-Square	0.69	0.74	0.60	0.69	0.64	0.60	0.61
Between	0.46	0.47	0.48	0.32	0.30	0.74	0.55
Overall	0.41	0.44	0.41	0.26	0.24	0.59	0.47
F	19.41 ^a	25.45 ^a	13.01 ^a	19.49 ^a	15.51 ^a	10.68 ^a	13.71 ^a
Number of obs.	1710	1710	1710	1710	1710	1446	1659

a and b denote 1% and 5% statistical significance levels, respectively. t statistics are in parenthesis.

Table 6

The effects of Airbnb supply (all) on Occupancy Rate (OCC).

	All Hotels	Economy Hotels	Midscale Hotels	Upscale	Upper Upscale	Luxury	Independent
Log Airbnb Supply	−0.004 ^b (−2.24)	−0.01 ^a (−4.66)	−0.001 (−0.47)	−0.005 ^a (−2.88)	−0.003 (−1.62)	−0.01 ^a (−3.98)	−0.008 ^a (−3.53)
Log Hotel Supply	−0.38 ^a (−11.71)	−0.62 ^a (−15.86)	−0.47 ^a (−12.09)	−0.36 ^a (−11.30)	−0.41 ^a (−11.67)	−0.39 ^a (−8.30)	−0.34 ^a (−9.35)
Log Population	−2.74 ^a (−10.37)	−1.81 ^a (−5.81)	−3.49 ^a (−11.26)	−2.49 ^a (−9.59)	−3.18 ^a (−11.13)	−2.44 ^a (−5.91)	−2.19 ^a (−7.10)
Log Hospitality Employees	0.71 ^a (14.66)	0.78 ^a (13.77)	0.98 ^a (17.32)	0.60 ^a (12.63)	0.73 ^a (14.06)	0.93 ^a (12.57)	0.64 ^a (11.90)
Log Airport Arrivals	0.32 ^a (18.46)	0.29 ^a (14.19)	0.29 ^a (14.59)	0.33 ^a (19.58)	0.32 ^a (17.50)	0.29 ^a (11.23)	0.31 ^a (16.16)
Unemployment Rate	0.71 ^a (−3.77)	−1.57 ^a (−7.11)	−0.48 ^b (−2.18)	−0.53 ^a (−2.87)	−0.17 (−0.84)	−0.53 ^c (−1.91)	−0.72 ^a (−3.33)
Constant	46.44 ^a (9.17)	31.10 ^a (5.21)	59.12 ^a (9.96)	42.36 ^a (8.53)	54.95 ^a (10.05)	38.03 ^a (4.79)	35.77 ^a (6.04)
Within R-Square	0.78	0.73	0.76	0.77	0.74	0.67	0.76
Between	0.20	0.29	0.15	0.04	0.14	0.07	0.25
Overall	0.11	0.17	0.11	0.04	0.08	0.05	0.13
F	32.05 ^a	24.48 ^a	27.70 ^a	30.18 ^a	25.42 ^a	14.82 ^a	26.60 ^a
Number of obs.	1710	1710	1710	1710	1710	1446	1659

a, b, and c denote 1%, 5%, and 10% statistical significance levels, respectively. t statistics are in parenthesis.

causal methodological approach. In view of these limitations, the present study examined the impact of Airbnb on the hotel industry. More specifically, we examined the impact of Airbnb supply on key hotel performance metrics, including RevPAR, ADR, and OCC in ten major U.S. hotel markets.

Our results showed that an increasing Airbnb supply negatively impacts hotel RevPAR. More specifically, a 1% increase in Airbnb supply decreases hotel RevPAR by 0.02%. Examining the effects of Airbnb supply on different hotel class segments showed that a 1% increase in Airbnb supply decreases hotel RevPAR by between 0.02% and 0.04%. Interestingly, Airbnb supply had the highest negative impact (0.04%) on both economy and luxury hotels. The upscale and upper upscale hotel segments were the second most impacted categories (0.03% RevPAR drop), while midscale and independent hotels were the least impacted by increasing Airbnb supply (0.02%). While previous research has demonstrated a negative impact on lower-end hotels, our findings provide evidence of Airbnb's growing impact on the mainstream market across hotel class segments, signaling a high level of consistency with the tenets of the theory of disruptive innovation. Comparing Airbnb and hotels attributes (such as cleanliness, comfort etc.), Guttentag and Smith (2017) found that "Airbnb was generally expected to outperform budget hotels/motels, underperform upscale hotels, and have mixed outcomes versus mid-range hotels, signalling some – but not complete – consistency with the concept of disruptive innovation" (p.1). Our findings are consistent with that of Guttentag and Smith (2017). Airbnb outperforms economy hotels on attributes and thus people are likely to substitute these for Airbnb.

However, our findings are inconsistent with that of Guttentag and Smith (2017) in the luxury segment. We think this is because Airbnb has been making a push to provide unique experiences across the spectrum, as a result of which there is now a large inventory of more

"luxury" experiences on the platform, where one can rent designer homes and unique accommodations like cabins, treehouses, boats etc. which tend to be in the higher price range. In fact, evidence of "upscale" of the Airbnb product is provided by its acquisition of home-sharing company Luxury Retreats that signalled its "official" move into luxury (Ting, 2017d) and also its provision of more upscale and luxury product tiers within the overall portfolio: "Beyond by Airbnb" and "Airbnb Plus" (Matthews, 2018).

Our findings on midscale and independent hotels can be attributed to pricing in the case of midscale hotels and consumer perception of independent hotels. That is, Airbnb's ADR are very similar to that of midscale hotels. Consumers who have been staying at midscale hotels might not have felt the need to switch to Airbnb. Hence, Airbnb supply has found to have lower but still significant impact on midscale hotels. One of the premises of Airbnb is the authenticity. Independent hotels might be perceived to be authentic compared to franchised hotels. Our findings on the effects of Airbnb on independent hotels supports the findings from Guttentag et al.'s (2017) study on motivation-based segmentation, which justifies that authenticity is an important motivator for Airbnb customers. Accordingly, our findings suggest that consumers' perceptions of authenticity are not significantly different between independent hotels' and Airbnb's level of authenticity, thus they feel that staying in a local, independent hotel still provides the same level of authenticity as Airbnb, and there is not as big a need to switch.

We also examined the effects of Airbnb supply on hotel ADR and occupancy rates. The effects, while smaller (between 0.003% and 0.03% on hotel ADR, and between 0.008% and 0.01% on OCC), were significant across hotel class segments, and demonstrate that Airbnb supply negatively impacts these two key performance metrics as well. Moreover, these results were consistent when we used either the total cumulative supply or the active Airbnb supply as the key independent

Table 7

The effects of Airbnb supply (active) on Occupancy Rate (OCC).

	All Hotels	Economy Hotels	Midscale Hotels	Upscale	Upper Upscale	Luxury	Independent
Log Airbnb Supply	−0.001 (−0.52)	−0.007 ^a (−2.95)	0.003 (1.49)	−0.002 (−1.12)	−0.001 (−0.48)	−0.01 ^a (−3.57)	−0.003 (−1.50)
Log Hotel Supply	−0.38 ^a (−11.61)	−0.62 ^a (−15.72)	−0.46 ^a (−12.01)	−0.36 ^a (−11.20)	−0.41 ^a (−11.61)	−0.40 ^a (−8.35)	−0.34 ^a (−9.22)
Log Population	−3.01 ^a (−11.47)	−2.13 ^a (−6.89)	−3.83 ^a (−12.50)	−2.75 ^a (−10.71)	−3.37 ^a (−11.92)	−2.64 ^a (−6.65)	−2.58 ^a (−8.52)
Log Hospitality Employees	0.70 ^a (14.43)	0.77 ^a (13.45)	0.97 ^a (17.15)	0.59 ^a (12.37)	0.72 ^a (13.93)	(0.93 ^a (12.51))	0.63 ^a (11.56)
Log Airport Arrivals	0.31 ^a (18.18)	0.28 ^a (13.86)	0.29 ^a (14.32)	0.32 ^a (19.28)	0.32 ^a (17.33)	0.29 ^a (11.08)	0.31 ^a (15.79)
Unemployment Rate	−0.82 ^b (−4.39)	−1.72 ^a (−7.80)	−0.61 ^b (−2.81)	−0.64 ^a (3.51)	−0.25 (−1.24)	−0.62 ^b (−2.25)	−0.89 ^a (−4.17)
Constant	51.73 ^a (10.35)	37.62 ^a (6.37)	65.90 ^a (11.27)	47.72 ^a (9.73)	58.74 ^a (10.90)	42.10 ^a (5.54)	43.67 ^a (7.54)
Within R-Square	0.78	0.73	0.76	0.77	0.74	0.67	0.76
Between	0.20	0.30	0.15	0.04	0.14	0.07	0.25
Overall	0.12	0.17	0.11	0.05	0.08	0.05	0.14
F	31.92 ^a	24.21 ^a	27.75 ^a	30.00 ^a	25.37 ^a	14.77 ^a	26.36 ^a
Number of obs.	1710	1710	1710	1710	1710	1446	1659

a and b denote 1% and 5% statistical significance levels, respectively. t statistics are in parenthesis.

Table 8

The effects of Entire home of Airbnb supply (active) on RevPAR, ADR, and OCC.

	RevPAR	ADR	OCC
Log Airbnb Supply	−0.02 ^c (−1.78)	−0.01 (−1.41)	−0.01 ^b (−2.14)
Log Hotel Supply	−1.74 ^a (−9.87)	−1.21 ^a (−11.07)	−0.34 ^a (−5.89)
Log Population	−9.06 ^a (−4.41)	−3.38 ^b (−2.64)	−3.82 ^a (−5.70)
Log Hospitality Employees	3.34 ^a (14.57)	2.04 ^a (14.30)	0.92 ^a (12.24)
Log Airport Arrivals	1.26 ^a (14.45)	0.74 ^a (13.62)	0.37 ^a (13.13)
Unemployment Rate	−2.14 ^b (−2.43)	−1.07 ^c (−1.95)	−0.81 ^b (−2.82)
Constant	146.10 ^a (3.62)	51.82 ^b (2.06)	63.41 ^a (4.81)
Within R-Square	0.78	0.71	0.82
Between	0.33	0.40	0.13
Overall	0.24	0.34	0.07
F	27.39 ^a	19.28 ^a	36.01 ^a
Number of obs.	936	936	936

a, b, and c denote 1%, 5%, and 10% statistical significance levels, respectively. t statistics are in parenthesis.

variable.

Furthermore, we analyzed the effects of Airbnb supply on hotel performance by excluding private and shared room listings from Airbnb supply, since it could be argued that such listings do not directly compete with conventional hotels. Thus, our final Airbnb supply variable included only active cumulative listings of entire homes, which comprise the majority of the total Airbnb supply and are considered to compete directly with conventional hotels. The results were consistent with our previous findings and indicated that an active supply of entire homes impacted hotel RevPAR by 0.02% and both ADR and OCC by 0.01%.

Overall, the present empirical evidence shows that an increasing Airbnb supply negatively impacts the hotel industry. These effects are not only statistically but also economically significant. The effect sizes might be considered marginal if Airbnb supply were to be increasing at a 1% level. However, our data shows that Airbnb supply has been increasing by over 100% year-over-year, as indicated in Fig. 1, effectively enhancing the real impact on the hotel industry by a multiple of (at least) 100. The resultant loss in RevPAR has significant economic implications for the hotel industry. For example, in the city of New York, the 1%–4% decrease in RevPAR would amount to a decrease of between \$2.22 and \$8.86 in RevPAR in 2016. Based on these results, the total potential revenue lost to Airbnb in New York City alone ranged between \$91 and \$365 million in 2016. Over time, at a 100% increase in Airbnb supply year-over-year, these losses add up, and their resulting impacts might have undesirable effects on the greater economy. Although a 100% increase in Airbnb supply year-over-year might seem dramatic, this estimation is based on historical trends in Airbnb supply. Airbnb is still in its infancy stage, and more hosts are being added to the Airbnb supply every day in many Airbnb markets. Therefore, this trend is expected to continue until Airbnb's maturity stage. The results of the present study, which thus quantify Airbnb's disruptive impact on the hotel industry, have important theoretical and practical implications for the hospitality and tourism industry.

5.1. Theoretical implications

From a theoretical perspective, the present study makes a key contribution to the limited formative empirical literature on the impacts of the sharing economy and Airbnb—economic or otherwise—on the hospitality industry. Much extant work in the field on this emerging phenomenon is conceptual and/or descriptive. Notably, Oskam and Boswijk (2016) have argued that classifying a network platform such as Airbnb under the denomination of the sharing economy obscures its true nature as a disruptive innovation with the potential to transform established socio-technical and -economic structures. While there is evidence to demonstrate that Airbnb offers unique alternative benefits to the hotel industry and is also competing with hotels along

traditionally favored attributes, there is little empirical research on Airbnb's economic impacts to verify and quantify its disruptive potential. Moreover, much existing research on Airbnb's economic impacts is limited in its inferential, temporal, and/or geographical scope. In this regard, the findings of the present study indicate that the exponential growth of Airbnb is consistent with the process-based tenets of the theory of disruptive innovation. Indeed, the disruptiveness of Airbnb is not a simple function of its emergence—the idea of sharing and of homesharing mediated by the Internet has been around for some time. Rather, it is determined by whether its economic impact on the incumbent (hotel industry) provides evidence of the process through which a disruptive product transforms a market (Guttentag, 2015). We find this to be the case. In so doing, we add to the limited body of work on disruptive innovation in our field (Brooker & Joppe, 2014) and to the research on innovation in tourism more broadly (Gomezelj, 2016). Methodologically, our approach, based on Zervas et al.'s (2017) study, provides a template for future research on this topic. It also extends the Zervas et al. (2017) study due to its temporal and geographical comprehensiveness.

5.2. Practical implications

The findings of this study have important managerial implications for the hotel industry and policy implications for destinations and regulators. As the findings demonstrate, while Airbnb may have started out as an attractive proposition to a niche market, owing to its unique attributes, it is now beginning to capture a slice of the mainstream market at the expense of the legacy hotel industry. This pattern is reflective of the process of disruption as outlined in the theory of disruptive innovation. As Airbnb attempts to increase its penetration of underserved markets, including the business travel segment, and as its alternative benefits become entrenched in travelers' consumption patterns and preferences (Gilbert, 2014; Guttentag, 2015), it is clear that the company represents a permanent (as opposed to a temporary) anomaly in business as usual (Belk, 2014). Moreover, the fact that a growing Airbnb supply impacts hotel performance across hotel class segments indicates that the threat of substitutability looms larger over the entire industry (Bailey, 2017; Guttentag et al., 2017; Hajibaba & Dolnicar, 2017).

In view of these findings, the first key implication for the hotel industry is to acknowledge that Airbnb is indeed a disruptor and that it is here to stay. The industry's response to Airbnb is a classic case of the theory of disruptive innovation's predictions. The industry's first knee-jerk response to Airbnb's disruption was *flight* (Belk, 2014), i.e., distancing itself from Airbnb as a provider of accommodations that can serve as an alternative to the hotel product. The hotel industry maintained for some time that Airbnb has a "fundamentally different business model" and serves a whole new set of customers, an argument that

was substantiated at the time by Airbnb's own discourse. However, as Airbnb began to grow, hoteliers adopted the second knee-jerk response: *fight* (Belk, 2014), arguing that Airbnb does not play by the same rules they do, and that much of the company's revenue comes from "illegal hotels." Interestingly, the very parlance "illegal hotels" indicates the industry's recognition of Airbnb as a substitute to the conventional hotel product. The disruptive innovation that was once ignored by the legacy businesses is now considered a major competitor to be attacked through legal battles, lobbying, and marketing. The industry's recent efforts to "ensure legislation in key markets around the country" suggest that hotel companies do view Airbnb a major competitor (Benner, 2017). However, in addition to the fight, it is important that the hotel industry also consider other long-term strategies to counter the threat of Airbnb and other P2P platforms.

For example, hoteliers must consider "the creative destruction of old business models and the adoption of new creative ways of participating in the sharing economy" (Belk, 2014, p. 1598). As an example, boutique hotels have started to use the Airbnb platform as a distribution channel, similar to the way they use booking services like Expedia and Priceline (Kessler, 2015). According to Chesky, over 15,000 boutique hotels have a listing on the platform since being allowed to officially join in November 2016 (Huang, 2017). In one of its latest acquisitions, Accor Hotels purchased onefinestay, a P2P provider of luxury homesharing services, to expand its footprint into the sharing economy (Larsen, 2016). Alternatively, hotels can begin competing more directly with Airbnb in its key attribute of price "by complementing their normal properties with smaller, cheaper properties located outside of primary tourist areas" (Guttentag, 2015, p. 2017) where Airbnb tends to thrive, or by incorporating Airbnb's experiential value propositions—i.e., its alternative benefits—into their own offerings. Mody et al. (2017) provide examples of hotel brands' efforts to incorporate Airbnb's experiential benefits of personalization, serendipity, localness, and *communitas* into their offerings. Finally, hotels can emphasize their own "sustaining innovations" to counter the threat of the sharing economy by tapping into the same economic, social, and technological trends that support the growth of companies like Airbnb. For example, to provide an alternative to Airbnb, Accor Hotels launched a new economy brand called Jo&Joe based on the *co-living concept*, which emphasizes communal spaces and social programming where guests can interact with locals (Ting, 2016b). Effectively, hotel companies need to go back to the drawing board to rethink how value is created, how it is consumed, how quality is controlled for the value creation, and how value creation scales in order to compete in today's dynamic marketplace (Choudhary, 2014).

5.2.1. Implications for destinations

Although Airbnb adversely impacts the hotel industry, Airbnb accommodations may provide substantial financial, economic, and social benefits to the communities in which they operate. The availability of supplementary Airbnb rentals may be beneficial during peak seasons or in the cases of mega events like the Olympics, rather than building hotels that will later not be utilized at optimal levels (Guttentag, 2015; Zervas et al., 2017). Furthermore, the benefits of Airbnb can include, but are not limited to, generating additional tax revenue for cities and local governments, especially in neighborhoods not traditionally visited by guests staying in the core hotel-dominated areas (Tussyadiah & Pesonen, 2016), and additional income for hosts and thus a surge in per capita income if Airbnb drives additional tourists to destinations.

Yet, given that Airbnb is not taxed in several jurisdictions, the revenue lost by hotels in those jurisdictions reduces the overall tax revenues for cities and local governments. Moreover, these sharing economy competitors in the "informal economy" can serve as an obstacle to existing formal businesses (Williams & Horodnic, 2017), having a negative impact on the larger economy of the destination in terms of job creation/unemployment, access to public resources, quality of life, etc. The findings from a recent study commissioned by

the Spanish hotel industry showed that direct and indirect employment creation by home sharing was significantly lower compared to that of employment creation by traditional accommodation sector (9.8 vs. 53.3 jobs per 100 beds) (EY España, 2015; as cited in Oskam & Boswijk, 2016). Also, allowing sharing economy platforms to operate with little or no regulation, as compared to the hotel industry, could make it difficult to attract new hotel developments to the destination and may thus reduce the conventional hotel supply growth in many markets (Lane & Woodworth, 2016). Indeed, hotels have a potentially larger multiplier effect within the local economy. Thus, destination- and policymakers should develop criteria to regulate Airbnb and other sharing economy platforms and work with these platforms to determine and facilitate occupancy tax collection, as they do with the hotel industry.

However, decisions on how to regulate sharing economy platforms will not be straightforward. The application of excessive legislation and regulation driven by the interests of incumbent industries has the potential to stifle innovation that ultimately benefits the consumer and absorb the gains yielded by technology improvements, preventing mutually beneficial trade and stifling economic growth (Allen & Berg, 2014). Lawmakers are clearly still grappling with the nuances of this emerging phenomenon and must thus rely on data-driven insights to regulate P2P accommodations (Titcomb, 2017).

6. Limitations and recommendations for future research

Despite its significant contribution to the emerging literature on Airbnb and the sharing economy, this study has some limitations. We conducted an overall examination of ten major U.S. hotel markets at the metropolitan statistical area (MSA) level. Further analyses are necessary to investigate the effects of Airbnb at neighborhood and property levels within these cities. Also, additional analysis is required to determine the effects of Airbnb on asset-heavy real estate investment trusts vs. franchising and management companies, as well as to identify other potential moderating effects. In addition to examining the impact of Airbnb on hotel performance, researchers must examine the broader economic and social impacts of the sharing economy on a destination to provide insights that support data-driven regulation. For example, while Zervas et al. (2017) argued that Airbnb might contribute to unemployment, Fang, Ye, and Law (2016) have suggested that the sharing economy benefits the entire tourism industry by creating new jobs, as alternative accommodations platforms such as Airbnb attract more tourists to destinations. However, the effects of Airbnb on employment have not been extensively researched. Also, the increasing Airbnb supply might have undesirable effects on the residential housing market. House-owners might simply turn their properties into Airbnb units if they believe they could make more money, which may exacerbate preexisting housing problems in metropolitan cities (D. Lee, 2016). Airbnb could have an adverse impact on residents' quality of life because of nuisances caused by visitors. These questions necessitate a more holistic assessment of the impact of the sharing economy on destination economies. Although we examined the effects of Airbnb across hotel types and also examined the Airbnb's impact on hotels by only looking at entire homes listed on Airbnb vs. total supply of Airbnb, future research is necessary to investigate other potential moderating factors that affect the relationship between Airbnb supply and hotel performance measures. Relatedly, while studies have demonstrated the substitutability potential of Airbnb, a more holistic economic impact assessment would involve understanding whether tourists who potentially spend less on accommodations by using Airbnb save their money or spend their savings in the destination in other ways, or whether tourists staying longer and dispersing their spending beyond cities' tourism cores has a positive overall economic impact on the destination (Guttentag, 2015). Also, with hints of a potential saturation point in the company's nearly vertical growth curve (Ting, 2017b), and with regulation slowing growth in popular markets (Ting, 2017c), one must

monitor Airbnb's impact on the hotel industry longitudinally and across a larger number of markets to determine the peak of its disruption to the incumbent. Finally, with Airbnb looking at its own sustaining innovations to continue on its growth trajectory, such as partnering with real estate developers to develop ersatz hotels (Niido by Airbnb) (Sheivachman, 2017), and hotel companies moving towards their own branded marketplace platforms (Richard & Cleveland, 2016) (e.g., Accor recently experimented with allowing independent hotels to use its online booking engine as a distribution platform), the fluid nature of innovation in the accommodations industry is likely to provide interesting new avenues of future research.

CRediT authorship contribution statement

Tarik Dogru: Writing – original draft, methodology, Formal analysis. **Makarand Mody:** Writing – original draft. **Courtney Suess:** Writing – original draft.

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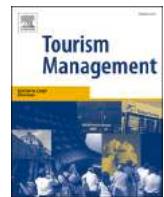
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Research note

The effects of Airbnb on hotel performance: Evidence from cities beyond the United States

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ARTICLE INFO

Keywords:

Sharing economy
International hotel markets
Airbnb
Economic impact
Hotel performance

ABSTRACT

Although Airbnb's impact on hotels has been quantified for major hotel markets in the United States, these effects have not been quantified in international hotel markets. Accordingly, the purpose of this study is to examine the effects of Airbnb listings on key hotel performance metrics in an international context. In particular, we examine the effects of Airbnb listings on hotel revenue per available room (RevPAR), average daily rate (ADR), and occupancy rate (OCC) in major international hotel markets, namely London, Paris, Sydney and Tokyo. The results show that Airbnb listings in these major cities have been increasing more than 100% year over year and that the effect of Airbnb on hotel RevPAR and OCC is negative and statistically significant. In particular, a 1% increase in Airbnb listings decreases hotel RevPAR by between 0.016% and 0.031% in these hotel markets. The implications of these findings for destinations and hoteliers are discussed.

1. Introduction

With more than three million listings, Airbnb is the world's largest alternative accommodations provider, boasting a presence in 191 cities worldwide. Since its inception, Airbnb has served over 200 million guests (Airbnb, (n.d.)) thereby establishing its place as a serious player in the accommodations game. The increase in room supply brought about by the advent of Airbnb has been a cause of great concern to operators of traditional hotels (Haywood, Mayoock, Freitag, Owoo, & Fiorilla, 2017), as customers increasingly come to view Airbnb properties as alternatives to established hotels (Dogru, Mody, Suess, Line, & Bonn, 2019; Guttentag & Smith, 2017; Ting, 2017).

The impact of Airbnb on traditional hotels is a research topic of great interest to industry professionals and academics alike. Of particular interest to the hotel industry is the direct financial impact of increased room supply due to Airbnb on key performance indicators such as occupancy rates (OCC), average daily rate (ADR), and revenue per available room (RevPAR) (Dogru, Mody, & Suess, 2019; Dogru, Hanks, Ozdemir, Kizildag, Ampountolas, Demirer, 2020; Haywood et al., 2017). Although there also exists a body of literature around Airbnb exploring

such topics as the customer and host experience (Ju, Back, Choi, & Lee, 2019; Lee, Yang, & Koo, 2019; Mody, Suess, & Lehto, 2017; Mody, Suess, & Lehto, 2018; Mody, Suess, & Lehto, 2019), employment (Dogru, Mody, Suess, McGinley, & Line, 2020), pricing (Dogru & Pekin, 2017; Gibbs, Guttentag, Gretzel, Morton, & Goodwill, 2018), community and resident impact (Lee, 2016; Mody, Suess, & Dogru, 2019), regulation (Kaplan & Nadler, 2015; Miller, 2014), the demand and supply dynamics of Airbnb (Gunter & Önder, 2018; Lu & Tabari, 2019), and Airbnb's economic impact on tourism industry (Heo, Blal, & Choi, 2019; Zekan, Önder, & Gunter, 2019), relatively less research has focused on the direct financial impact of Airbnb on hotel performance indicators.

Recently, in order to bridge that gap, Dogru et al. (2019) conducted a study examining the impact of Airbnb on hotel OCC, ADR, and RevPAR metrics in the United States, from the founding of Airbnb until 2017, the last year for which data was available. These researchers found that an increased supply of Airbnb inventory adversely affected all three performance metrics, and this result was robust across all segments of the hotel industry, from budget to luxury properties. While this study represented a step forward in our empirical understanding of these

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dynamics, this data was examined only for U.S. based properties.

Limited number of studies have investigated the effects of Airbnb on hotels in destinations beyond the U.S. For example, Choi, Jung, Ryu, Do Kim, and Yoon (2015) showed that Airbnb does not affect hotel revenues in Korea, while Neeser, Peitz, and Stuhler (2015) reported that Airbnb has negative impacts on hotel room prices in Nordic countries. Similar to the findings in Nordic countries, Benítez-Auriolles (2019) also found negative impacts of Airbnb on hotels in Barcelona. However, these studies were limited in their geographical scope and/or timeframe. Therefore, a better and more comprehensive understanding of Airbnb's effects on hotel financial outcomes in global locations is essential to our understanding of the impact of the Airbnb model on the hotel industry worldwide, as global hotel revenues topped USD 500 billion in 2018 ([soegjobs.com](#)), and these revenues stand to be significantly impacted by the rise of Airbnb.

Although Airbnb boasts property listings in 81,000 cities across 191 countries, to the best of our knowledge, no study has yet investigated the direct financial impact of Airbnb on the OCC, ADR, and RevPAR of hotels in international markets. To this end, we build on Dogru et al.'s (2019) research to expand the scope of study to four international locations: Tokyo, Sydney, Paris, and London. In doing so, we expect to extend the results of Dogru et al. (2019), examining whether the presence of Airbnb room inventory has a direct and adverse effect on the OCC, ADR, and RevPAR of traditional hotels in the international market. By testing these propositions, this study hopes to serve as a springboard for future, more detailed empirical research into the international financial ramifications of Airbnb on the global hotel industry. Based on extant literature, we predict that:

H_1 : In an international context, Airbnb supply negatively impacts hotel room revenues (RevPAR), i.e., with increased Airbnb supply, hotel RevPAR decreases.

H_2 : In an international context, Airbnb supply negatively impacts hotel average daily rates (ADR), i.e., with increased Airbnb supply, hotel ADR decreases.

H_3 : In an international context, Airbnb supply negatively impacts hotel occupancies (OCC), i.e., with increased Airbnb supply, hotel OCC decreases.

2. Methodology

We follow the empirical procedure employed in Dogru et al. (2019) and Zervas, Proserpio, and Byers (2017). Specifically, we utilized the panel data ordinary least square regression technique to examine the effects of Airbnb supply on key hotel performance metrics (i.e. RevPAR, ADR, and OCC). We also conducted the Hausman test to determine whether the fixed or random effect model is more suitable for the panel data of the study. The results from the Hausman test suggests that the panel data fixed effect model is more suitable. The coefficient estimates from the panel data fixed effect model yield results similar to that of the results from the panel data ordinary least square regression model. Therefore, we only reported the result from the panel data ordinary least square regression model to be consistent with the studies of Zervas et al. (2017) and Dogru et al. (2019).

We also consider Airbnb listings as a variable intervention in time against hotel RevPAR, ADR, and OCC to analyze the before and after effect of Airbnb listings on the hotel performance metrics in these markets. Accordingly, the dataset includes the period prior to the existence of Airbnb (i.e., January 2001 to June 2008), where Airbnb listings are assigned a value of zero, and the period after the emergence of Airbnb, between July 2008 and June 2017. During this period, Airbnb listings take the value of the number of cumulative listings created.

The sample of this study consists of four major international cities, namely London, Paris, Sydney, and Tokyo, for the period between January 2001 and June 2017, which was the most recent time point for which data was available. Monthly hotel room revenue per available room (RevPAR), average daily rate (ADR) and occupancy rate (OCC) are

the study's dependent variables, provided by Smith Travel Research (STR).

Airbnb listings, a variable which is measured as the cumulative number of listings created since the emergence of Airbnb, is the study's main independent variable. We also used an alternative measure of Airbnb listings, which includes cumulative number of listings created since the emergence of Airbnb and still active within the past twelve months. We obtained Airbnb data from short-term rental data provider AirDNA.

Following the studies of Dogru et al. (2019) and Zervas et al. (2017), we included hotel room supply, number of employees, tourist arrivals, and unemployment rate in the model to control for macroeconomic factors that might affect hotel performance irrespective of the Airbnb's introduction. We obtained the hotel room supply from STR. Number of employees, tourist arrivals, and unemployment rate data were obtained from the Bureau of Statistics of the respective countries. With the exception of the OCC and unemployment rate variables, we utilized logarithmic transformation of the study's variables to account for data-skewness. Furthermore, all models control for city and year-month fixed effects.

3. Results

Tables 1 and 2 present the number of Airbnb listings created in these four hotel markets since the founding of Airbnb. Indeed, Airbnb has grown substantially in the last four years and reached 381,097 listings as of June 2017, with the majority of listings being entire homes (250,337 listings). Tables 3–5 present the results from the analyses of the effects of Airbnb listings on key hotel performance metrics.

The effect of Airbnb listings on hotel RevPAR is negative and statistically significant for every Airbnb listings measure with the exception of shared room listings. That is, a 1% increase in Airbnb listings decreases hotel RevPAR by between 0.016% and 0.031% in these hotel markets. While these impacts appear to be marginal on the surface, a close examination of the growth rate of Airbnb tells an entirely different story. Similar to the growth rate of Airbnb in U.S. cities (see Dogru et al., 2019), Airbnb listings have been increasing by more than 100% year-over-year between 2008 and 2017 in these four cities. Considering this growth pace of Airbnb, a 100% increase in Airbnb listings reduces hotel RevPAR by between 1.6% and 3.1% in these cities.

Similar findings are also observed when analyzing the effects of Airbnb listings on hotel OCC. However, the effects of Airbnb listings on hotel ADR were statistically insignificant, suggesting that hotel room rates were not affected by the growing Airbnb supply.

These results collectively suggest that hotels seem to have ignored the presence of Airbnb and did not utilize pricing as a strategy against Airbnb accommodations. Put differently, hotels did not reduce prices to compete with Airbnb, thus potentially losing customers to the company (lower occupancy) and resulting in lower RevPAR. Indeed, hoteliers initially did not consider Airbnb as a competitive force. Nevertheless, Airbnb supply has adversely affected hotel revenues and occupancy rates over the past ten or so years.

4. Discussion and conclusion

Airbnb has quickly risen to become a significant player in the accommodations space, causing marketplace disruption in the hotel industry (Dogru et al., 2019). Previous researchers have demonstrated that an increase in the number of available Airbnb rooms in a market has a direct, significant, and negative impact on such key hotel metrics as OCC, ADR, and RevPAR (Xie & Kwok, 2017; Zervas et al., 2017). However, extant research has focused on the U.S. market, largely to the exclusion of international destinations. This research expanded the scope of this important stream of investigation by exploring these Airbnb-hotel dynamics in four international locations: Tokyo, Sidney, Paris, and London. Our results indicated that international hotel markets

Table 1

Number of listings created since the introduction of Airbnb in each city.

City Year	Tokyo		Sydney		Paris		London	
	All Listings	Active Listings ^a						
2008	0	0	0	0	3	2	0	0
2009	2	0	8	7	74	51	21	7
2010	16	6	52	39	452	296	162	92
2011	66	42	243	155	1641	1071	915	574
2012	159	105	1028	608	6472	4092	4694	2793
2013	682	446	3095	1715	16,861	10,028	9557	5714
2014	2917	1838	9212	4294	37,149	20,161	22,706	12,266
2015	14,308	8626	26,972	11,000	78,351	39,797	60,776	28,992
2016	30,585	22,893	50,637	28,493	120,091	73,054	116,065	70,781
2017 ^b	37,586	27,071	33,430	32,809	119,244	81,521	144,844	85,122

^a Listings with at least one booking within the past 12 months.^b Number of listings as of June 2017.**Table 2**

Total number of listings created since the introduction of Airbnb.

Year	Total cumulative Airbnb listings				Active cumulative Airbnb listings ^a			
	All Listings	Entire Homes	Private Rooms	Shared Rooms	All Listings	Entire Homes	Private Rooms	Shared Rooms
2008	3	2	1	0	2	1	1	0
2009	105	81	23	1	65	48	16	1
2010	682	511	166	5	433	331	99	3
2011	2865	2105	741	19	1842	1393	442	7
2012	12,353	8770	3509	74	7598	5570	1997	31
2013	30,195	22,307	7683	205	17,903	13,561	4251	91
2014	71,984	52,311	18,922	751	38,559	29,020	9224	315
2015	180,407	123,963	53,248	3195	88,415	64,462	22,818	1135
2016	317,378	210,858	100,034	6446	195,221	134,427	57,285	3484
2017 ^b	381,097	250,337	122,473	7751	226,523	154,464	67,604	4126

^a Listings with at least one booking within the past 12 months.^b Number of listings as of June 2017.**Table 3**

The effects of Airbnb listings on Hotel Room Revenue (RevPAR).

	Total Airbnb Listings				Active Airbnb Listings			
	All Listings	Entire Homes	Private Rooms	Shared Rooms	All Listings	Entire Homes	Private Rooms	Shared Rooms
Log Airbnb Listings ^{rowhead}	-0.031a (-3.25)	-0.030a (-3.09)	-0.027a (-3.01)	-0.012 (-1.08)	-0.023b (-2.48)	-0.025b (-2.41)	0.016c (-1.87)	-0.019c (-1.86)
Log Hotel Supply ^{rowhead}	-1.25a (-12.87)	-1.27a (-13.33)	-1.25a (-12.74)	-1.35a (-14.01)	-1.28a (-13.00)	-1.27a (-12.64)	-1.31a (-13.45)	-1.33a (-14.12)
Log Employment ^{rowhead}	2.08a (13.44)	2.02a (13.74)	2.09a (12.85)	1.81a (14.11)	2.01a (12.90)	1.99a (12.99)	1.95a (12.35)	1.80a (14.66)
Log Tourist Arrivals ^{rowhead}	0.21a (13.67)	0.21a (13.69)	0.20a (13.26)	0.21a (12.94)	0.21a (13.61)	0.22a (13.59)	0.21a (13.41)	0.22a (13.39)
Unemployment Rater ^{rowhead}	0.04a (10.28)	0.04a (10.31)	0.05a (9.93)	0.04a (10.18)	0.04a (10.05)	0.04a (9.99)	0.04a (9.62)	0.03a (10.45)
Constant ^{rowhead}	-15.93a (-4.59)	-14.72a (-4.46)	-16.02a (-4.41)	-9.66a (-3.31)	-14.21a (-4.03)	-14.08a (-3.98)	-12.72a (-3.60)	-10.04a (-3.69)
R-Square ^{rowhead}	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adjusted R-Square ^{rowhead}	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
F-Test ^{rowhead}	61.95a	61.83a	61.78a	60.88a	61.45a	61.41a	61.15a	61.14a
Number of obs. ^{rowhead}	696	696	696	696	696	696	696	696

a, b and c denote 1%, 5% and 10% statistical significance levels, respectively. t statistics are in parenthesis.

are not immune to the adverse effects of Airbnb, and are consistent with those of studies that have examined Airbnb's impact on hotels in major U.S. cities. Accordingly, a 1% increase in total Airbnb listings reduces hotel RevPAR by 0.031%. We must note that different types of listings have different effects on hotels. That is, a 1% increase in entire home, private room, and shared room Airbnb listings decreases hotel RevPAR by 0.030, 0.027, and 0.012%, respectively in these markets. The results are robust to alternative measures of Airbnb listings, where only the impact of active Airbnb listings on hotels were analyzed. While our findings are similar to those of Dogru et al. (2019) in terms of the effects of Airbnb on hotel RevPAR and OCC, our analyses report contradictory

findings on the effects of Airbnb on hotel ADR. In particular, the growth of Airbnb listings in these markets did not affect hotel ADR. The likely reason for this outcome is that hotels in these markets did not perceive Airbnb as a disruptive competitive phenomenon and thus did not utilize aggressive pricing strategies to mitigate Airbnb's potential adverse effects. These results have significant implications not only for industry but also for future research on this issue.

4.1. Implications and future research

The implications of this research are threefold. First, our study serves

Table 4

The effects of Airbnb listings on Hotel Room Occupancy.

	Total Airbnb Listings				Active Airbnb Listings			
	All Listings	Entire Homes	Private Rooms	Shared Rooms	All Listings	Entire Homes	Private Rooms	Shared Rooms
Log Airbnb Listingsrowhead	-0.016a (-3.57)	-0.018a (-3.97)	-0.012a (-3.00)	-0.022a (-4.15)	-0.016a (-3.60)	-0.024a (-4.90)	0.008b (-2.16)	-0.017a (-3.58)
Log Hotel Supplyrowhead	-0.03 (-0.67)	0.03 (0.72)	0.02 (0.47)	0.04 (0.89)	0.03 (0.76)	0.07 (1.60)	-0.01 (-0.01)	0.01 (0.43)
Log Employmentrowhead	0.85a (11.86)	0.85a (12.41)	0.84a (11.14)	0.77a (13.08)	0.85a (11.87)	0.90a (12.84)	0.79a (10.79)	0.73a (12.82)
Log Tourist Arrivalsrowhead	0.13a (17.72)	0.13a (17.86)	0.12a (17.26)	0.14a (17.92)	0.13a (17.83)	0.13a (18.27)	0.12a (17.42)	0.13a (17.80)
Unemployment Raterowhead	0.02a (9.11)	0.02a (9.43)	0.02a (8.61)	0.01a (9.56)	0.02a (9.26)	0.02a (10.02)	0.01a (8.38)	0.01a (8.98)
Constantrowhead	-16.53a (-10.20)	-16.49a (-10.74)	-16.21a (-9.54)	-15.37a (-11.40)	-16.66a (-10.16)	-18.16a (-11.13)	-15.02a (-9.09)	-14.28a (-11.30)
R-Squarerowhead	0.70	0.71	0.70	0.71	0.70	0.71	0.70	0.71
Adjusted R-Squarerowhead	0.68	0.68	0.68	0.69	0.68	0.69	0.68	0.68
F-Testrowhead	29.57a	29.76a	29.33a	29.86a	29.58a	30.29a	29.06a	29.57a
Number of obs.rowhead	696	696	696	696	696	696	696	696

a, b and c denote 1%, 5% and 10% statistical significance levels, respectively. t statistics are in parenthesis.

Table 5

The effects of Airbnb listings on Average Daily Rate (ADR).

	Total Airbnb Listings				Active Airbnb Listings			
	All Listings	Entire Homes	Private Rooms	Shared Rooms	All Listings	Entire Homes	Private Rooms	Shared Rooms
Log Airbnb Listingsrowhead	-0.001 (-0.12)	0.003 (0.31)	-0.001 (-0.18)	-0.002 (-0.18)	0.004 (0.40)	0.011 (1.02)	0.004 (0.50)	0.006 (0.57)
Log Hotel Supplyrowhead	-0.98a (-9.65)	-1.01a (-10.05)	-0.98a (-9.49)	0.98a (-9.72)	-1.01a (-9.84)	-1.05a (-9.94)	-1.01a (-9.94)	-1.01a (-10.31)
Log Employmentrowhead	1.91a (11.76)	1.87a (12.09)	1.92a (11.23)	1.91a (14.27)	1.85a (11.37)	1.80a (11.22)	1.85a (11.17)	1.88a (14.65)
Log Tourist Arrivalsrowhead	0.14a (8.64)	0.14a (8.57)	0.14a (8.65)	0.14a (8.24)	0.14a (8.46)	0.14a (8.24)	0.14a (8.65)	0.14a (8.24)
Unemployment Raterowhead	0.02a (3.41)	0.01a (3.26)	0.02a (3.32)	0.02a (4.03)	0.01a (3.25)	0.01a (2.93)	0.01a (3.17)	0.01a (4.09)
Constantrowhead	-15.23a (-4.18)	-14.23a (-4.11)	-15.43a (-4.04)	-15.22a (-5.00)	-13.73a (-3.72)	-12.26a (-3.31)	-13.64a (-3.69)	-14.30a (-5.03)
R-Squarerowhead	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adjusted R-Squarerowhead	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
F-Testrowhead	129.89a	129.91a	129.90a	129.90a	129.94a	130.12a	129.95a	129.96a
Number of obs.rowhead	696	696	696	696	696	696	696	696

a, b and c denote 1%, 5% and 10% statistical significance levels, respectively. t statistics are in parenthesis.

as a replication of [Dogru et al. \(2019\)](#), confirming the direct, significant, and negative relationship between the addition of Airbnb room inventory in a market and the key hotel metrics of OCC and RevPAR. From an industry standpoint, this finding is significant in that the strength, direction, reliability, and validity of these relationships will be key to driving strategy and policy at traditional hotel companies as they look for ways to mitigate the financial damage caused by Airbnb. Second, our results extend previous findings to markets outside of the U.S., demonstrating that these relationships hold in international contexts as well. As the global hotel industry is set to top 500 billion dollars in revenue this year, enhancing our understanding of the financial relationships in the accommodations sector becomes ever more important. Lastly, this study lays the foundation for future research into the international ramifications of Airbnb on the financial health of the traditional hotel industry across the globe.

Future research should be conducted based on the results of this study in order to extend, expand, and further illuminate the impact of Airbnb on the financial success of international hotels. This would be of particular interest to multinational hotel chains that have properties across the world, and are thus financially impacted by Airbnb in several key hotel markets. Also, analyzing the impact of Airbnb on hotel performance metrics in cities beyond this study's sample is important to

further uncover the effects of Airbnb. While Airbnb is the dominant sharing economy platform in the lodging industry, other platforms, such as VRBO, also play a vital role in the context of sharing economy. Future studies may examine and compare the effects VRBO on hotel industry across the globe. Although we analyzed the effect of Airbnb on key hotel performance measures in cities beyond the US, our analyses are limited to overall hotels. That is, we did not analyze the effect of Airbnb on different hotel segments, such as economy scale, midscale, and luxury scale hotels. Airbnb might have varying impact on alternative hotel segments. Therefore, future studies are necessary to investigate the effect of Airbnb on hotel performance measures across different hotel segments. While we controlled for the effects of major macroeconomic factors on hotel performance measures in the empirical models, there could be other factors that might affect hotel performance measures. Future studies may explore the factors affecting hotel performance measures that are beyond the Airbnb. Although Airbnb might have an adverse impact on hotels, the overall impact of Airbnb to the economy might be greater. Therefore, further studies are necessary to analyze the economic impacts of Airbnb to the tourism industry, tourism demand, and employment.

Authors contribution statement

Dr. Tarik Dogru designed the general framework of the study and implemented the empirical analysis. Dr. Lydia Hanks wrote the introduction and conclusion. Dr. Makarand Mody, Dr. Courtney Suess, and Dr. Ercan Sirakaya-Turk discussed and contributed to the theoretical framework, empirical strategy, results, and implications.

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The Trustworthiness of Online Channels for Experience- and Goal-Directed Search Tasks

Journal of Travel Research
50(4) 378–391
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DOI: 10.1177/0047287510371694
<http://jtr.sagepub.com>


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Abstract

Travelers have used the Internet as an information channel for years and more recently also started to produce content themselves. With an abundance of information channels competing for customers' attention, researchers and practitioners need to better understand which online channels are trustworthy and consulted for travel-related factual information or for reports on experiences. Thus, this article compares the trustworthiness of three different online channels (personal, marketing, and editorial). The results of the experiment indicate that user-generated content appears to be highly trustworthy, showing high levels of integrity; however, it is not always regarded as the most informative. Editorial content providers, such as tourist boards, are considered to be the most able information provider. The results confirm that depending on the type of online channel, different dimensions of trustworthiness become effective as drivers of overall trust.

Keywords

trustworthiness of information channels, information search, exploratory search, electronic word of mouth, tourism marketing

Introduction

The Internet has become an important channel for travelers' information search (Gretzel, Fesenmaier, and O'Leary 2006; Gursoy and McLeary 2003; Pan and Fesenmaier 2006; Xiang, Wöber, and Fesenmaier 2008), creating an environment whereby online information providers such as tourist boards, hotel and resort websites, travel agents, bloggers and magazines actively compete for attention to attract searchers and ultimately, bookers. Recent research indicates that travelers usually rely on multiple information channels depending on their travel planning process (Bieger and Laesser 2004; Zins 2007); among these are websites of hotels, travel agents, car rentals and airlines, and national and regional tourist offices. In addition, travelers have begun to use other so called Web 2.0 websites which enable them to share their views and opinions about products and services (Pan, MacLaurin, and Crotts 2007; Xiang and Gretzel 2009). Importantly, these studies indicate that electronic word of mouth is becoming increasingly popular because it is considered highly credible and informative as customers can make inferences about the trustworthiness of a website and the information it provides (Bailey 2004; Bickart and Schindler 2001). Studies also indicate that online channels exhibit trustworthiness in a variety of ways depending on content (Gefen, Benbasat, and Pavlou 2008). This study builds on this research in order to investigate the trustworthiness of three popular online information channels providing tourism content: (1) the service provider

(marketing content), (2) city tourist boards (editorial content), and (3) user-generated content (personal content). Tourist boards are considered editorial content as they are completely or partly funded by governments (Davidson and Maitland 1997), with a majority of 86% of them involved in developing tourism in their country, marketing, providing tourism information and tourism statistics (Baum 1994; Davidson and Maitland 1997).

Two streams of research are considered relevant for this study. First, we draw on theory from the field of trustworthiness as this is an integral driver for ultimately choosing specific information channels over others. Second, the literature on information search in tourism is reviewed since this is the setting of the study. Two questions were used to guide this research: (a) Do these online channels exhibit different levels of trustworthiness? and (b) Do the dimensions of trustworthiness differ depending on the channel used? It is argued that this research contributes to the existing literature by documenting the differences between channels of information (i.e., personal, marketing, and editorial) in terms of trustworthiness that, in turn, provides insights for marketers regarding travelers' perceptions. The remainder of the article proceeds

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as follows. First, the literature review provides insights into information search and the concept of trustworthiness and serves as a basis for hypotheses development. Then, the research setting, including methodology, is explained and the results of the analyses are presented. Finally, the article closes with a discussion of the implications of these findings and avenues for future research.

Literature Review

Information Search and Channel Usage in Tourism

There is extensive research on information search as part of the customer buying decision process (Bettman 1979) as well as on information search in the pretravel plan (Crompton 1979; Jun, Vogt, and MacKay 2007; Mansfeld 1992). After identification of needs, customers may first start internal search, using existing knowledge that is also dependent on consumers' ability to access stored knowledge (Alba and Hutchinson 1987; Brucks 1985; Gursoy and McLeary 2003; Kim and Fesenmaier 2009; Vogt and Fesenmaier 1998). If internal search is not successful, the customer continues with external search. Gursoy and McLeary (2003) proposed a model of tourist information search behavior that integrated internal and external search, cost of search, concepts of familiarity, expertise, and previous visits with involvement and learning of the individual. In addition, Zins and Teichmann (2006) conducted a longitudinal study where they found that credibility of information channels change from the pretrip to the posttrip phase. Bieger and Laesser (2004) also investigated the differences in information channels before and after a trip decision is made. Consistent with Zins and Teichmann (2006), this study shows that the selection of the information channel differs significantly depending on type of trip, degree of packaging, and choice of destination. They also found that friends or, in the web context, other users are very important channels, as are guide books, regional and destination information brochures, and tourist boards (Bieger and Laesser 2004). Other research has focused on conceptual work, discussing ideas of the impact of the Internet on information search behavior (Peterson and Merino 2003).

Table 1 summarizes the differences between the three online channels investigated in this study and their media benefits (Wendel and Dellaert 2005). This literature confirms that different information channels are used to meet different information needs; that is, the information channel depends to a large extent on the stage of the travel planning process and/or the component of the trip that is searched (Zins 2009). Vogt and Fesenmaier (1998) also outline information needs such as functional, hedonic, innovation, aesthetic, and sign needs.

As can be seen in literature from advertising, there are differences regarding effectiveness of the message and the media channels used. These studies show differentiation of high- and low-involvement media (Batra, Myers, and Aaker 1995) and

Table 1. Channel Benefits

Characteristics	Editorial Information	Personal Information	Marketing Information
Trustworthy	X	X	
Detailed	X		X
Time saving			X
Easy to use	X		X
Personal		X	
Stimulating		X	X
Informative	X	X	X

differences in the effects of advertising depending on media (Kim, Hwang, and Fesenmaier 2005). Importantly, some show that trustworthiness is key in addition to channels being detailed, time saving, easy to use, personal, stimulating, and informative (Wendel and Dellaert 2005). Research on tourism websites shows that credibility is an important factor contributing to the persuasiveness of websites and ultimately to purchase or revisit intentions (Loda, Teichmann, and Zins 2009).

Trust and Trustworthiness in Online Environments

Trust, as a concept in research, has been examined in several social sciences including sociology, psychology, anthropology, economics, organizational behavior, and in information systems and marketing (Bhattacherjee 2002; Gefen 2002; Hoffman, Novak, and Peralta 1999; Jarvenpaa, Tractinsky, and Vitale 2000; Siau and Shen 2003). In services marketing, Berry and Parasuraman (1991) argue that "customer company relationships require trust" and that "effective services marketing depends on the management of trust because the customer typically must buy a service before experiencing it" (p. 144). This suggests that within the context of tourism, receiving wrong information can often lead to a dissatisfactory travel experience.

There are four major streams of research on trust in online environments as identified by Gefen, Benbasat, and Pavlou (2008), and they include the nature and role of trust, the antecedents of trust, moderators of trust, and empirical methods for examining trust. Research on the antecedents of trust focuses heavily on building trust and identifying relevant drivers (Gefen, Benbasat, and Pavlou 2008; Pavlou 2002; Pavlou and Gefen 2004). It also discusses the relationship between trust, IT artifacts, and adoption of e-commerce. In Internet shopping, for instance, trust can be understood as confidence in the interaction with the service provider, trust in the system, in protection of customers' privacy and secure payment, as well as trust in truthful online information provision (Parasuraman, Zeithaml, and Malhotra 2005). Furthermore, researchers tried to understand how risk and trust beliefs arise as well as whether trust is an object or behavioral-based

belief. Behavioral beliefs concern using the system and are a direct antecedent to adoption intentions, while object beliefs concern beliefs about the system (Wixom and Todd 2005).

Trustworthiness is emerging as a key aspect leading to IT acceptance and can be viewed as a multidimensional construct combining the dimensions of ability, integrity, and benevolence and assessing their impact on overall trust (Gefen 2002). It is posited in this study that it is important to make a distinction between trust and trustworthiness; that is, following Gefen and Straub (2004) and Gefen (2002), trustworthiness describes the trustee's ability, integrity, and benevolence and not one's willingness to depend (Gefen 2000). In addition, it is argued that trustworthiness includes the following three dimensions (Gefen 2002): (1) integrity, the belief that the information provider adheres to accepted rules of conduct, is honest, and keeps promises; (2) benevolence, the belief that the information provider wants to help the customer; and (3) ability, the belief that the information provider is competent. Not all of these dimensions are equal. Integrity, for instance, is effective with purchase intentions (Gefen and Heart 2006), whereas ability is effective when just inquiring about a product. In this research, we propose that the three dimensions of trustworthiness differ as antecedents to overall trust depending on the information channel used. Gefen, Benbasat, and Pavlou (2008) recommend that future research should investigate the dimensions of trustworthiness to further clarify how trust operates. In this study, the three dimensions are investigated in light of different information channels. It helps to understand the distinction among the dimensions of trust, particularly important also for practitioners since this examines customers' beliefs about the trustees. They are dependent on the trustor's behavioral intention to engage in a business relationship, that is, the willingness to trust and depend on the trustee. As such, trust deals with the behavioral intention to engage in a behavior that depends on the trustee while trustworthiness deals with the trustor's beliefs about a trustee (Gefen, Benbasat, and Pavlou 2008). This difference between beliefs and intentions is also made in the theory of planned behavior (Ajzen 1991). Trusting beliefs (trustworthiness) and trusting intentions are also explored and differentiated by Pavlou and Fygenson (2006).

Several website quality models include dimensions related to trust, trustworthiness, reliability, and credibility. For instance, the WebQual instrument proposed by Loiacono, Chen, and Goodhue (2002) as well as Barnes and Vidgen (2002) or Parasuraman, Zeithaml, and Malhotra (2005) include some aspect of trust. In addition, models of website evaluation include the performance of the site, content, and the seller (Chakraborty, Lala, and Warren 2003). The trustworthiness dimensions primarily focus on the provider of the information but not the actual message communicated. Thus, relying on literature from advertising, the three-dimensional concept of trustworthiness is extended by adding informativeness (Ducoffe 1995, 1996). This concept focuses on the actual

information provided and whether it is informative. Advertising literature includes this important concept as a contributor to value of the consumer derived by reading an advertisement. The focus is on timeliness, relevancy, and quality of the information in our case contributing to overall trust (Pavlou and Gefen 2004; Tussyadiah and Fesenmaier 2009). While ability judges the capability of the information provider, informativeness focuses on the actual content.

This research investigates which of the dimensions of trustworthiness is the main driver of overall trust in different information channels. The integrity of peers might be high, giving the best advice possible, but is user-generated content up-to-date and informative enough for information search? Therefore, ability might be the driver of overall trust for marketing and editorial content.

Hypothesis Development

The results of the literature review indicate that travelers choose different information channels depending on their trip planning process or their information needs (Vogt and Fesenmaier 1998; Zins 2009). This may suggest that customers perceive these channels and their trustworthiness differently. The relevance of interpersonal exchange and the role of friends and relatives as decision aids has been explored in previous research (Bieger and Laesser 2004; Zins and Teichmann 2006). In on-site search, the greatest reliance is on friends or relatives as decision aids (Fodness and Murray 1999). Regarding the effectiveness of online user-generated content, Bickart and Schindler (2001) state that consumer-generated information, as opposed to company-generated information, had a greater influence on consumer behavior. It is considered more credible, relevant, and trustworthy as an information channel; furthermore, the online world created a sense of empathy among the readers. Thus, we propose:

Hypothesis 1: Personal content exhibits more (a) informativeness, (b) integrity, (c) benevolence, and (d) ability than marketing and editorial content.

Hypothesis 2: Editorial content exhibits more (a) informativeness, (b) integrity, and (c) benevolence than marketing content but less (d) ability. (less in all dimensions than personal content)

Hypothesis 3: Marketing content exhibits less (a) informativeness, (b) integrity, and (c) benevolence than editorial and personal content but more (d) ability than editorial content. (less in all dimensions than personal content)

Research shows that particularly in travel and tourism, customers need to reduce risk through information search since they cannot investigate the hotel, destination, etc. prior to their actual trip (Engel, Blackwell, and Miniard 1995) and that they tend to use personal information channels (friends

and relatives; Murray 1991). Furthermore, previous research has stressed the importance of experiential attributes in online information to create some degree of trustworthiness (Alba et al. 1997). These experiential narratives are particularly well conveyed in user-generated content (Tussyadiah and Fesenmaier 2009).

Therefore, this study differentiates between experiential and goal-directed search tasks (Holbrook 1986; Vogt and Fesenmaier 1998). In a goal-directed search setting, the customer has a stronger orientation toward utilitarian benefits and the process of searching. Ultimately, the choice of the information channel would be outcome oriented (Hoffman and Novak 1996). In experience-oriented settings, hedonic benefits are of importance. The search process may be more extensive, and others engaging in same experiences may be an information channel through word of mouth (Hoffman and Novak 1996). Therefore, it is argued that personal content may be considered more trustworthy in the experience-oriented settings as customers provide narratives about their visits. Editorial content, on the other hand, may be considered more informative in goal-directed settings where facts and figures are presented. In this research, we differentiate a goal-directed search task (searching for facts such as opening hours of a museum) from an experience-oriented task (browsing to find a nice restaurant). Thus, in line with above arguments, we hypothesize:

Hypothesis 4a: Personal content is more trustworthy for experience than goal-directed tasks.

Hypothesis 4b: Editorial content is more trustworthy for goal- than experience-directed tasks.

Hypothesis 4c: For marketing content, there is no difference in trustworthiness for the search tasks.

Following Gefen and Straub (2004) and Gefen (2002), it is proposed that informativeness, integrity, benevolence, and ability have a direct positive effect on overall trust (Hypotheses 5a-d). However, these effects are hypothesized to differ depending on the online channel used. The literature review revealed that different channels are used depending on information needs and the planning process (Vogt and Fesenmaier 1998; Zins 2009); the relevance of interpersonal exchange was stressed (Bickart and Schindler 2001; Bieger and Laesser 2004; Fodness and Murray 1999; Zins and Teichmann 2006). These differences may also become effective regarding the antecedents of overall trust. For personal content, benevolence and integrity may have a higher impact on overall trust since it can be assumed that travelers want to help each other and give good advice (Hypothesis 7b, c). However, the ability to do so might not have the highest impact on trust (Hypothesis 7d). Specifically, informativeness should be the main driver of trust for editorial content and also the marketing content (Hypothesis 6a). Tourist boards and service providers are the ones that have most information on the services offered

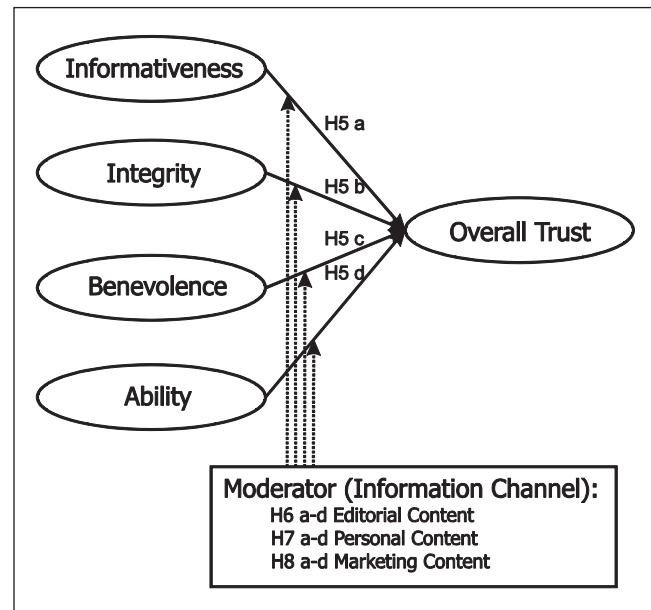


Figure 1. Research model

and, thus, can provide it through their online channels. Since they are independent information providers, one can assume that integrity and benevolence also exhibit strong effects on overall trust (Hypotheses 6b, c). When it comes to marketing content, integrity and benevolence might not be the strongest antecedents to trust, since they run their business essentially to make money (Hypotheses 6b, c). However, service providers should have the most information (Hypotheses 6a, d). Figure 1 depicts the research model including hypotheses 5-8 a-d.

Finally, it is hypothesized that

Hypothesis 5: (a) Informativeness, (b) integrity, (c) benevolence, and (d) ability have a direct positive effect on overall trust.

Hypothesis 6: For editorial content, the effect of (a) informativeness, (b) integrity, and (c) benevolence is strengthened and (d) ability is attenuated.

Hypothesis 7: For personal content, the effect of (a) informativeness, (b) integrity, and (c) benevolence is strengthened and (d) ability is attenuated

Hypothesis 8: For marketing content, the effect of (a) informativeness is strengthened, (b) integrity and (c) benevolence is attenuated, and (d) ability on overall trust is strengthened.

Method

Data Collection

To collect the data, tourists were approached by interviewers in the primary tourist sites of Hanoi, Vietnam. This included

parks, cafes, sights, points of interest, train stations, and the airport. Vietnam lent itself to be the study location as it has experienced unprecedented growth since the opening of the economy in the 1990s (Wood 2009). With the Old Quarter, the Ho Chi Minh Mausoleum complex, the Opera, and many more sights, Hanoi is an attractive tourist destination. The increase of foreign visitor arrivals by 16% in 2007 and the 4.25 million tourist arrivals in 2008 indicated that Vietnam is one of the most popular destinations in the Asia-Pacific region (Wood 2009). The field phase lasted 2 weeks in August 2007. The interviews were conducted during the week and on weekends, and the interviewers were instructed to select every fifth person in the points of interest mentioned above. This provided a random sample reflecting the actual gender, age, and nationality distributions of Hanoi tourists.

The first page of the questionnaire explained the research context, informed respondents about confidentiality and anonymity of the research, and invited people to participate. Respondents needed to be Internet users in general and needed to have used the Internet for information search to ensure that they can answer the questions asked. Each individual questionnaire included a screen shot (see Appendix A for examples) of the online channels investigated in the experience-oriented and the goal-oriented information search task which yielded a total of six versions of the questionnaire. The introduction to the questionnaire explained the search task to the respondents (experience vs. goal-directed) and varied in terms of online information channel (i.e., editorial, personal, and marketing). This resulted in one experience and one goal-oriented setting for each of the three online channels (Appendix B presents the search task descriptions). The experience-oriented task dealt with browsing for a restaurant, the goal-directed one with finding museum opening times.

Respondents were assigned to the conditions randomly by the interviewer and had as much time to look at the screen shot as they needed. The mentioned search tasks involved searching for a restaurant or museum in Ho Chi Minh City, which is located in the south of Vietnam. The online channels involved were the Ho Chi Minh tourist office (restaurant and museum descriptions), trip advisor as an example of user-generated content (restaurant and museum reviews), and service providers (an actual restaurant and museum website). In addition to the screen shots in the questionnaire, interviewers had a high-resolution color printout of the websites with them.

Measurement

Multiple-item 7-point Likert-type scales adapted from Gefen and Straub (2004) measured the trustworthiness dimensions. Integrity was measured by five items, benevolence also by five items, and ability by four items (Gefen 2002). Informativeness was measured using three items; these were adapted from Ducoffe (1996). Prior experience was considered in the

measurement model, as the level of a person's knowledge of the destination had the potential to influence the search process (Gursoy and McLeary 2003). This is important to be able to rule out confounding effects. To measure prior experience, items from previous research were adapted to this research setting (Moorthy, Ratchford, and Talukdar 1997; Punj and Staelin 1983). To check for the two search settings, respondents were asked if they followed their gut feeling or rational attributes when searching or if the search process was logical as opposed to emotional. This reflected the stimulus-driven versus planned search also described by Janiszewski (1998).

The questionnaire asked respondents to indicate whether they were familiar with restaurants/museums and whether they thought they knew Ho Chi Minh City on a 7-point Likert-type scale with anchors from *strongly agree* to *strongly disagree*. The questionnaire was pretested with a sample of 20 tourism students. Some adaptations regarding the description of the scenarios were made and some items were rephrased. Furthermore, one expert from the tourism field was involved in the development of the questionnaire.

Table 2 depicts the final items, including Cronbach's alphas for reliability and factor loadings to indicate the quality of the multiple item constructs. Both (Cronbach's alphas and factor loadings) exceed the common cut-off value of .7. Next, reliability was investigated through composite scale reliability (CR; Fornell and Larcker 1981) and average variance extracted (AVE; Fornell and Larcker 1981). For all measures, the CR is well above the .70 threshold and the AVE exceeds the recommended cut-off value of .50 (see Table 3). Discriminate validity is also achieved; the concepts do not share more variance with another construct in the model than the ones they are intended to. This is indicated by AVE levels exceeding the levels of the latent concepts' correlations as depicted in Table 3.

Analyses

A general linear model (GLM) multivariate analysis (MANOVA) is used to assess the group differences across multiple indicators simultaneously using unweighted indices. The trustworthiness dimensions measured through multiple item indicators can be assessed across the different groups. This shows if the basic hypotheses regarding the differences of the trustworthiness dimensions can be confirmed (Hypotheses 1 to 4). The structural equation model illustrates the contribution of each of the dimensions to overall trust in a second step of the analyses (Hypotheses 5a-d). ANOVA is used to check whether the manipulation regarding the experience and goal-oriented scenario is successful and, furthermore, to identify confounding effects due to prior experience of respondents. The software used is SPSS.

Mplus, a second-generation structural equation modeling (SEM) tool, allowing for estimation of models with nonmetric data (Muthén and Muthén 2007), is used to estimate the drivers of overall trust. This tool accounts for categorical data and

Table 2. Measurement Instrument, Factor loadings, Cronbach's Alpha

Scale	Factor Loadings	Cronbach's Alpha
Overall trust		
I trust the tourist board/user content/service provider.	N/A	N/A
Informativeness		.799
It is a good source of information.	.871	
It supplies relevant information.	.873	
It provides timely information.	.792	
Integrity		.844
Promises made by the tourist board/reviewer/service provider are likely to be reliable.	.773	
I do not doubt the honesty of the tourist board/the reviewer/service provider.	.764	
I expect that the advice given by the tourist board/reviewer/service provider is their best judgment.	.828	
I expect that the tourist board/reviewers/service providers will keep promises they make.	.779	
I can count on the tourist board/reviewer/service provider to be sincere.	.783	
Benevolence		.847
I expect that the tourist board/reviewer/service provider is ready and willing to assist and support me.	.785	
I expect that the tourist board/reviewer/service provider has good intentions toward me.	.835	
I expect that the tourist boards'/reviewers'/service providers' intentions are benevolent.	.837	
I expect that the tourist board/reviewers/service providers put customers' interests before their own.	.707	
I expect that the tourist board/reviewer/service provider is well meaning.	.800	
Ability		.829
The tourist board/reviewer/service provider is a competent information provider.	.816	
The tourist board/reviewer/service provider understands the market they work in.	.855	
The tourist board/reviewer/service provider knows about restaurants/museums.	.798	
The tourist board/reviewers/service provider knows how to provide excellent service.	.781	
Manipulation check		.704
Considering the scenario you were faced with, what did you base your restaurant/museum search on? Rational Attributes–Gut Feeling	N/A	
What adjective would best describe your decision-making process when searching for a restaurant/museum? Logical–Emotional	N/A	
Prior experience		.629
Generally, I know about restaurants.	N/A	
I know about Ho Chi Minh City.	N/A	

Table 3. Assessing Composite Reliability, Average Variance Extracted and Discriminant Validity

Construct	CR	1	2	3	4
1. Informativeness	.903	.757			
2. Integrity	.921	.549	.702		
3. Benevolence	.925	.331	.601	.714	
4. Ability	.912	.391	.507	.537	.722

Note: The average variance extracted is reported on the diagonal.

violations of the assumptions of normal distribution and metric data, a requirement often made but rarely met in behavioral research (DeCarlo 1997; Micceri 1989). To test for the differences between the path estimates of informativeness, integrity,

benevolence, and ability on overall trust and to find channel-specific differences, multiple group analysis is carried out. This is a test for Hypotheses 6 to 8. Multiple group analyses give insights into the different effects based on the information channel provided to the respondents in the questionnaire. For the moderation effect, we follow the definition of Baron and Kenny (1986), which is feasible as group membership is pre-defined because of the experimental design.

Results and Discussion

Sample and Manipulation

A total of 453 fully completed questionnaires are included in the analyses after data cleaning. The distribution regarding

Table 4. Sample Profile

Gender, %		Nationalities, %	
Male	49	North America	26
Female	51	Australia and New Zealand	17
Age, %		South America	2
<25	23	France	14
25-29	16	Scandinavia	6
30-34	14	United Kingdom	7
35-39	11	Germany	7
40-44	11	Total Europe	53
45-49	10	Information channels used, %	
>50	15	Travel guide	71
Years of formal education, %		Friends and relatives	62
≤10	3	Travel agent at home	31
11-15	30.5	Web pages of regions	51
>15	66.5	Web pages of accommodations	35
Occupation, %		Online communities	25
No paid job	12.8	Online travel agencies	21
Unskilled worker	5.7	National tourist board website	15
Generally trained worker	16.2		
Vocationally trained worker	25.1		
White-collar worker	24.6		
Self-employed	15.5		

the six subgroups is as follows: editorial information provider (Ho Chi Minh City tourist office) for restaurant information $n = 83$ and for museum information $n = 83$; personal channel (tripadvisor) for restaurant information $n = 88$ and for museum information $n = 71$. The marketing channel yielded $n = 71$ and $n = 57$ for the restaurant and the museum, respectively.

Gender distribution is nearly even in the sample, with 49.2% female and 50.8% male respondents. Regarding jobs, 24% are vocationally trained, 16% hold a middle management position, 16% are generally trained workers, 15% are self-employed, 13% do not have a paid job (this includes students), 8% hold a higher management position, and 6% are unskilled workers. The age distribution is as follows: 23% are less than 25 years old, 16% are between 25 and 29 years, 14% are between 30 and 34 years, 11% are between 35 and 39 years and another 11% are between 40 and 44 years, 10% are between 45 and 49 years, and the remaining 15% are more than 50 years old. Nationalities of the travelers are distributed as follows: 26% North America, 17% Australia and New Zealand, 2% South America, and 53% from 18 different European countries, with the majority from France (14%), Scandinavia (6%), United Kingdom (7%), and Germany (7%). Respondents were asked about their information channel usage prior to their trip. Among the most popular information channels are Travel guide 71%, friends and relatives 62%, web pages about regions

51%, web pages about accommodations 35%, agent at home 31%, online communities 25%, other pages 25%, online travel agencies 21%, and the national tourist board website 15%. See Table 4 for details regarding the sample profile.

The items measuring the level of experience and goal-oriented focus of the restaurant or museum search process show a significant difference ($p < .02$). This suggests that the task description successfully manipulated the goal-oriented and the experience-oriented information search task. To investigate potential confounding effects of prior knowledge of Ho Chi Minh City and of museums and restaurants, separate ANOVAS are carried out. Since the differences are not significant for all the measures, a confounding effect can be ruled out.

Difference between the Online Channels

Table 5 presents the results of MANOVA indicating which of the information channels ranks highest (1), medium (2), or lowest (3) regarding informativeness, integrity, benevolence, and ability (Hypotheses 1a-d, 2a-d, and 3a-d).

Figure 2 depicts the means of the concepts informativeness, integrity, benevolence, and ability (all of them showing significant group differences) for the three investigated channels. The results show that Hypotheses 1 to 3 are supported to a large extent.

Informativeness. The MANOVA shows that differences are only significant at the $p < .063$ level (Wilks's Lambda = .974, $F = 2.005$). Thus, one has to be cautious with interpretations. The comparison of the means indicates that personal content is most informative ($M = 2.93$), followed by editorial ($M = 3$) and marketing ($M = 3.32$). This might be due to the fact that in user communities, travelers can post an abundance of information one would not find through service providers' and tourist boards' channels. The personal (user-generated) information is the most informative online channel, followed by editorial and marketing content. This confirms Hypotheses 1a, 2a, and 3a.

Integrity. The results indicate that the difference between the three channels of information is significant at the $p < .019$ level. Wilks's Lambda arrives at .953 and $F = 2.157$. The differences are mainly due to the fact that the editorial channel is considered to be the most reliable and sincere. The users providing their experiences are considered to be the most honest and provide advice based on their best judgment. However, users are not the ones who are considered promise keepers. This is contrary to Hypothesis 1b that personal content shows most integrity. Travelers are extremely cautious regarding marketing content as information channel. This might be due to the fact that service providers are focused on making profits with their enterprises and, thus, not considered as the players with the highest integrity. This confirms Hypothesis 3b stipulating that marketing content is not considered to show integrity.

Table 5. Summary of Findings for Difference between Online Channels

	Hypothesis 1: Personal (User-Generated Content)				Hypothesis 2: Editorial (City Tourist Office)			Hypothesis 3: Marketing (Service Provider)		
	Significance	Rank	M	SD	Rank	M	SD	Rank	M	SD
a. Informativeness	.063	1	2.93	1.27	2	3.00	1.25	3	3.32	1.39
b. Integrity	.019	1	3.17	1.20	1	3.17	1.20	3	3.32	1.31
c. Benevolence	.007	3	3.28	1.18	1	3.01	1.16	2	3.19	1.30
d. Ability	.000	3	3.41	1.27	1	3.03	1.21	2	3.35	1.30

Note: 1 = highest of the three online channels; 2 = in the middle of the three online channels; 3 = third of the three online channels.

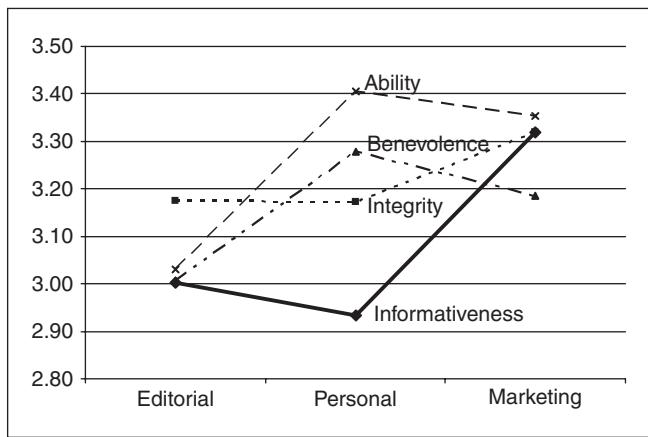


Figure 2. Means of the concepts informativeness, integrity, benevolence and ability in the three different online channels
Note: The vertical axis depicts the means for the respective information channels, with high means on the lower end of the scale.

Benevolence. MANOVA illustrates that perceptions of benevolence vary significantly in the three information channels ($p < .007$; Wilks's Lambda = .947, $F = 2.45$). The editorial channel is considered most benevolent, which is accounted for by the high level of assistance and support the respondents expect from them. Personal channels are considered to be least benevolent. This is contrary to what was hypothesized as Hypotheses 1c, 2c, and 3c could not be confirmed. Benevolence includes assistance for the traveler and good intentions, which is hardly possible through user-generated content. Travelers can only read the statements, but engaging in an interaction is not an option. This is however the case for marketing and editorial content providers, which may consequently lead to them being considered more benevolent.

Ability. The results for ability are highly significant ($p < .000$, Wilks's Lambda = .914, $F = 5.117$). The groups differ regarding the perceptions of ability for information provision. Comparing the means, it is evident that tourist boards are considered the most able channel ($M = 3.03$), followed by marketing ($M = 3.35$) and personal channels ($M = 3.41$). This indicates that the competence in their industry is accounted to city tourist boards but does not confirm the

Hypotheses 1d and 2d. It is contrary to Hypothesis 1d that ability is lowest for personal content. Apparently, travelers think that the providers of information through the other channels are more competent.

Difference between Experience and Goal-Oriented Search Task

The following paragraphs report the results of the test of Hypotheses 4a-c.

Personal channels in an experience and goal-oriented setting. There are no significant differences regarding the perceived informativeness of personal information in an experience and goal-oriented search setting. Integrity shows a just significant difference ($p < .046$, Wilks's Lambda = .903, $F = 2.314$) and a slightly higher rating for the goal-oriented task. As opposed to benevolence, ability shows a significant difference ($p < .029$, Wilks's Lambda = .933, $F = 2.774$). A comparison of the means indicates that travelers are considered to have more ability to judge in the goal-directed setting ($M = 3.34$), or it is considered easier to evaluate and review than the experience-oriented one. The insignificant difference of benevolence indicates that the users are focused on helping other travelers regardless if they report about restaurants or museums. The results do show some significant differences and therefore partly support Hypothesis 4a, though not in the expected direction. While it was hypothesized that personal content would be more trustworthy for experience-directed search, the results indicate the contrary.

Editorial channels in an experience and goal-oriented setting. There is a significant difference regarding the perception of informativeness between the experience- and goal-oriented service setting ($p < .003$, Wilks's Lambda = .919, $F = 4.740$). The mean is 2.73 and 3.28 for the goal- and experience-oriented setting, respectively. This implies that the tourist office plays an important role as a high-quality information channel for hard facts such as dates and opening times. This partly confirms the Hypothesis 4b that editorial content is more informative for goal-directed search. However, for the other subdimensions of trustworthiness (integrity, benevolence, and ability), there is no significant difference for the two settings. This means that no matter whether tourists are searching or

Table 6. Summary of Findings: Difference between Experience and Goal-Oriented Task (Hypothesis 4)

	Significance	Experience-Oriented Task		Goal-Oriented Task	
		Means	Standard Deviation	Means	Standard Deviation
Editorial					
Informativeness	.003	3.28	1.34	2.73	1.08
Integrity	n.s.				
Benevolence	n.s.				
Ability	n.s.				
Personal					
Informativeness	n.s.				
Integrity	.046	3.18	1.29	3.17	1.06
Benevolence	n.s.				
Ability	.029	3.46	1.32	3.34	1.20
Marketing					
Informativeness	n.s.				
Integrity	n.s.				
Benevolence	n.s.				
Ability	n.s.				

browsing, they believe that the information provided is correct and in the tourist offices' best knowledge.

Marketing channels in an experience and goal-oriented setting. There is no significant difference regarding the experience and goal-oriented scenario regarding the service provider as information channel. Thus, no matter if a restaurant or a museum provides information, travelers do not consider that there is a difference. The trustworthiness is not considered higher for either search setting. This supports Hypothesis 4c suggesting no difference for the two search settings. Table 6 summarizes the results for Hypotheses 4a-c.

Effect of the Antecedents on Overall Trust

To understand the impact of the dimensions of trustworthiness on overall trust, an SEM has been carried out testing Hypotheses 5a-d. The data fit the model well, with a comparative fit index of .912 and a Tucker-Lewis index of .894, both close to the required cut-off value of .90 (Hu and Bentler 1995). The authors follow the advice by Muthén and Muthén (2007) to use the root mean square error of approximation to decide on overall fit when categorical data are used. The required cut-off value is met with .08. The test of the model shows that the hypotheses are supported to a large extent. Two of the four path estimates show the suggested effect ($p < .02$), one is insignificant ($p > .10$), and the fourth shows a negative instead of a positive relationship ($p > .07$). The results indicate that informativeness (Hypothesis 5a) has the highest effect on trust toward an online information channel ($\beta = 0.483$); this is followed by integrity (Hypothesis 5b; $\beta = 0.251$).

In line with Baron and Kenny's (1986) definition of moderation, the relationships in the research model differ

depending on the online channel investigated. As such, the authors perform a multiple-group SEM analysis using the channel (editorial, personal, marketing) as the moderator to form different groups (Baron and Kenny 1986). Tests to guarantee the differences in coefficients are due to group membership and not due to measurement error are performed before testing for the moderating effect. To assess for invariance, we check whether the chi-square difference test is significant and how the fit indicators behave in more- and less-restricted models (Steenkamp and Baumgartner 1998). A comparison of three models to account for measurement noninvariance, factor loading invariance, and factor loading and intercept invariance. At first the results do not exhibit significant chi-square differences, indicating that the measurement model is invariant; however, when constraining the latent means, we find significant changes indicating that there are differences regarding the path model, $\Delta\chi^2(26) = 64.192, p < .001$ (Steenkamp and Baumgartner 1998).

We also estimated the model with the moderated paths free to vary and the measurement model equal across groups. This procedure allows for a simultaneous assessment of the path differences between the groups. Finally, the difference between the path coefficients for the two groups are assessed using t tests (Muthén and Muthén 2007). The group differences are significant at the .01 level, indicating that the hypothesis regarding group differences can be confirmed (Hypothesis 4).

The results indicate that for the editorial channel, informativeness has the highest impact on overall trust (Hypothesis 6a; $\beta = 0.483$). As hypothesized, this relationship is strengthened. Regarding the personal channel, the analyses show a very positive and significant effect of informativeness on

trust (Hypothesis 7a; $\beta = 0.527$). Thus, user-generated content is regarded as highly informative. Furthermore, the high and significant relationship between benevolence and overall trust (Hypothesis 7c; $\beta = 0.514$) indicates that the well meaning of other travelers is honored by those who still search for information. This path was not significant for the overall sample, but evidently when it comes to personal information exchange, benevolence is a main driver of trust into information. Ability, however, has a negative impact (Hypothesis 7d) contrary to what was hypothesized. The effect was only hypothesized to be attenuated; however, the perception of travelers' ability to give professional advice even negatively influences overall trust. As shown by the data, the main drivers for trust in personal channels are informativeness and benevolence. Contrary to what was hypothesized, the effect of integrity on trust was strengthened for the marketing channel (Hypothesis 8b; $\beta = 1.086$). This indicates that honesty and sincerity have a high influence on the feeling of trust toward information provided by service providers. It strikes that the coefficient is greater than one, however, after inspection of the variance inflation factor and tolerance (Kline 2004; Maruyama 1997) as well as the residuals, reasons for higher coefficients such as multicollinearity (Grewal, Cote, and Baumgartner 2004) and the Heywood case (Dillon, Kumar, and Mulani 1987) are ruled out. Jöreskog (1999) provides an explanation for higher coefficients; they have to be regarded as regression coefficients that can arrive at levels greater than one.

The results show that the trust in editorial channels profits from informativeness; this is the main driver of trust for this type of information. The same is true for personal channels, where the impact of benevolence is nearly equally strong. Good intentions among like-minded travelers and well meaning are important. However, sometimes travelers lack the ability to really provide accurate and timely information. Ideally service providers extend their content with user communities or recommendation possibilities to add a sense of benevolence and a human touch to their marketing messages. The same is true for editorial content that could be enriched by personal accounts of travelers.

Conclusion

Summary and Implications

The goal of this research was to explore the dimensions of trustworthiness for three online channels. Building on literature review on information search and trustworthiness, this study investigated two main questions: (a) Do different online information channels exhibit different levels of trustworthiness? (b) Do the dimensions of trustworthiness differ depending on the type of information sought?

The results of a 3×2 experiment, totaling 453 participants, show that there is in fact a difference regarding the perceptions based on the different information channels. User-generated

content is considered to be extremely informative, but the ability of users to provide high-quality information is doubted. Whereas official authorities such as city tourist boards enjoy a high standing with respect to ability, benevolence, and integrity, this does not fully apply to the other online channels. The results imply that a city tourism board is much more trustworthy than, for instance, the service provider. This suggests that customers do not rate the service provider's integrity and benevolence as too high. They are not considered to operate in the best interest of the customers. Therefore, they should try to earn some sort of quality certificate or third-party certification to gain higher credibility and trust. Another approach would be the provision of a customer forum or community on their websites that allows customers to comment on the services provided and, thus, increase trust in service providers. The formation of a community would create a sense of belonging and strengthen the relationship with customers that might lead to increased loyalty and consequently higher profits. Furthermore, testimonials of customers on service providers' websites could achieve this goal.

The results indicate that there are significant differences regarding trust in user-generated channels in the experience and goal-oriented setting (Table 6). This hints at different perceptions of ability and integrity regarding the customers that generate content.

The survey gives further insights into the effects of the ability, integrity, benevolence, and informativeness on overall trust (Table 7). As such it provides a preliminary understanding of which dimension of trustworthiness contribute to overall trust for the three popular information channels investigated. More specifically, the impact of benevolence becomes dominant for the personal channel, when investigating the different groups. As found in research on community participation, the social needs (including trust) are most important (Wang and Fesenmaier 2004). This seems to be also true for the consumption of the content created by such communities. The sense of helping each other and being part of personal exchange is important for travelers. Ability, however, negatively contributes to trust when it comes to user-generated content. When investigating marketing channels, it is interesting to see that integrity drives trust. This shows the effect of customers' positive beliefs about the honesty and sincerity of service providers. Editorial channels are considered as informative; however, looking into the usage statistics, it becomes evident that only 15% of the respondents consult them. To summarize, these findings confirm that different dimensions of trustworthiness become effective depending on the online channel used (Gefen, Benbasat, and Pavlou 2008).

The results further indicate that experience-oriented content is well communicated through social media. With users becoming more powerful and increasingly using their dual role as content producers (Tapscott and Williams 2006) and consumers, tourism marketers have to adapt their communication strategies to take advantage of this trend. As other

Table 7. Results of the Overall Model and Moderating Effects

Path	Hypothesis	Overall Model	Hypothesis	Editorial (n = 166)	Personal (n = 159)	Marketing (n = 128)	p
Informativeness → Trust	3a	0.483	6-8a	↑ 0.595	↑ 0.527	(0.253)	<.01
Integrity → Trust	3b	0.251	6-8b	(0.172)	(0.035)	↑ 1.086	<.01
Benevolence → Trust	3c	(0.173)	6-8c	(0.171)	↑ 0.514	(-0.532)	<.01
Ability → Trust	3d	(-0.138)	6-8d	(-0.181)	↓ -0.327	(-0.121)	<.01

Note: Standardized path estimates are reported. The arrows indicate the moderator's effect on the path estimates (↑ strengthened, ↓ attenuated). Estimates in parentheses are not significant.

research suggest, they could embrace social media and advertise or promote content on those sites (Xiang and Gretzel 2009). Fuelled by this trend, marketers can no longer fully control content and channels and need to adapt (Rappaport 2007).

Limitations and Future Research

Although this study provides new insights into the trustworthiness of online channels, there are still various research avenues to pursue. First, the survey instrument developed for this study only imitates a real online environment. This may influence the responses and ultimately the results. Second, two tourism services were chosen as treatments; future studies should include a more extensive choice of services apart from restaurants and museums. This also accounts for the exploratory and goal-directed search task. Third, the sample consists of real travelers and a good representation of demographic profiles; however, a replication in other countries would be worthwhile to examine the consistency in responses. Fourth, some respondents might have known the community platform tripadvisor, leading to a positive predisposition. However, answer patterns of community users and nonusers in the sample did not show significant differences. Since Mplus can handle categorical data, further analyses could include the usage of the experimental condition as an antecedent to overall trust.

More experiments comparing user-generated content for different types of products and services would provide more insights into the effect of online peer influence. Also, the impact of positive and negative user reviews on behavior is worth further exploration.

Despite the limitations mentioned above, the study contributes to the understanding of the dimensions of trustworthiness and how they operate for different online channels. It provides avenues for future research investigating trust and other media benefits for online channels. Above that, channel choice for specific information components is of interest. This would clarify the relevance of information channels for specific types of products and services. While the motivation to contribute user content on the Internet is already explored, the effect on other users merits further investigation. The results also provide managers with suggestions to integrate user content into

their communication channels. This offers further opportunities to research the effect of such personal content in editorial and marketing websites. With the lines of communication channels blurring and user content getting integrated in city tourist board websites or service providers' websites, the role of trustworthiness needs further investigation. The effect of specific components on a website, for example, customer comments on a marketing website, requires further investigation. It would be interesting to investigate if benevolence and informativeness, drivers of trust for user generated information but not significant for service providers, also become effective drivers when integrated in a marketing channel.

Appendix A

Personal Content: Restaurant

(continued)

Appendix A (continued)

Editorial Content: Museum

Editorial Content - Museum

The screenshot shows the official website of the Ho Chi Minh City Department of Tourism. The main navigation bar includes 'Explore The City' and 'Attractions'. Under 'Attractions', 'Viet Nam Historical Museum' is selected. The page displays a large image of the museum building, its address (2 Nguyen Binh Khiem Street, District 1), phone number (08-829 8146), opening hours (except Mondays from 8am to 11:30am and 1:30pm to 4:30pm), and entry fee (VND 10,000). A sidebar lists other attractions like War Remnants Museum, Ho Chi Minh Museum, Reunification Palace, Cu Chi Tunnels, Notre Dame Cathedral, Ben Thanh Market, Ben Thanh Market, Vinh Nghiem Pagoda, Gac Lam Pagoda, Can Gio Mangrove Forest, Thien Hau Temple, and HCMC Central Post Office.

Marketing Content: Restaurant

The screenshot shows the Ngoc Suong Marina website. The main menu categories include RESTAURANTS, HOTELS, RESORTS, FURNITURE, PROMOTION, and PROJECTS. The central content area is for 'Ngoc Suong Marina', featuring a photo of a traditional boat, contact information (Address: 198 Lo Quy Don Street, District 3; Tel: (08) 9304909; Fax: (08) 9305234; Email: nsmarina@vnn.vn; Website: www.ngocsuong.com), and a section titled 'ABOUT US' with text about their seafood restaurant and Ngoc Suong restaurant. At the bottom, there's a 'Menu' button and a photo of the restaurant's exterior.

Appendix B

Experience-oriented task: Now, think about your information search involved with finding a nice restaurant in Ho Chi

(continued)

Appendix B (continued)

Minh City. You want to experience a nice evening with your fellow travelers. You want fine food, great music, and a hip crowd. As online information channel you use

- The official website of the Ho Chi Minh City-Tourism organization, which provides addresses and pictures of meals. Below you find a screen shot as an example.
- The website Tripadvisor.com providing reports and reviews of former travelers. Below you find a screen shot as an example.
- The websites of different restaurants providing their information to customers. Below you find a screen shot as an example.

Goal-oriented task: Now, think about your information search involved with finding a museum in Ho Chi Minh City. You want to learn about all the facts of Vietnamese History. As online information channel you use

- The official website of the Ho Chi Minh City-Tourism organization. They provide information, addresses, opening hours etc. Below you find a screen shot as an example.
- The website Tripadvisor.com providing reports and reviews of former travelers. Below you find a screen shot as an example.
- The websites of museums providing their customers with information. Below you find a screen shot as an example.

Declaration of Conflicting Interests

The authors declared no conflicts of interests with respect to the authorship and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research and/or authorship of this article: Parts of this research stem from the IDIOM Project (Information Diffusion across Interactive Online Media; www.idiom.at) which is funded by the Austrian Research Promotion Agency within the strategic objective FIT-IT (www.fit-it.at).

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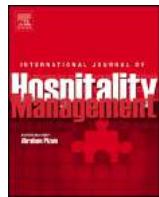
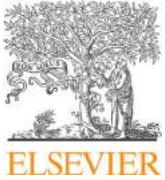
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Bio

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Sharing economy: A review and agenda for future research

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ARTICLE INFO

Article history:

Received 3 January 2016

Received in revised form 15 April 2016

Accepted 7 June 2016

Available online 21 June 2016

Keywords:

Sharing economy

Collaborative consumption

Co-citation analysis

Content analysis

Tourism and hospitality

ABSTRACT

This paper provides an objective, systematic and holistic review of the sharing economy (SE) academic literature to uncover the theoretical foundations and key themes underlying the field by using co-citation analysis and content analysis. Sixty-six publications on sharing economy with ten papers related to tourism and hospitality from 2010 to 2015 (inclusive) have been identified. This paper revealed three broad areas of foci with sharing economy research in general: (1) SE's business models and its impacts, (2) nature of SE, and (3) SE's sustainability development as well as two areas of foci in tourism and hospitality specifically: (1) SE's impacts on destinations and tourism services (2) SE's impacts on tourists. The sharing economy has a strong intellectual tradition from lifestyle and social movement field, consumption practice and sharing paradigm. This paper presents a more robust framework and holistic understanding of the sharing economy field and calls for a new theory-informed research agenda on sharing economy to coalesce multi-level perspectives.

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1. Introduction

The rapid growth of sharing economy (SE) and its dramatic impacts on various aspects of today's social economic system have stimulated growing public interest in the last five years. It has introduced new players in many fields, where some of them (e.g. [Airbnb, 2014](#)) have topped many old players and others are gaining some prominence in their respective fields ([PwC, 2015a](#)). This rapid growth of SE in the past decade is strongly related to social-economic conditions in pursuit of better value distribution of the supply chain ([Gansky, 2010](#)), reduction of ecological impacts ([Schor and Fitzmaurice, 2015](#)), technology advancement and ultimately users' changing attitudes towards product ownership and the need for social connection ([Botsman and Rogers, 2010](#)). At the time of this research, there is no standard quantifying the size of SE. Industry practitioners, however, speculatively estimate that sharing economy will potentially increase to 335 billion by 2025 compared with 15 billion in 2015 ([PwC, 2015b](#)). In particular, tourism and hospitality (TH) scholars envision that sharing economy would change the future dynamics of the hospitality and tourism industry ([Guttentag, 2015; Sigala, 2015](#)). However, literature concerning SE, particularly in relation to TH, has been relatively fragmented. As such, it is timely to undertake a review article on SE to advance the field.

This paper will shed new insights on the theoretical foundations and key themes underpinning SE in general and its relevancy to

TH. By combining the strengths of co-citation analysis and content analysis through Leximancer suggested by [Randhawa et al. \(2016\)](#), it analyses this literature in a holistic, objective and systematic manner that reduces the traditional literature review approaches' subjectivity bias ([Collins and Fauser, 2005; Petticrew and Roberts, 2006; Smith and Humphreys, 2006](#)). The use of co-citation network analysis enables the researcher to have a clear understanding of the structure and knowledge base of the sharing economy field ([Zupic and Ćater, 2015](#)). By employing content analysis through Leximancer, it provides a text-driven conceptual map that visually presents the conceptual and relational insights of the actual content written by the authors ([Biesenthal and Warden, 2014](#)). Hence, combining these two complementary methods presents a richer and holistic understanding of the foundation knowledge-base and key themes ([Randhawa et al., 2016](#)) that comprise the sharing economy field up-to-date. It allows the researcher to visibly identify research gaps and set future research agenda for sharing economy.

This paper begins by introducing a brief summary of the historical evolution of SE including definitional development and the social-economic background in contributing to its growth. Afterwards, SE in the context of TH is discussed. The research design combining co-citation and content analysis is then introduced. The results are discussed via a series of visual representations. Afterwards, relevant insights are presented from the results and research gaps and areas for future research then follow. It concludes with a summary of the findings and limitation of this study.

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2. Emergence of sharing economy

Since the book published by [Botsman and Rogers \(2010\)](#) on the rise of collaborative consumption, SE has become a popular buzz word in public media ([Hern, 2015](#); [The Economist, 2013](#)). The terms “sharing economy” “collaborative consumption” “peer to peer economy” are among the most popular to describe the phenomenon as peer to peer sharing of access to underutilised goods and services, which prioritizes utilization and accessibility over ownership ([Schor and Fitzmaurice, 2015](#)). However, more than typical faddish buzz, SE presents the opportunity to transform how we make sense of what is happening by rethinking our business model design, and day-to-day decision-making ([OECD, 2016](#)), which has deep implications for us both an opportunity and a challenge ([Guttentag, 2015](#); [Pedersen and Netter, 2015](#)). The new players, such as Airbnb, revolutionised the way we see this phenomenon, as with a few years’ development, it has topped the world leading traditional international hotel chains and is expanding seamlessly to the world ([Clampet, 2015](#)).

SE can be traced back to ancient times in sharing among close kin family members and friends ([Belk, 2014](#)). In early 2000, in response to growing salience of natural resource constraints, society started to utilize the Internet to increase efficiency by linking the online and offline world and SE became one of these initiatives ([Botsman and Rogers, 2010](#)). The practices of SE in its origin were believed to be not-for-profit initiatives, such as couchsurfing and Freecycle and have gradually grown into a big business model by taking a fraction of the sharing fee, such as Uber and Airbnb ([Belk, 2014](#); [Codagnone and Martens, 2016](#)). The sharing economy concept entered wide public discourse between 2011 and 2012 with the two Silicon Valley success stories of Airbnb and Uber ([Martin, 2016](#)). With its development, scholars have created different terms in capturing various meanings of SE based on their discipline background, such as moral economy from postmodern sociology ([Germann Molz, 2013](#)), and access-based consumption from Neo-classical microeconomics ([Bardhi and Eckhardt, 2012](#)). For example, [Stephany \(2015\)](#) suggests that SE is organized by “the value in taking under-utilised assets and making them accessible online to a community, leading to a reduced need for ownership” (p. 205) while [Belk \(2014\)](#) treats consumers as collaborators by highlighting that SE is “people coordinating the acquisition and distribution of a resource for a fee or other compensation” (p. 1597). A detailed examination of terminologies in different disciplines are presented in the work of [Dredge and Gyimóthy \(2015\)](#). While there is no definitive definition of what constitutes SE, policy makers, scholars and practitioners believe that it has started to transform many aspects of our current social economic system by allowing individuals, communities, organizations and policy makers to rethink the way we live, grow, connect and sustain ([Department for Business Innovation and Skills, 2015](#); [PwC, 2015a](#); [Schor and Fitzmaurice, 2015](#)).

3. Sharing economy in tourism and hospitality

Since the start of SE, tourism and hospitality have emerged as one of the pioneering sectors for its growth as SE allows for tourists and residents to share their homes, cars, four course meals, and expert local knowledge (e.g. locals being tour guides) ([OECD, 2016](#); [Sigala, 2015](#); [Lyons and Wearing, 2015](#)). A multitude of drivers have pushed sharing as one of the mainstream practices in many aspects of tourism and hospitality today. Visitors are in pursuit of better value for money, sustainable tourism products, and authentic tourism experience ([Forno and Garibaldi, 2015](#); [Sigala, 2015](#); [OECD, 2016](#)). A recent study of [Tussyadiah and Pesonen \(2015\)](#) based on USA and Finnish travellers points out that peer-to-peer

accommodation significantly changes travel patterns by reducing accommodation costs and providing meaningful social encounters with locals. From a supply perspective, SE has broadened the overall supply of tourism options, as it is easy to start a tourism business at a relatively low start-up cost ([Nadler, 2014](#)). The online platforms further enable SE start-ups by allowing their consumers to access a wide range of products and services, many of which are of high standard but more affordable compared to their traditional counterparts ([Shaheen et al., 2012](#); [Juul, 2015](#)). More importantly, the nature of SE enables destinations to better respond to peak demand by offering alternative tourism services ([Juul, 2015](#)).

While such benefits are acknowledged by the TH community, many scholars, practitioners and policy makers are increasingly concerned with the rapid growth of SE ([Dredge and Gyimóthy, 2015](#); [Queensland Tourism Industry Council, 2014](#)). While SE contributes to income for the hosts, it will result in the casualization of labour with no social security coverage if the income from SE becomes the sole source ([Lyones and Wearing, 2015](#); [Schor and Fitzmaurice, 2015](#)). Governments are also concerned that many tourism SE start-ups bypass government regulations and overhead costs that will have a series of impacts on consumer rights, safety and quality as well as disability compliance standards ([Juul, 2015](#); [Rauch and Schleicher, 2015](#)). For example, Airbnb has been treated as a threat to safety and affordability of residential communities and more importantly, displacement of long term tenants and creation of housing shortages ([Edelman and Geradin, 2015](#)). In some cases, SE start-ups might be involved in tax evasion and unfair competition ([Lyons and Wearing, 2015](#)). Further, the emergence of the intermediaries (e.g. Airbnb) who play a central role in connecting the actions of new ‘circuits of commerce’ ([Zelizer, 2010](#)), not only facilitate the exchange between strangers through reputation capital ([Deenihan and Caulfield, 2015](#)) but also have the power to define the rules, regulatory framework and assign risks ([Dredge and Gyimóthy, 2015](#)). From a market competition perspective, hoteliers and government agencies also perceive SE (e.g. Airbnb) as a threat to traditional tourism and hospitality businesses, particularly concerning lower-priced hotels ([Queensland Tourism Industry Council, 2014](#)). Additionally, scholars argue that the form of SE largely benefits those who possess a high level of cultural capital; privileged middle class rather than those who are poor, unemployed or living in rural areas ([Schor and Fitzmaurice, 2015](#); [Dredge and Gyimóthy, 2015](#)). As such, the authentic tourist-host encounters probably only exist between like-minded and privileged members of the society ([Dredge and Gyimóthy, 2015](#)).

In summary, the rapid growth, various perspectives and complex nature of SE in general and TH specifically require a better understanding of the field and its future development. As such, this article draws on co-citation analysis and content analysis to uncover SE’s theoretical foundations and key concepts, identify research gaps and set agendas for future research.

4. Research design

4.1. Data collection

In this study, the researcher searched titles, key words and abstracts for “sharing economy”, “collaborative economy/consumption” and some typical sharing economy products, such as “AirBnB” through EBSCOHost, Science Direct, and Google Scholar, three of the largest and most popular online databases and search engines ([Buhalis and Law, 2008](#)). In addition, references cited in published journal papers and the ones obtained through the researcher’s personal communication with sharing economy researchers were traced as suggested by [Cheng et al. \(2016\)](#). Only articles published in refereed academic journals were reviewed, as

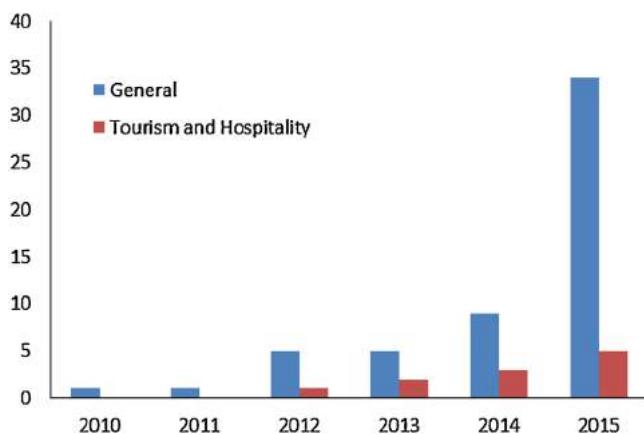


Fig. 1. Articles on SE from 2010 to 2015 (inclusive).

journal papers are the premium outlets for scholarly advancement and assessment of their references strengthen the results' reliability by using co-citation analysis (Ramos-Rodríguez and Ruíz-Navarro, 2004). "Grey" literature, such as conference papers and industry reports, were also reviewed but were excluded from the analysis. In the initial search, a total of 162 articles between 2010 and 2015 (inclusive) were retrieved. The researcher reviewed these articles one by one and the final selection of papers was based on SE being one of the main focus of the papers. Sixty-six articles in total with 10 focusing on TH research were identified.

Key information for the 66 articles was retrieved from Scopus including: citation information of author(s), document title, year, citation count, abstract, keywords; content of full length article; and references. The published items in each year are presented in Fig. 1. In total, there are 66 focal articles.

4.2. Data analysis

4.2.1. Co-citation analysis

Co-citation analysis has been widely adopted in the academic community as a valid method of studying the intellectual structure of a scientific discipline in many scientific areas (Ramos-Rodríguez and Ruíz-Navarro, 2004; Zupic and Ćater, 2015) including tourism and hospitality (García-Lillo et al., 2016; Köseoglu et al., 2015). It examines the frequency of two publications cited in a pair as references represent the invisible development and relationship of research and signal their influences (Ramos-Rodríguez and Ruíz-Navarro, 2004). As such, it allows the researcher to discover the structure and theoretical foundations within a particular school of thought by indicating the affinity and proximity between publications (White and Griffith, 1981), as frequently cited together documents are more likely to influence the discipline than those less cited (Culnan, 1986). More importantly, publications that are more frequently cited in a pair are more likely to have similar or related concepts (White and Griffith, 1981).

Three stages suggested by Randhawa et al. (2016) are involved in co-citation analysis. First, the co-citation analysis performed at the document level (Gmür, 2003) by differentiating and linking thoughts and research streams within one research domain (Zupic and Ćater, 2015). Second, co-citation analysis proximity scores were visualised by using a network graph, which is based on (1) the normalised strength of co-citation ties, (2) the length between any publications by proximity scores and (3) the size of the bubble reflecting the amount of citations for a given article. Third, in order to visibly identify the research streams within the wider scientific community, a network grouping algorithm was conducted to uncover clusters of relevant publications (Blondel et al., 2008).

The co-citation analysis was performed by using BibExcel program (Persson et al., 2009) while Gephi software was used to visualize the network results (Bastian et al., 2009).

4.2.2. Content analysis

In co-citation, references could be proxies for thoughts and concepts that influence a publication (Schildt et al., 2006), as co-citation analysis could not identify whether a citation gives supportive arguments or offers a critique (Kunz and Hogreve, 2011). As such, a "holistic analysis method" by combining "citation analysis and text mining approaches could minimize this potential bias [citation proxy] and create a more precise depiction of the scientific discipline" (Kunz & Hogreve, 2011, p. 245). Thus, content analysis was used to provide a text-driven review of the publications.

The idea of content analysis is that a systematic analysis of texts would enable the researchers to uncover concepts, themes, and relationships in the documents, and identify unknown qualities about the data to generate valid and trustworthy inferences (Krippendorff, 2012). As journal articles are naturally occurring data, the author of this study thereby makes sense of text as the authors write it. Thus, by using the natural language processing software Leximancer 4.0, it helps remove the likelihood of the researcher's pre-conception bias (Smith and Humphreys, 2006). Author information, affiliation and references were deleted as this information that would potentially crowd the analysis.

Leximancer is a qualitative analysis (e.g. content analysis) tool that has gained prominence in the academic community (Randhawa et al., 2016; Biesenthal and Wilden, 2014), more recently in tourism and hospitality (Cheng et al., 2016; Darcy and Pegg, 2011; Edwards et al., 2017; Jin and Wang, 2015). It interprets and visualizes complex text data by transforming "lexical co-occurrence information from natural language into semantic patterns in an unsupervised manner" through "two stages of extraction – semantic and relational" (Smith and Humphreys, 2006, p. 262). Bayesian theory underpins the statistical procedure behind Leximancer, in which "fragmented pieces of evidence can be used to predict what is actually happening in a system" (Watson et al., 2005, p. 1233). As high level natural language processing software, it removes the problems of expectation biases that can occur in manual text analysis by demonstrating high reproducibility and reliability of concept extractions and thematic clustering (Smith and Humphreys, 2006; Biesenthal and Wilden, 2014). Based on the frequency occurrence of a concept, the final analysis of Leximancer is produced in a hot map, in which the brightness of a circle represents the importance of a theme, whereas the size indicates the quantity of the concepts in the selected documents (Angus et al., 2013). The closely mapped concepts present a strongly related semantic meaning (Campbell et al., 2011; Rooney, 2005; Smith and Humphreys, 2006). The fact that a concept is absent also indicates "important concepts fail to occur sufficiently frequently within the text to be identified and associated with other concepts" (Liesch et al., 2011, p.25).

The Leximancer analysis was undertaken through two stages. First, the SE articles in general as well as in TH were analyzed. Second, TH specific literature was compared to general SE literature to map our current knowledge by using prominence scores. In Leximancer, prominence is defined as "the joint probability divided by (the product of the marginal probabilities)" (Leximancer, 2011). Based on Bayesian Statistics, the prominence scores are "absolute measures of correlation between categories and attributes and can be used to make comparison between different concepts" (Leximancer, 2011). A score of >1.0 for prominence indicates that the co-occurrence happens more often than chance (i.e., the items are not independent) (Leximancer, 2011).

In summary, the use of these two different approaches – co-citation analysis and content analysis via Leximancer (Randhawa

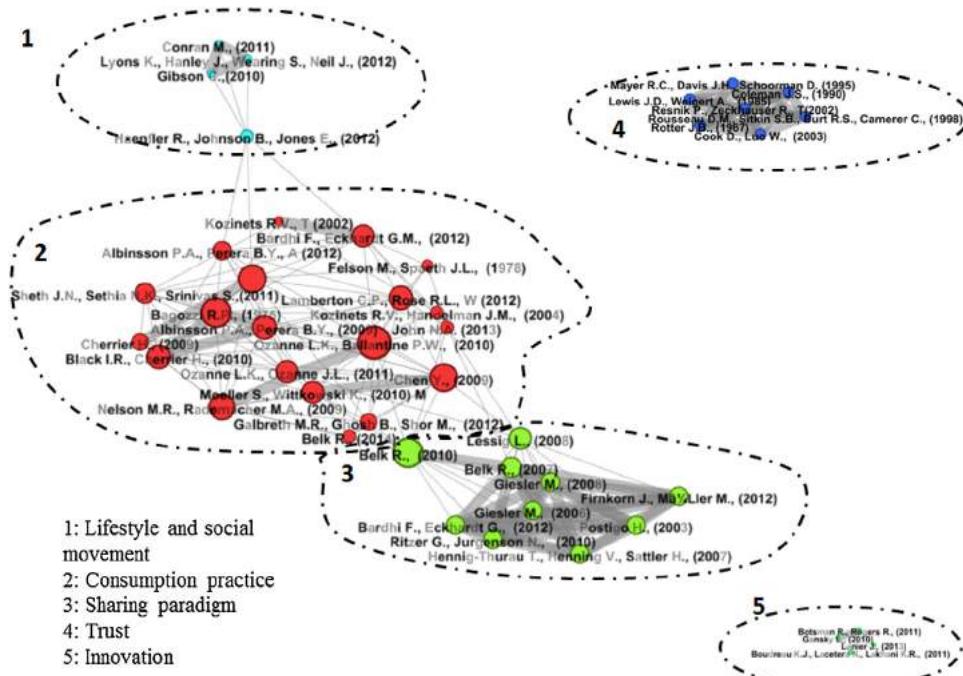


Fig. 2. Visualized co-citation network. Note: to present the results in a readable manner, publications with a co-citation strength >3 are shown.

et al., 2016) complement each other to identify the theoretical foundations and structure of SE research as well as uncover key themes and concepts, reveal research gaps and set areas for future research.

5. Results

5.1. Co-citation results

The co-citation network of the references from the focal articles was visualised in Fig. 2. The size of the bubble presents the normalised citations received by the articles and the thickness of the lines represents the strength of co-citations ties. The results indicate that the whole network is not influenced by any particular study. However, the network does show the importance of several authors' work, which plays significant bridging roles across a number of research streams. In order to reveal the structure and theoretical foundations of SE, the references of focus articles have been clustered by using a Louvain algorithm in different colours (Blondel et al., 2008). Five clusters have been identified through the process (Fig. 1). The clusters identified are (1) Lifestyle and Social Movement; (2) Consumption Practice; (3) Sharing paradigm; (4) Trust; (5) Innovation. As showed in Fig. 2, two clusters – trust and innovation are formed within themselves (with close co-citation links between each article inside the cluster) and have no connection ties from the main co-citation network suggesting that these lines of work are not integrated with main SE streams. A detail description of each cluster and its associated representative articles is given in Table 1.

A close examination of the visual network indicates that a number of articles play important roles in bridging different research domains (Fig. 2). The work of Haenfler et al., (2012) plays a significant role in linking the fields of lifestyle and social movement and consumption practice by highlighting the intersection of private action and movement participation, personal and social change, and personal and collective identity, which is highly relevant to the growth of consumption practice. Belk (2010) work in conceptualizing sharing and Lessig (2008) book advocating the practice of SE play a bridging role in consumption and sharing clusters. In

particular, the fact that the two clusters sharing paradigm and consumption practice are strongly related indicates inter-dependence of the two scholarly streams co-influencing the SE literature.

5.2. Content analysis results

Figs. 3 and 4 present the conceptual map of the content analysis of the SE articles in general and in TH specifically.

5.2.1. The sharing economy literature in general

Fig. 3 indicates three broad area of foci (1) SE's business models and its impacts, (2) nature of SE, and (3) sustainability development in the general SE literature. There are various themes and concepts in each broad area reflecting the growing diverse perspectives and complex nature of SE.

The most dominant broad area is SE's business models and its impacts including various types of SE business "models", "P2P renting", "market", and "cost" which are highly semantically close. The theme "model" is highly diverse comprising different collaborative and business models, and their potentials, particularly service models' impacts on the personal aspects of consumers and goods. The concept P2P in close proximity with renting and vehicle indicates SE's increasing impacts on the car hire sector (Bardhi and Eckhardt, 2012; Cohen and Kietzmann, 2014). The theme "market" reflects SE's impacts on the market in terms of time and needs, as well as market values and terms. This theme is particularly connected to the "sustainability" and "development" themes by the concept housing reflecting the strong relationship between the accommodation sector in SE and sustainable sharing practices (Cohen and Muñoz, 2015). Moreover, "risk" appears as an important theme that is connected with market, illustrating that SE challenges current market cost structures (price) and subsequently future demand. There is a risk involvement in the changes at various levels. For example, the study of Santana and Parigi (2015) found that the greater the frequency of usage of sharing economy websites, the greater the risk aversion of their users.

The nature of SE is concerned with sharing as an alternative consumption practice. Particularly, the themes "sharing" and

Table 1
Research clusters.

Research Cluster/Streams	Short description	Representative works from focal articles	
		General	Tourism and Hospitality
Lifestyle and social movement	Conceptualization of lifestyle movement as a primary means to foster social change	Laamanen et al. (2015)	N/A
Consumption practice	Theoretical appraisal of alternative consumption practice	Bardhi and Eckhardt (2012)	Forno and Garibaldi (2015)
Sharing paradigm	Conceptualization of sharing as a theoretical construct	Belk (2014)	Dredge and Gyimóthy (2015)
Trust	Trust as a social and economic construct	Möhlmann (2015)	Germann Molz (2013)
Innovation	Theory of social and disruptive innovation	Martin and Upham (2015)	Guttentag (2015)

“use” comprise the most diverse concepts by highlighting various conceptualizations of collaborative consumption, means of use, accessibility, ownership, internet-facilitating and resources management issues in SE. They have a strong connection with the *model* theme, which reflects the fact that SE presents a challenge to mainstream businesses that follow the practice on the sales of planned obsolescence products and require new business models to be applied for long term sustainability (Kopnina, 2015). The theme “social” refers to the social aspect of SE; that is people in the SE are engaged in “social interaction” through different sites to facilitate the flow of information effectively. It also highlights social aspects of SE require communities to be open. The theme “members” is connected to the theme “social” through information and communities respectively, indicating the importance of communication among the members to build up resilient communities through empowerment (Martin et al., 2015). This reflects that sharing access to

resources could help build up social capital inside a community as people interact in the process of sharing through communication and allows for more equitable distribution of goods and services (Martin et al., 2015). SE also contributes to values such as equality, mutuality, honesty, openness, empathy, and an ethic of care (John, 2013). The theme “private” describes the fact that different uses of SE blur prevalent local perceptions of the “proper” boundary between the public and the private (John, 2013). The theme “food” comprises diverse concepts indicating a new phenomenon in SE that people in urban spaces, particularly in cities share lands to produce food (Wekerle and Classens, 2015), which also blurs work and *home* space sharing (Cohen and Muñoz, 2015). The “online” themes reflect digital sharing practice online but also its connection to offline *culture*, as those who participate in online sharing information or media are more likely to be engaged in sharing practices in the physical world than those who are not (John, 2013).

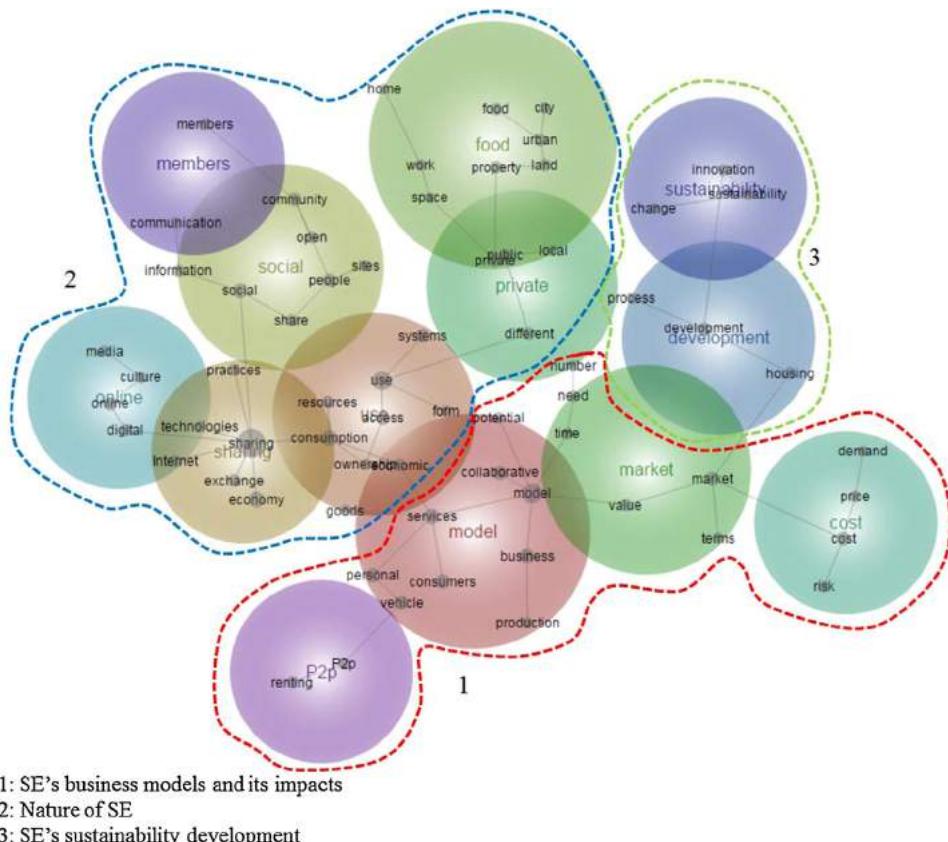


Fig. 3. Conceptual map of SE literature in general.

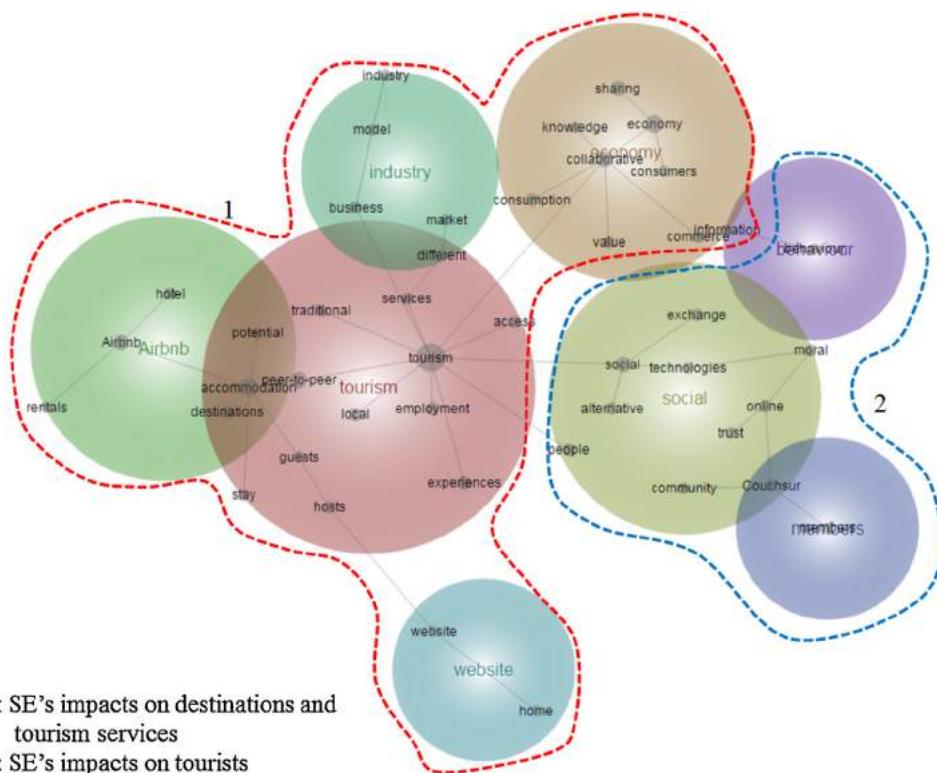


Fig. 4. Conceptual map of SE literature in tourism and hospitality.

The sustainability development area receives relatively less attention, but we start to see growing interest recognizing the relationship between *innovation* and *sustainability* in SE (Martin and Upham, 2015). Two narratives concern the sustainability theme. One advocates that SE enables disruptive innovation that disrupts established business models, generates economy activity and leads to incidental social and environment benefits, such as shared mobility (Cohen and Kietzmann, 2014). The other treats it as a social innovation that helps to address injustices and inequalities of market economies creating “potential pathways to sustainability” (Heinrichs, 2013, p. 228). The concept *change* indicates consumers use SE products, such as sharing events as a form of resistance to the capitalist economic model (Albinsson and Yasanthi Perera, 2012) and as a means of raising awareness about various issues including sustainability and over-consumption through its development (Richardson, 2015), which highlights the importance of community, collaboration, and changing consumer mindsets to the success of such sharing efforts (Albinsson and Yasanthi Perera, 2012).

5.2.2. SE in tourism and hospitality literature

Fig. 4 indicates two areas of SE foci in TH specifically: (1) SE's impacts on destinations and tourism services, and (2) SE's impacts on tourists.

SE's impacts on destinations and tourism services contain relatively fewer themes and concepts. “Tourism” is the domain theme (red color) as SE challenges people's *traditional* ways of using tourism services. The concepts *stay*, *guests* and *host* indicate SE's impacts on destinations' different actors in terms of tourists' length of stay and guest-host relationship as well as the overall experience of a destination (Dredge and Gyimóthy, 2015). The concept *employment* also indicates SE's impact on the traditional labour market. The theme “Airbnb” overlaps with tourism in the concept *accommodation* indicating both themes are frequently mentioned together within articles. This demonstrates “accommodation” at the frontier of SE and the theme “Airbnb” also indicates the rapid growth of

Airbnb has significant impacts on *hotel* and *rental* in terms of market share and competition (Guttentag, 2015).

The theme “industry” and its concepts with the connecting concept *services* indicate that SE transforms current business models in tourism services and appeals to different markets. The theme “economy” is connected with the “tourism” theme as it mainly discusses the conceptualization of SE in the context of TH and its impact on the whole tourism economic system that is related to consumers' consumption, value systems (e.g. shared values of cooperation) and information sources and knowledge production (Andriotis and Agiomirgianakis, 2013; Sigala, 2015). The theme “website” is a relatively small theme (light blue) containing *website* and *home* by connecting with *hosts* demonstrating the role of websites in facilitating home rental for hosts.

SE's impacts on tourists include three themes “social”, “behaviour” and “members”. *Social* is the domain theme showing the role of *technology* in SE on tourists' social exchange and alternative experiences, and the *moral* dimension of the impacts on tourists. The moral dimension is in close proximity to *trust* issues in the online space (Germann Molz, 2013). *Couchsurfing* also appears to be a concept that is strongly semantically close to *community* and the theme “members”, highlighting the discussion of Couchsurfing as a form of SE and its role connecting tourists to community members (Germann Molz, 2013). The theme “behaviour” is the least important theme but nevertheless indicates SE gradually influences tourists' behaviour (Tussyadiah and Pesonen, 2015).

5.2.3. Comparison between SE in general and TH specifically

To increase the readability of the diagram, only the top 20 concepts with prominence scores greater than 1 were compared. Fig. 5 indicates that both of SE in general and TH have placed great emphasis on discussing the conceptualization of SE as an alternative to current business models (Quadrant 2). Many important areas are not covered in tourism and hospitality (TH), particularly the sustainability development issues in SE (Quadrant 4). Also, the

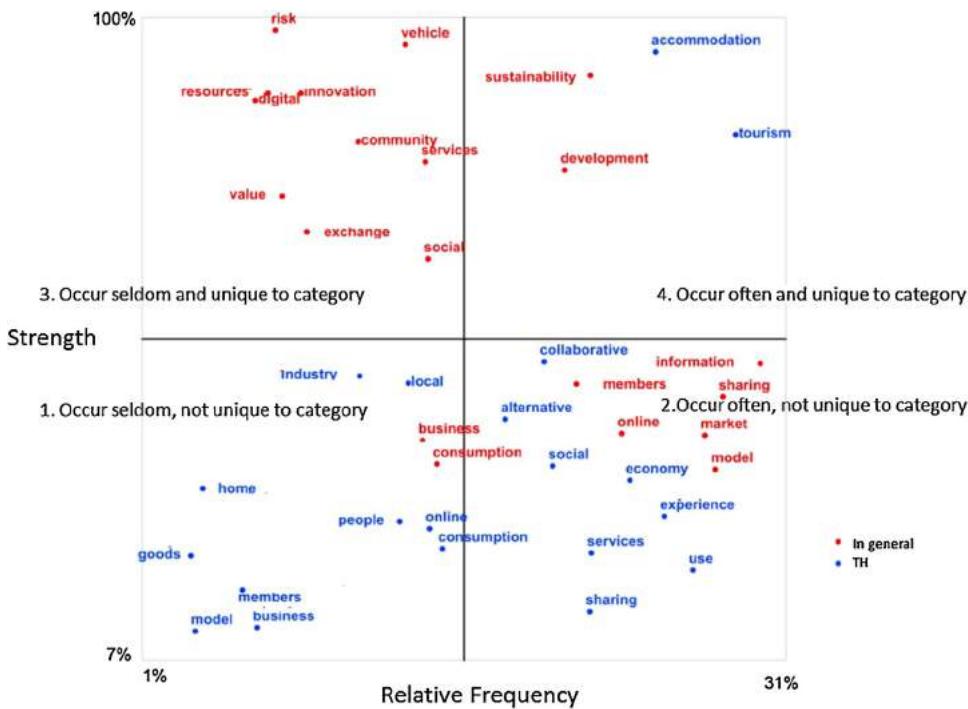


Fig. 5. The comparison between concepts from SE in general and TH specifically.

discussion of business models received relatively little attention in TH (Quadrant 1) while the accommodation sector is the main focus of TH (Quadrant 4). The comparison between two conceptual maps shows that there are fewer unique concepts in TH despite the fact that TH is at the frontier of SE (Quadrant 3).

6. Discussion

The analysis of extant literature indicates there are three distinct areas within the sharing economy literature in general (1) SE's business models and its impacts, (2) nature of SE, and (3) SE's sustainability development and two areas specific to TH (1) SE's impacts on destination and tourism services and (2) SE's impacts on tourists. Five research streams have been identified: (1) Lifestyle and Social Movement, (2) Consumption, (3) Sharing, (4) Trust and (5) Innovation. In order to understand the highly complex and changing nature of SE, a three-level micro-meso-macro typology was adopted from evolutionary economics (Dopfer et al., 2004). The micro level describes the smallest levels of agent (e.g. individual consumers and suppliers in SE) and their interactions with each other whereas the macro level refers to the analysis of complex structures and associated processes with large-scales patterns, such as government and community. The meso-level is the middle level between the micro and macro levels concerning groups and their interactions, such as the SE start-ups and traditional firms. The following discussion focuses on two promising areas for future research, micro-meso-macro levels of SE, and new theoretical lens, multi-disciplinary and multi-level approaches to SE.

6.1. Micro-meso-macro levels of sharing economy

6.1.1. Micro-level (The individual level)

The results of the review suggest that current research has predominantly adopted a user-centric approach to investigate SE. At its start, SE was conceptualised as a way for users to be engaged a new social-economic phenomenon and to open up private-public boundaries to leverage resources (Belk, 2010). Since then,

researchers have a tendency to try to understand how users adopt SE, conditions that contribute to this adoption (Hamari et al., 2015), who are engaged in sharing economy practices and how SE impacts individuals and tourists (Tussyadiah and Pesonen, 2015). In particular, by developing a typology of shared goods in conceptualizing commercial sharing systems, Lamberton and Rose (2012) offer five practical suggestions for increasing the likelihood to change the propensity to share by lowering costs and raising benefits of sharing, highlighting the perceived risk of product scarcity, heterogeneous or complementary usage within demographic segments, and increasing people's familiarity with sharing. However, the authors cautiously note that trust does not explain the propensity to share. While this piece of evidence is significant, they focus largely on the immediate results. These studies lack in-depth analysis of how SE negatively or positively transforms individuals. In tourism and hospitality, while SE enables an authentic local-guest experience (Tussyadiah and Pesonen, 2015), it also entails risks (e.g. monetary risk as well as emotional and personal safety) (Sigala, 2015). Transactions (e.g. Airbnb) in the context of SE go beyond online trading, which is followed by face-to-face interaction with strangers when consuming the services (Sigala, 2015). Thus, for both researchers and practitioners, it is important to examine tourists' trust building processes and coping strategies as well as host attributes and strategies in facilitating the delivery of products to alleviate the "trust" tension. From a broader academic perspective, it is of central importance to understand how SE redefines the roles of consumers and suppliers compared with those of the conventional market economy.

To date, sharing economy research has been conducted from a Western perspective and in Western regions. Less attention has been paid to emerging regions, which concurrently enjoy rapid growth of SE in their own regions and present their unique group dynamics (Tolkach et al., 2015). Recent news articles indicate that while Airbnb has been exerting its efforts to expand into the China market, it is constantly experiencing barriers to its growth (Han, 2015). Whether this is due to China's cultural resistance has not been tested empirically (Han, 2015). More importantly, Chinese

owned AirBnb business models (e.g. www.tujia.com and www.unests.com) have also been established (Cheung, 2014) and they operate as full service intermediaries, not only in charge of finding renters, but also taking care of the apartments (Yang and Marquis, 2014). With the continued growth of non-Western users, their own group dynamics and their SE start-ups' new business models require substantial attention. The growing number of Asian tourists travelling outside their regions will be likely to carry their own perceptions and usages of SE around the world. Therefore, this has the potential to significantly change SE in TH sector. As such, future studies from an emic approach and additional cross-cultural comparisons of different user segments would provide researchers with a more comprehensive picture of SE worldwide.

6.1.2. Meso-level (The firm/organization level)

The results indicate that SE at the meso-level receives relatively little attention, despite the fact that the facilitation of technology advancement and low entry barriers give rise to many start-ups using SE models, some of which have become the new top players in their fields (Schor and Fitzmaurice, 2015).

Academic literature thus far on the meso-level focuses largely on SE firms' operating practices in addressing the ambiguous nature of encounters in SE (e.g. self-management tools in organic farming networks (Ince, 2015)) and in developing optimal framework (e.g. sharing cities sustainable consumption and production typology (Cohen and Muñoz, 2015)) and strategies (e.g. public and private collaboration in shared mobility services (Cohen and Kietzmann, 2014)) to achieve sustainability. In the context of SE, some start-ups have enjoyed great success (Gauthey, 2014) but many have failed (Evans and Schmalensee, 2010). As such, their business models and their wider implications (Cohen and Kietzmann, 2014), as well as the characteristics and behaviour of these entrepreneurs require future academic attention. The absence of these entrepreneurs with their significant influence over the firms, as the unit of analysis in the literature will hinder future development in understanding the strategy formulation of the start-ups. As Jawahar and McLaughlin (2001, p. 411) noted, "the stakeholder theory we present ignores individual differences' even though 'manager' beliefs, values and ideologies are likely to influence the strategies the managers use to deal with different stakeholders." Additionally, existing research shows that start-ups also contribute to the increase of micro-financing or crowdfunding (Martin, 2016). At the time of this research, Angel Funding website has listed 517 SE start-ups with average valuation of \$3.9 M per start-up (Angel.co, 2015). In TH, beyond the accommodation sector, many start-ups are emerging in traditional restaurant, transport and tour guide sectors. For example, instead of seeking a professional tour guide from tour operators, many platforms (e.g. localguiding.com) facilitate a transaction between locals and visitors (Sigala, 2015), where locals serve as a tour guide for visitors. As such, it is important to understand these start-ups' operating models and their means of crowdfunding.

Moreover, the 'ripple effects' and the wide implications of SE's start-ups require further detailed investigation (Sigala, 2015). It raises the question as to how traditional players respond to new ones as the operating models of SE start-ups foster competition that drives traditional players to innovate and redefine their current models; such as creating SE services (BMW's new i Mobility Services) (BMW, 2014) and co-opetition (Groupon acquired Side-Tour an internet platform matching visitors with local experts) (Sigala, 2015). For tourism service providers, it is of central importance to understand the successful factors and operating models of new TH models, the impacts of new players on traditional tourism service providers and traditional tourism service providers' coping strategies.

6.1.3. Macro level (The community/government level)

While regulatory authorities' role in SE has attracted continuous debate, research in this area seems less developed in TH. Prima facie, both regulatory authorities and SE firms have not aligned well (Bond, 2015). Current literature indicates that the loose or non-engagement of many start-ups with the government at an early stage makes potential regulators perceive these start-ups as exploiting loopholes instead of developing a legitimate business model (Bond, 2015; Cannon and Summers, 2014; Cohen and Kietzmann, 2014). An instance is the case of policy makers in Frankfurt and Massachusetts who have taken action against Uber's practices. However, other governments support the growth of SE in their cities. For example, Amsterdam promotes itself as a "sharing city" and passes "Airbnb friendly legislation" (Sharenl, 2015). It raises the questions as to how government can optimally facilitate the integration of SE and traditional service providers into existing systems (Cohen and Kietzmann, 2014).

The contrasting and contradictory positions taken by regulatory authorities confuse the development of SE and require further detailed academic research by examining the impacts of SE on various sectors (Lyons and Wearing, 2015; Richardson, 2015). A better understanding of the impacts would lead to knowledge that could assist governments to draft or improve codes of practice for a wider range of SE start-ups and assist SE providers with a better road map for development. Equally, SE presents opportunities to promote innovation and entrepreneurship, which might help create jobs, strengthen community resilience and drive economic growth (OECD, 2016; Richardson, 2015). This raises questions as to how the government can facilitate the process to encourage a better understanding of SE in both the public and private sectors (OECD, 2016) and develop regulation and policy that regulates and encourages the healthy growth of sharing economy (Shuford, 2015; Ranchordás, 2015). From a practical viewpoint, Cannon and Summers (2014) suggest SE start-ups be proactive in engaging regulatory authorities by sharing their business models and data openly, being responsive to the regulatory authorities' concerns, making a well-researched case, and using an industry association approach rather than an individual company one to approach governments.

6.1.4. Alignment of micro-meso-macro levels of sharing economy

The intertwining nature of the actors in the SE system requires a holistic approach to understanding this rapidly growing area both as an economic opportunity and a sustainable form of consumption (Martin, 2016). As such, the alignment of the individual, firm, government and community at micro-meso-macro levels in contributing to a sustainable "sharing cities" (Cohen and Muñoz, 2015; OECD, 2016) requires further academic attention, as Cohen and Kietzmann (2014) point out that existing private or public SE business models are fraught with conflicts and there is an urgent need to develop a merit model in aligning the strengths of agents (SE service providers) and principals (governments).

In TH, while the major impacts of SE on tourism sector have been well acknowledged, there is a dearth of work that looks into SE's wider impacts on local and regional economies through its disruptive innovation and how it might reconstruct our current tourism systems (Guttentag, 2015). For example, a recent industry report estimates that nearly 40% of the global outbound accommodation market belongs to SE (IPK International, 2014). This will have direct impacts on TH related investment behaviour, tourist-host relationship, authenticity, direct competition with the traditional accommodation sector and indirect impacts on the local community and government revenue systems (Sigala, 2015; OECD, 2016). There appears scope for more research into the ecological, economic, and social impacts of SE. For example, accurate and cross-sectional standardized measurement of the impacts of

SE could be one promising area. However, such investigations are still at their infancy in the current TH literature and it is unclear how tourism policy makers, business communities and organizations (e.g. UNWTO) respond to the impacts of SE on tourism and hospitality.

Additionally, while Airbnb is at the frontier of SE in transforming the traditional accommodation sector, other sectors in tourism and hospitality are also facing increasing pressures, such as peer-to-peer financing, transport and restaurants, but no attention has been devoted to these areas to date. SE uses under-utilised personal assets for value creation in stimulating employment by creating a resilient community (Martin et al., 2015). However, the jobs created through the “decentralized system of distributed labours” (Schor and Fitzmaurice, 2015) present “unregulated spaces of employment” without employment health and safety, insurance and union protection at the community level (Richardson, 2015). A recent study of SE on tourism employment in the US shows that at certain developmental stages, SE could help solve the unemployment problem (Fang et al., 2015). However, the authors cautiously mentioned that it is important for the government to formulate appropriate policies for its regulation to facilitate this contribution. As such, Bernhardt (2014) concurs that it is of central importance for policy makers to focus on specific regions and industry in examining “when and where pernicious forms of non-standard work have grown, and which groups of workers have been most impacted” (p. 15). Dredge and Gyimóthy (2015) agree that we need to go beyond the current lens to uncover and conceptualise “bonding, power constellations and control mechanisms in the virtual sphere rather than just taking fairness for granted” (p. 295).

From a sustainable perspective, how SE would help transform individuals and communities into a more sustainable consumption in TH remains unclear. It is debatable whether SE contributes to a more sustainable consumption practice or is a negative expression of neoliberalism (Martin, 2016). At the meso-macro level, Cohen and Kietzmann (2014) further point out that existing private or public SE business models present conflicts to achieve sustainable mobility. At the micro level, for example, Airbnb (2014) claims that their business model could lead to sustainable business practices between hosts and guests by reducing greenhouse emissions, energy and water use. However, this claim has not been grounded in any comprehensive empirical studies to reveal its sustainable contribution to ecological impacts of SE (Juul, 2015). This requires research to widen its scope in understanding SE in TH through a holistic, integrated and multi-level approach.

6.2. New theoretical lens, multi-disciplinary and multi-level approach

The co-citation analysis indicates SE research has a theoretical background with five research streams. Highly connected clusters are lifestyle and social movement, sharing paradigm and consumption practice, while trust and innovation clusters are distant and detached from the rest. This indicates that these lines of work are not integrated with mainstream SE concepts and SE as an area of investigation does not embrace a wide theoretical lens, particularly in TH. A further close examination of the co-citation network and conceptual map reveals that current sharing economy literature is predominantly investigated from sociological perspectives in conceptualizing sharing (Belk, 2014) and advocating lifestyle and social movement towards moral economy (Molz, 2013) and mobility paradigm (Cohen and Kietzmann, 2014), economic perspectives in articulating its growth and impacts on consumption practices (Richardson, 2015) and framing social or disruptive innovation (Guttentag, 2015), social-technological transition perspective towards sustainability (Martin et al., 2015) and consumer behaviour perspectives, e.g. trust building, risk aversion (Santana

and Parigi, 2015), and travel pattern (Tussyadiah and Pesonen, 2015). Despite the gradually changing focus (e.g. sustainability) and increasing engagement with different disciplinary perspectives (e.g. social-technological transition perspectives) beyond economics, scholarship in this field is immature compared with many other areas. Yet, a number of studies play bridging roles (e.g. Haenfler et al., 2012; Belk, 2010) in linking the identified knowledge domains. Such articles contribute to the evolving intellectual structure of SE by tying separate knowledge streams together, demonstrating their important relationships and new contributions to knowledge (Cheng et al., 2016). It highlights that there are future opportunities to better integrate other relevant theories, such as social presence theory, and multiple-level analysis through disciplinary, multi-disciplinary, interdisciplinary, trans-disciplinary and contextual field with SE research.

Additionally, despite acknowledgement of the complex and multi-faceted nature of SE, there is a complete absence of multi-level analysis in theorizing micro, meso and macro perspectives in the current SE literature, such as meso/macro level analysis via a resource-based view or micro/meso analysis based on stakeholder theory. Future studies on SE will benefit from constructing multi-level frameworks by applying multiple theoretical perspectives that integrate the wide changes in social-economic system at the macro level, the strategic organizational factors at the meso level and individual perception and behaviour at the micro level (Frynas and Stephens, 2015). The integration of variables at various levels will have the potential to push SE field forward. In particular, any specific theoretical construct is suited principally to explaining phenomena given a level of analysis (Frynas and Stephens, 2015) and as such multiple theoretical perspectives by improving and refining current methodologies should underpin the multi-level analysis of SE.

7. Conclusion and limitations

The complementary network-based co-citation analysis, and content analysis through Leximancer present an objective, systematic and holistic review of current SE literature by identifying the structure, theoretical foundations, key concepts and themes underpinning the field as well as uncovering research gaps and setting up future research agenda. Our findings reveal three distinct areas of SE in general and two unique areas specifically in TH. The comparison between both literatures reveals limited expansion in TH literature despite the fact that TH are at the frontier of SE.

In summary, this study has a number of contributions to extant literature. From an academic perspective it offers a clear-cut representation of the sharing economy literature by understanding its theoretical foundations and main themes in general and its relevancy to the tourism and hospitality field. As such, it helps researchers visibly position themselves in the literature to identify potential new directions as well as to locate their work within the field. From a methodological point of view, this paper highlights opportunities offered by a visual analytics approach (Cheng and Edwards, 2015; Edwards et al., 2017) to effectively approach data's messiness. From a practical point of view, it can serve as an introduction to the rapidly evolving SE field and its relevancy to tourism and hospitality by addressing the call of Tranfield et al. (2003) for an evidence-informed approach. In particular, by aggregating various fragmented, even contradictory evidence (e.g. income for owners vs casualization of labour) in the literature, individual consumers, service providers, regulatory authorities, new SE start-ups and traditional TH firms will benefit from holistic and multi-level insights on their own territories and beyond to develop and formulate their strategies (e.g. traditional firms' competition strategies) and policies (e.g. regulatory authorities' informed mechanism for the healthy

development of SE) effectively. It also highlights existing barriers and opportunities on collaboration to harness the benefits of SE.

This study is not without limitations. First, this study examines only academic journal articles. Future research including grey literature and perhaps a further comparative approach between industry and academic sources would offer additional insights into the SE phenomenon. Second, future research utilizing Delphi methods through consultation with experts, practitioners and regulatory authorities would add another layer of insights into the complexity of SE.

Acknowledgement

The author would like to express his great appreciation to Graeme Kinsella for his penetrating comments and Professor Jenny Edwards and members of the writing group at UTS Business School, University of Technology Sydney for their constructive comments in improving the quality of this paper.

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Further reading

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Contents lists available at ScienceDirect

Annals of Tourism Research

journal homepage: <https://www.journals.elsevier.com/annals-of-tourism-research>



The seven lives of Airbnb. The role of accommodation types

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ARTICLE INFO

Article history:

Received 17 November 2020

Received in revised form 16 January 2021

Accepted 3 February 2021

Available online 17 February 2021

Associate editor: Eyal Ert

Keywords:

COVID-19

Need for physical distance

Peer-to-peer

Accommodation

Airbnb

Experiments

ABSTRACT

This paper investigates how COVID-19 is impacting different accommodation types, and whether travellers' choices regarding accommodation type are affected by the need for physical distance. Study 1 shows that travellers are very reluctant to book shared flats on Airbnb during the pandemic. However, full flats – controlling for price levels – are preferred to hotel rooms. Study 2 clarifies the process behind the increased choice for full flats, i.e., the need for physical distance. In Study 3, we actively manipulate physical distance and show that assuring physical distance will reduce the concerns towards hotel and shared flat options. Apart from enlightening the psychological process behind accommodation choice, the study offers operators actionable suggestions on how to maximise bookings despite the pandemic.

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Introduction

The global pandemic has posed a serious threat to the global economy, the tourism and hospitality sector in general (Sharma & Nicolau, 2020), and to paid peer-to-peer accommodation types specifically (Dolnicar & Zare, 2020). Peer-to-peer models have grown exponentially in recent years (Ert et al., 2016; Gutiérrez et al., 2017; Viglia, 2020), mainly due to rapid technological developments (see Buhalis et al., 2019). Over time, paid peer-to-peer models like Airbnb have threatened traditional hotels by stealing market shares, proposing new ways to access services and focussing on unique experience, social/physical interactions and lower prices (Tussyadiah & Pesonen, 2016, 2018). In line with this, a growing body of literature has recently discussed the differences between paid peer-to-peer

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versus traditional models (i.e., Heo, 2016; Osman et al., 2019), along with the elements that travellers look for when choosing one model over another (Hajibaba & Dolnicar, 2017). Additionally, some systematic reviews on the state of current research (see Dolnicar, 2019; Prayag & Ozanne, 2018; Sainaghi, 2020; Sainaghi & Baggio, 2020) show substitution effects between these two realms.

Traditional models (e.g., hotels) are characterized by strong institutional settings (Osman et al., 2019), while in the case of paid peer-to-peer accommodation there is a lower social/physical distance and higher trust between guests and hosts (Ert & Fleischer, 2019; Pera et al., 2019). Hence, traditionally, travellers who choose a paid peer-to-peer model seek meaningful social/physical interactions with locals, unique experiences and lower prices (Tussyadiah & Pesonen, 2016). As argued by Dolnicar (2019, pp. 248–249), ‘a unique feature of paid online peer-to-peer accommodation is the wide range of different kinds of spaces being offered’ and ‘sometimes the human relationship rather than a house is... the primary shared asset’. To the best of our knowledge, only one study has explored empirically different types of paid peer-to-peer options, such as shared rooms, private rooms and entire homes (Tussyadiah, 2016). In particular, the author found that the pursuit of social benefits is associated more with the choice of shared flat than full flat. Nevertheless, as anticipated, the COVID-19 pandemic has changed the *status quo* of the sector, imposing new dynamics regarding the structures of accommodations, on the one hand, and the choices, needs, necessities and uses of travellers, on the other (Gössling et al., 2020). Consistently, Dolnicar and Zare (2020) have recently proposed that COVID-19 will disrupt the paid peer-to-peer accommodation type, and recent data show that paid peer-to-peer services have witnessed a dramatic drop in business volumes during the lockdown (Glusac, 2020). Moreover, given the economic crisis and the continued social/physical distancing applied in many countries around the world, these business models will likely continue to suffer for many months. Brian Chesky, Airbnb's chief executive, declared: ‘*Airbnb's business has been hit hard, with revenue this year forecasted to be less than half of what we earned in 2019*’. Nonetheless, Airbnb will now be listed in the stock market this year, which shows that its future is far from over (Driebusch et al., 2020).

In this paper, we propose and hypothesize that the paid peer-to-peer accommodation type is not dead but that there will be a change in bookings in favour of full flats rather than shared flats. In other terms, the pandemic reduces tourists' expectations and the search for the social/physical interaction typical of peer-to-peer models (Osman et al., 2019; Pera et al., 2019) and hotel main receptions and common spaces, such as bars or lounges. Along these lines, the pandemic favours types of accommodations that guarantee physical distance, such as full flats. Accordingly, we also hypothesize – and find evidence for it – that the increased choice for full flats is driven by the need for physical distance.

Physical distancing asks for fast changes in the social habits of citizens (Pfattheicher et al., 2020), so the physical aspect can be seen as the driving social habits change due to the pandemic. We use the composed term “social/physical” throughout the paper to reflect the physical part of social interactions (vs. social/technology-mediated interactions). In the past, social and physical interactions have been regarded mainly as synonymous/interchangeable, with the second being the main vehicle for the first (conviviality is a clear example). In the digital age (as exemplified by travellers' blogs or online communities), we feel it important to specify what we refer to.

The scientific community has found and communicated that COVID-19 can occur in specific settings, particularly indoor, where infected person(s) spend long periods of time with others (World Health Organization; <https://www.who.int>). A lingering question for the International health authorities and policy makers has therefore become “how to reduce virus spread while limiting also the negative socio-economic impact”. Physical distancing, that is minimizing one's contacts with others, has been proposed as one of the useful measures. Depending on the specific geographical context and on the timing, physical distancing has been induced through mandatory regulations (such as lockdown) and/or encouraged as voluntary practice by calling upon each citizen self-responsibility.

Measures such as physical distancing ask for fast changes in core social habits of citizens (Pfattheicher et al., 2020). Minimizing contacts between people may lead to benefits that are both egoistic in nature (namely, protecting oneself) and altruistic or social (as protecting others). At the same time, they entail personal costs. The presence of physical distance, indeed, inhibits also social/physical interaction. Given these arguments, we portray that need for physical distance is a key factor driving changes in each one's behaviour, including tourists' consumption patterns.

Methodologically, the paper proposes, in line with previous studies (Pera et al., 2019; Tassiello et al., 2018), three experiments to test the choice of the type of accommodation (full flat, shared flat, and hotel) across two different scenarios (non-pandemic versus pandemic one).

We test how these choices are mediated by the need for physical distance. We also actively manipulate physical distance to see whether a change in the level of this variable is able to influence accommodation choice. As far as we know, it is the first time that a tourism paper proposes a manipulation of a mediator in experimental designs (see Jacoby & Sassenberg, 2011). Using a manipulation of a mediator is important because it allows assessing whether it is possible to actively affect a process that induces certain behaviours (e.g., the choice of an accommodation). The empirical research finds that: a) controlling for price levels, full flats gained popularity during the pandemic crisis compared to hotels and shared flats; b) one person's need for physical distance represents the underlying mechanism behind the enhanced choice for full flats on Airbnb during the pandemic; c) the need for physical distance contributes to explaining the relationship between the pandemic situation and the accommodation type chosen, such that the ability of guaranteeing physical distance increases the preference for shared rooms and hotels.

The paper provides two clear implications for theory. First, the paper contributes to the literature on paid peer-to-peer accommodation types (e.g., Dolnicar, 2020; Dolnicar & Talebi, 2020; Ert & Fleischer, 2020; Guttentag et al., 2018), suggesting that this model is not dead but rather will undergo a major change. Specifically, the paper adds to the literature on social/physical distance in the accommodation realm (Osman et al., 2019; Pera et al., 2019), highlighting that, due to the COVID-19 pandemic, travellers

will increasingly choose the full flat model. Second, drawing from spatial distance theory (Williams & Bargh, 2008), this paper has proposed – and found evidence for – the need for physical distance (Pfattheicher et al., 2020) as an important underlying mechanism. We expect that the need for physical distance will affect travellers and influence their decisions and behaviours in the coming months and years, due to the COVID-19 pandemic.

From a managerial perspective, the study encourages to: a) list entire homes instead of splitting them into different listings; and b) put emphasis on, and include in communication, all the measures and practices to increase physical distance between strangers such as differentiated pathways. Overall, the paper sheds light on the emotional and behavioural responses of tourists to the changes imposed by the Covid-19 pandemic.

Theoretical background

The sharing economy has attracted growing interest among scholars and practitioners in the last two decades and seems to receive even more attention recently (Dolnicar, 2020). Having revolutionized habits, relationships and business models, this rising phenomenon led researchers from different fields to pose new research questions (Eckhardt et al., 2019). It also permeated the boundaries of the tourism and hospitality sectors (Ert et al., 2016; Fang et al., 2016), crafting new ways for consuming services together, with new disruptive business models such as paid peer-to-peer ones (Dolnicar & Talebi, 2020).

Paid peer-to-peer accommodation has been analyzed with distinct theoretical backgrounds and various methodologies, giving rise to an increasing number of academic papers on a broad range of topics (see Belarmino & Koh, 2020; Dolnicar, 2019; Sainaghi, 2020; Sainaghi & Baggio, 2020).

Conceptual studies have focused on the nature of sharing in the hospitality and tourism sectors (for example, Kannisto, 2017), since 'the P2P accommodation segment has several aspects which make it unique, even in the realm of the sharing economy' (Belarmino & Koh, 2020, p. 1).

Overall, studies indicate that in traditional models such hotels there are strong institutional settings (Osman et al., 2019). Contrarily, paid peer-to-peer models present a lower social/physical distance between guests and hosts (Pera et al., 2019).

Studies focused on guests and on host-guest relationships account for a high share of available literature on peer-to-peer accommodation platforms (Belarmino & Koh, 2020; Sainaghi & Baggio, 2020). A rich stream of studies investigated the characteristics of paid peer-to-peer accommodations, together with the factors that lead tourists to choose this type of model instead of traditional models. For example, Quinby and Gasdia (2014) suggested that lower prices and more physical space in the apartment/house are the main reasons for choosing paid peer-to-peer accommodations instead of hotels. Similarly, Balck and Cracau (2015) confirmed the key role of cost reduction in the choice of accommodation type. In addition to the two previous studies, Tussyadiah and Pesonen (2016) found that travellers seek meaningful social/physical interactions with locals, unique experiences and lower prices when choosing a paid peer-to-peer model. When contrasting paid peer-to-peer accommodation to traditional models, the former seems to raise concerns about the safety. For example, Hajibaba and Dolnicar (2017) found that safety was the main perceived worry preventing respondents from booking on peer-to-peer websites in the Australian context. Birinci et al. (2018), in a cross-sectional online survey done in the United States, discovered that the safety and security risk was important as a satisfaction predictor only in the Airbnb sample.

These findings seem to point to the opportunity to look at peer-to-peer accommodation types not as a homogeneous category to be contrasted with traditional accommodation types. Indeed, to the best of our knowledge, only Tussyadiah (2016) has empirically investigated guests' cognitive and behavioural intentions with respect to different types of paid peer-to-peer accommodation. The most interesting result, in this respect, is that the search for social benefits is associated more with the choice of shared flat than full flat.

Recently, studies on the sharing economy have focused on the negative impacts of COVID-19 (Farzanegan et al., 2020). For example, Farmaki and colleagues have found that the pandemic's effects have been equally great on peer-to-peer accommodation as on mainstream hospitality players. More interestingly, they found that while some hosts rent through peer to peer platforms, as they feel optimistic about the future. Others decided to exit the platform to turn to long-term renting (Farmaki et al., 2020). Despite this, there is a dearth of studies focusing on guests.

In this regard, a lingering question is whether COVID-19 affects tourists' needs and, particularly, their motivations, preferences, perceptions and behaviour regarding accommodation choices and need for social/physical distance (De Vos, 2020). Safety risk perception, especially as far as personal health is concerned, is now altered by the worldwide sequence of events.

The COVID-19 pandemic might have induced a higher need for personal 'physical' distance, especially with non-relatives. This tendency might translate into a reduced quest for, or sensitivity to, social interaction/experience and to the related low levels of required social/physical distance that were found to characterize some segments of peer-to-peer accommodation customers (Tussyadiah, 2016). In other words, social/physical distance might continue to be a motivating factor for choosing peer-to-peer accommodation, but with a different meaning and possibly a reversed effect. Specifically, the relevance of physical space while choosing accommodation might change.

Altogether, a sharpened safety risk perception might increase the need for physical distance to avoid infection – and this might affect accommodation choices.

Table 1 offers an illustration of papers dealing with the above aspects. The selection revolves around two criteria: i) studies exploring different types of accommodation (comparing hotels vs. peer-to-peer, but also considering different types within peer-to-peer); and ii) studies investigating the effects of social/physical distance in peer-to-peer models and/or traditional models. The last row of the table presents the proposed contribution of our paper. The next paragraph elaborates on the expected contextual effects of COVID-19 before developing the hypotheses.

Table 1

Why tourists chose different accommodation types (paid peer-to-peer vs. traditional hotels) and how they evaluate these models. Illustrative examples.

Authors, year Title	Research goal(s)	Methodology (n.a. – not available)	Key findings <i>Findings relevant to the proposed study are in italics.</i>
<i>Why tourists chose different accommodation types (paid peer-to-peer vs. traditional accommodation types)</i>			
Quinby & Gasdia, 2014 Share this! Private accommodation & the rise of the new gen renter	Examining the US short-rental travellers: who they are, how they travel, what they want, and how they shop and book. The paper compares peer-to-peer accommodation vs. hotels	Survey (for the tourism research company Phocuswright) United States n.a.	Physical spaces in the apartment/house and prices are the main reasons for choosing peer-to-peer accommodations instead of hotels.
Hajibaba & Dolnicar, 2017 Substitutable by peer-to-peer accommodation networks?	To determine tourists' perceived substitutability of established commercial accommodation with peer-to-peer accommodation in Australia	Online panel research Australia 2016	Peer-to-peer networks are seen as a substitute for established commercial accommodation providers and tourists are very good at distinguishing between accommodation options and therefore have differentiated assessments of substitution effects for different kinds of commercial accommodation providers as well as staying with friends. <i>'Safety' emerges as the main perceived worry preventing respondents from booking on peer-to-peer websites.</i>
Birinci et al., 2018 Comparing customer perceptions of hotel and peer-to-peer accommodation advantages and disadvantages.	To compare customer perceptions of hotel and peer-to-peer accommodation advantages and disadvantages and examine their influence on customer satisfaction and repurchase intentions	Cross-sectional online survey United States 2018	<i>Safety and security risk appear to be important as satisfaction predictors only in the Airbnb sample.</i>
<i>How tourists evaluate different paid peer-to-peer accommodation types</i>			
Tussyadiah, 2016 Factors of satisfaction and intention to use peer-to-peer accommodation	Examining the factors that influence guests' satisfaction with and behavioural intention to re-use a peer-to-peer accommodation	Online survey United States 2015	Guests' satisfaction with using peer-to-peer accommodation is influenced by factors of enjoyment, economic benefits and accommodation amenities. <i>The search for social benefits is associated more with the choice of a shared flat than a full flat.</i>
Guttentag et al., 2018 Why tourists choose Airbnb: a motivation-based segmentation study	To investigate tourists' motivations for using Airbnb accommodations (as they pertain to their particular characteristics) and to segment them accordingly	Online survey Country n.a. 2015	Airbnb guests are driven by a broad range of motivations. Different segments of travellers are identified, based on the motivating factors, and profiled. <i>The starker motivating factor differentiating the segments is the interaction factor.</i> <i>The influence of the interaction factor on the segmentation results is very closely related to the type of accommodation used.</i> <i>The interaction factor points to a broader social appeal of P2P accommodation (Tussyadiah & Pesonen, 2016), and includes a personal and meaningful interaction with the one's host and other locals. The interaction with the host, indeed, vary dramatically depending upon whether one is renting an entire home or not.</i>
Osman et al., 2019 Home and away: Why do consumers shy away from reporting negative experiences in the peer-to-peer realms?	To explore the bias in consumer reviews (non-reporting of negative experiences) of peer-to-peer rented accommodation	Mixed method approach (quantitative exploratory analysis; qualitative exploratory investigation using in-depth interviews) Country n.a. 2016	There is a consistent online review gap between institutional actors and peer-to-peer actors, with peer-to-peer platforms being characterized most by the absence of negative online reviews. <i>The social distance between the actors affects the way in which consumers interpret the experience of their stays.</i> <i>When hosts and guests share a physical space (i.e., shared accommodation) or by living in with the host and sharing life stories, a personal connection occurs; the guest is placed "here" or at home (Crouch et al., 2001) with a feeling of social togetherness, thus leading to a low social distance.</i>

Table 1 (continued)

Authors, year Title	Research goal(s)	Methodology (n.a. – not available)	Key findings <i>Findings relevant to the proposed study are in italics.</i>
Pera et al., 2019 When empathy prevents negative reviewing behaviour	Understanding why peer-to-peer platforms present almost no negative reviews	Sequential transformative mixed-method approach (qualitative analysis through in-depth interviews; two laboratory experiments) Italy, Great Britain and Vietnam for the empirical analysis Italy for the lab experiment Year n.a.	<i>Social distance appears to have an influence on reporting bias. Consumers of peer-to-peer accommodation prefer not to engage in negative reporting if a bond with the host is developed (thus experiencing low social distance). The perception of 'home' decreases the social distance, which impacts the accuracy of the reviews.</i> Peer-to-peer settings, even more than institutional ones, suffer from a consistent reviewing bias as ratings tend to be overwhelmingly positive, although online review users tend to value the negative ones more compared with positive ones. <i>Social closeness hinders tourists' willingness to provide negative online reviews to express their poor experiences. This bias is mediated by empathy between guests and hosts.</i>
Present research	To understand the possible effects of the current COVID-19 pandemic on travellers' choices of accommodation type (paid peer-to-peer vs. hotel). The work measures the choice of different types of paid peer-to-peer accommodation (full flat vs. shared flat) and the potential mediating role of need for physical distance.	Three experiments including behavioural realism in the dependent variable Europe 2020 (during the COVID-19 pandemic)	After the COVID-19 pandemic, the choice of a paid full flat peer-to-peer accommodation is higher than the choice of a traditional hotel. However, the shared flat peer-to-peer model is the least preferred. Need for physical distance partially mediates the relationship between the pandemic situation and the preferred accommodation type. When actively manipulating physical distance, the detrimental effect of the pandemic on the choice of a hotel room and a shared flat (vs. a full flat in Airbnb) vanishes. The need for physical distance creates a barrier for the traditional social appeal of accommodation types. A possible solution is favouring a non-physical social interaction (i.e. inducing a sense of personal connection via digital tools).

As can be seen in Table 1, the literature has often neglected the type of accommodation (full flat versus shared flat) when analysing the paid peer-to-peer accommodation type. This represents a key aspect after COVID-19. Traditionally, paid peer-to-peer models are classified into three broad groups (Gyödi, 2019): shared rooms, private rooms and entire homes. A shared room generally means that the traveller sleeps in a common space. A private room usually indicates that the traveller is entitled to use a single room in a flat or house. Finally, an entire home generally implies that the traveller has exclusive use of the whole property. COVID-19 and the social/physical distancing requirements are imposing constraints on the first two groups because a portion of travellers are afraid of sharing a house or room with strangers. Therefore, the structure of accommodations (shared house vs. full house) together with the 'negative side' of social/physical interaction and an increasing fear of contagion may dramatically alter the demand for paid peer-to-peer accommodations after COVID-19.

Hypotheses development

A traveller chooses a shared flat when she/he wants to save money and enjoy a shared experience with another individual as a means of experiencing social/physical interactions (Liberman et al., 2007; Liu & Mattila, 2017; Yannopoulou et al., 2013). This is in line with the essence of the peer-to-peer accommodation type. However, the COVID-19 pandemic led to both normative (lock-down and mandatory social/physical distancing) and social constraints (less inclination towards social/physical interactions). Therefore, it is reasonable to infer that, due to the COVID-19 pandemic, travellers will prefer to avoid shared flats in peer-to-peer accommodation types, embracing full flats.

It should be noted that also traditional accommodation types, such as hotels, are characterized by institutional settings that require contact with staff and indirect contact with other travellers in the hotel (Osman et al., 2019). By contrast, the type of full flat/house renting of peer-to-peer accommodation types often requires no interaction with others, and allows for full social/physical distancing from other individuals, especially if it is an isolated structure. Therefore, it is reasonable to assume that in a pandemic scenario the full flat model will be widely used by travellers, and will be preferred to traditional models and shared flats.

Hp. 1. Compared to a non-pandemic situation, in a pandemic situation travellers tend to choose a full flat accommodation over hotels and shared flats.

COVID-19 represents an economic and social shock (Gössling et al., 2020) that, through the imposed lockdown and social/physical distancing, will affect the tourism and hospitality sector from both the business model and customer behaviour standpoints. From a psychological point of view, research indicates that the current pandemic can constitute a paradigm shift in tourists' behaviour and decision-making (Kock et al., 2020). Previous research has found that quarantine measures have negative short- and long-term psychological effects, including anxiety and post-traumatic stress, with even more severe effects for longer quarantines (Brooks et al., 2020).

Previous studies have highlighted the behaviour of travellers with regard to risk of contagion and fear of infectious diseases (e.g., Jonas et al., 2011) and how these affect their choices in tourist accommodation, suggesting that travellers display self-protecting behaviours when threatened by external factors (Cahyanto et al., 2016). As a consequence, people will increasingly look for individual social/physical distancing. The latter phenomena can be viewed as the desire to avoid unnecessary contact and proximity. An entire stream of psychological theories focuses on the effects of different levels of physical distance – the so-called spatial distance theory (Williams & Bargh, 2008). This has been also investigated by the literature on tourist xenophobia, which has been defined as 'a tourist's perceptual discomfort and anxiety associated with people encountered at a destination' (Kock et al., 2020, p. 6). We expect this to be accrued by the fear of being infected and infecting others (Brooks et al., 2020). In fact, fear of contagion has been proposed as the human brain's response to external stimuli (Schimmenti et al., 2020), which influences our behaviours and choices, and thus it will have an impact on travel decisions from now on. Past studies have investigated the perceived health risks related to travels, and how these affect tourists' decisions, which are highly influenced by disease-avoiding behaviour (Griskevicius & Kenrick, 2013; Jonas et al., 2011). Other studies have assessed how tourists behave in trying to limit infection risk (Chien et al., 2017). In a pandemic scenario where scientists showed how infection risks are related to the physical proximity with other persons, need for physical distance might influence tourists' preferences and choices when deciding the type of accommodation.

Based on the above theorizing, we propose need for physical distance as the underlying mechanism behind the enhanced choice of full flats on Airbnb during a pandemic.

Hp. 2. Need for physical distance mediates the relationship between the pandemic situation (or not) and the choice of different accommodation types, such that the higher the need for physical distance the greater the likelihood of choosing a full flat option.

Hosts operating in peer-to-peer platforms and hotel operators need to offer a strategic response to users' new needs (Farmaki et al., 2020). Spatial distance theory (Williams & Bargh, 2008) portrays that physical distance is able to affect choice. If the need for physical distance is an important variable behind the main pandemic-accommodation choice relationship, actively manipulating physical distance should have an impact on the accommodation choice. Specifically, reducing the need for physical distance by providing reassuring guidelines that guarantee physical distance will reduce the concerns towards booking hotels and shared flats even in a pandemic scenario.

Hp. 3. Manipulating physical distance perceptions would alter the relationship between the pandemic situation (or not) and the choice of different accommodation types, such that when physical distance is reduced travellers will reduce their avoidance to hotels and shared flats.

Overview of the studies and conceptual model

Based on the aforementioned literature, Fig. 1 presents our conceptual model.

The research employs three complementary laboratory experiments. This methodological approach is getting more popularity in tourism and hospitality (Fang et al., 2020; Huang et al., 2020). Study 1 investigates whether the presence of the pandemic (or not) influences the type of accommodation chosen, namely a private room in a shared flat [shared flat] vs. in a hotel [hotel] vs. a full flat [full flat], controlling for the price (H1). Study 2 examines whether the need for physical distance mediates this main relationship (H2), while Study 3 tests whether actively manipulating physical distance affects the choice odds towards hotel and shared room (H3). As discussed by Viglia and Dolnicar (2020), a multi-stage complementary experimental research design is essential for probing the theory and establishing external validity of the results. All the three studies have been set up as laboratory experiments. Contrarily to online experiments, this research design presents two main advantages: high internal validity and full control for researchers (Pera et al., 2019). Moreover, laboratory experiments are particularly useful for the identification of psychological processes causing changes in the dependent variable (Hwang & Mattila, 2018).

Study 1

Method

The purpose of Study 1 is to examine travellers' accommodation choice (shared flat in Airbnb vs. hotel vs. full flat in Airbnb) in two different scenarios, namely pandemic situation or not. Hence, the aim of this study is to test H1. Study 1 is a laboratory study run in October 2020 in a large European university, with a sample of participants from different nationalities. We specifically

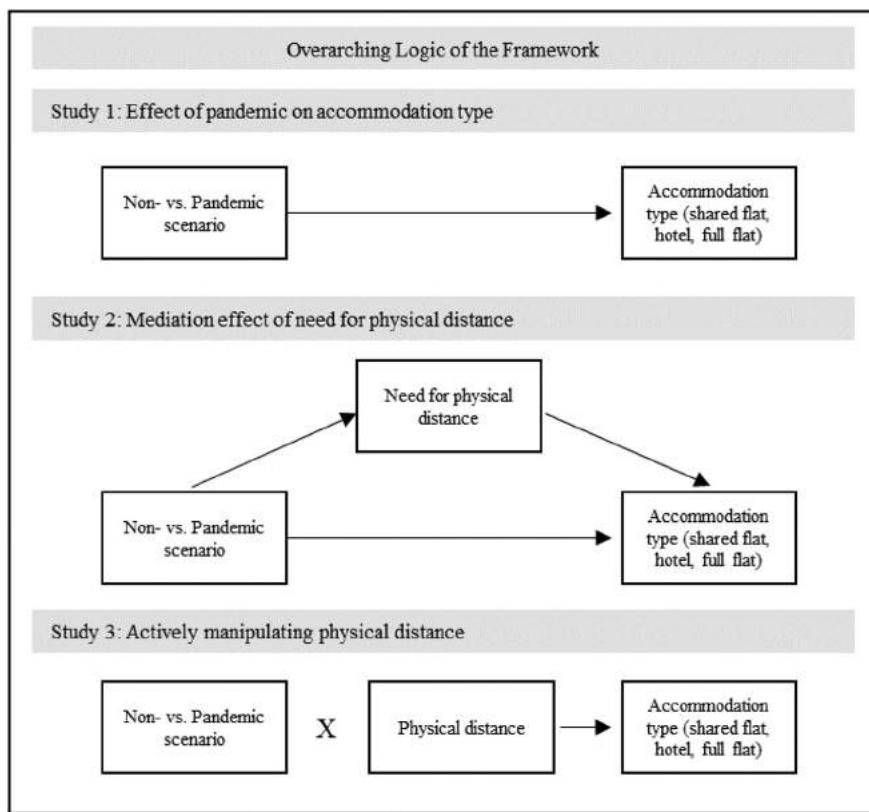


Fig. 1. Conceptual framework.

required prior booking experience as a screening question. This stratified sample includes students and workers, both freelance professionals and employees.

As the goal of the first experiment is to investigate the choice among three different accommodation types depending on the pandemic situation, we made use of three fictitious Airbnb and Booking.com listings based on Pera et al. (2019). To control for the price of the different offerings, we have taken the average prices for the three options from Statista (Statista, 2020 – www.statista.com). Specifically, the price for the shared flat was £ 53 whereas the price for the hotel and the full flat was £ 117. We used comparable offers in terms of number of guests, services and location, as shown in Fig. 2. We told participants they were going to visit the location (London) alone. To avoid any confounding effect, the listings did not contain any other additional information.

The independent variable consisted of two different levels (0 = non-pandemic; 1 = pandemic). Using a between-subject design, participants were asked to think of the pre (vs. during) pandemic times. Afterwards, all participants were shown 3 accommodation choices and they were asked to pick one. Since all the data were collected in October, we asked participants to think of the times before (vs. now during) the pandemic and then they were led to think about their accommodation choice, based on three different offerings: shared flat on Airbnb (-1), hotel on Booking.com (0), and full flat on Airbnb (1). Enhanced behavioural realism (Morales et al., 2017; Viglia & Dolnicar, 2020) was used in the dependent variable by giving 10 Booking/Airbnb vouchers of the value of €50 based on their Booking/Airbnb preference.

Additionally, we collected some demographic data (age and gender) and the nationality of participants (60% of British participants) to control for potential cultural effects. Finally, we included an attention check, i.e., “will the travel take place during the pandemic?”, to see whether participants remembered the situation they were assigned to (pandemic or not).

Results

A total of 134 people participated in the experiment. Of these, 59% were males. In terms of age, 34.3% of the participants were 18–24 years old, 48.5% were 25–34, 11.9% were 35–44, and 5.2% were in 45–54 age group.

The attention check worked as designed, i.e., participants correctly identified the condition they were assigned to (pandemic or not).

We performed a chi-square test of independence in SPSS 27 to examine the relation between the pandemic (or not) scenario and the type of accommodation (shared flat vs. hotel vs. full flat). The relation between these variables is significant, $\chi^2 (1, n = 134) = 37.04, p = 0.001$. Specifically, at their respective average prices (£53 for the shared flat and £117 for the hotel and the full flat), the majority of the respondents preferred shared flat (48,6%) to hotel (33,8%) and full flat (17,6%) in a non-pandemic

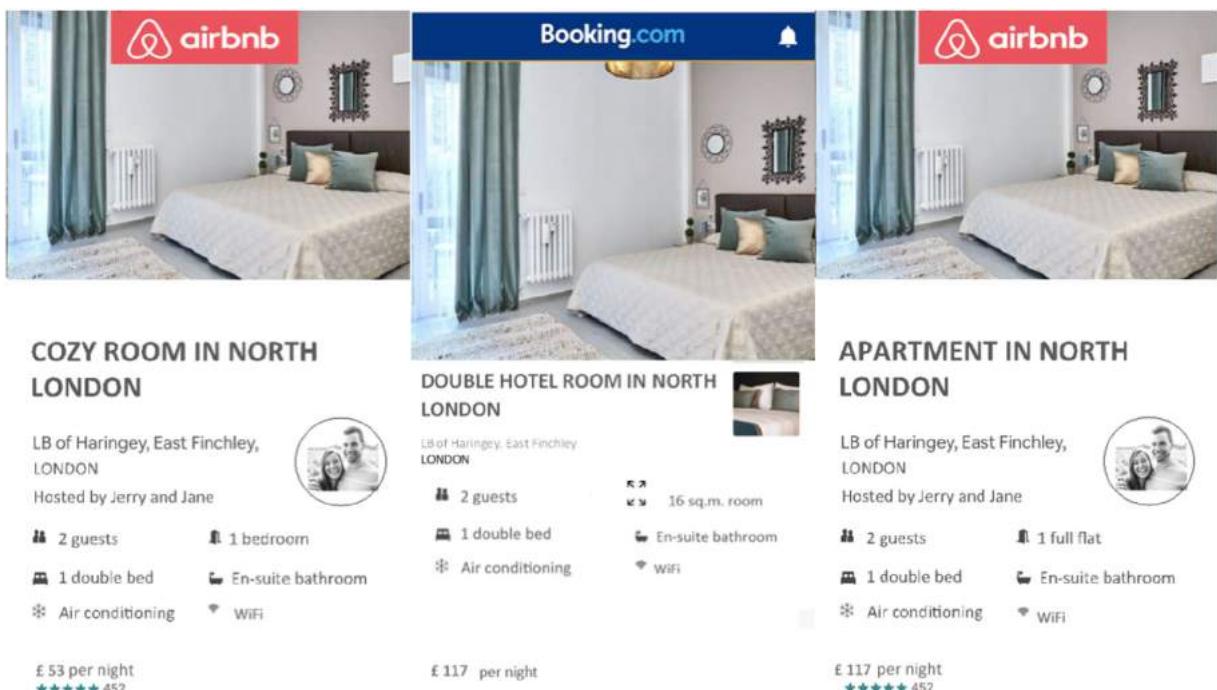


Fig. 2. Stimuli.

situation. However, in the pandemic condition the choices were completely flipped, favouring the full flat (65,1%), to hotel (25,8%) and shared flat (9,1%).

The results of Study 1 indicate that, compared with the non-pandemic situation, in a pandemic situation travellers tend to choose a full flat over a hotel and a shared flat accommodation, thus supporting H1. We do not find any significant results with regard to our demographic variables (age, gender) and cultural variable (i.e., nationality), with the latter that was excluded from the analysis for the sake of parsimony.

Study 2

Study 1 established the preference of tourists for full flats on peer-to-peer platforms (Airbnb) over hotels and shared flats during a pandemic situation. Study 2 investigates whether the personal need for physical distance is the mechanism behind the relationship between a pandemic scenario (or not) and the choice of one of the three accommodation types. This new study tests whether travellers' need for physical distance mediates this relationship, and whether these results change based on the accommodation type. Hence, it tests H2.

Method

The experiment was run in November 2020, using a sample of people registered with the university lab of a South European University who had at least one booking experience on Airbnb or Booking.com. The rationale to run the experiment in a different lab with respect to Study 1 was to exclude the participants who took place to the first experiment to avoid confounding/learning effects. This stratified sample included students and workers, both freelance professionals and employees.

As for Study 1, we included an attention check to measure whether participants recalled the type of scenario (pandemic or not) they were assigned to. The stimuli consisted of the same three types of accommodation advertisements used in Study 1 (Fig. 2). We also gave 10 randomly selected participants a gift card of €50 for their chosen offering (Airbnb/Booking.com).

In addition to the variables used for Study 1, we included our hypothesized mediator 'need for physical distance'. We measured it on a metric slider scale ranging from 1 = strongly disagree to 7 = strongly agree, involving three items. The items were taken from Pfattheicher et al. (2020), and state: "I won't likely be at places where other people will also be"; "I won't visit family members with whom I do not live together"; "I want to minimize close contact between people". Therefore, higher self-report rates reflect higher personal need for physical distance ($\alpha = 0.72$).

Given the multinomial nature of the dependent variable (3 choices), we conducted a multinomial logistic regression in STATA 13, with a mediation analysis to test for hypothesis 2. Specifically, a multinomial logistic regression approach allows estimating the probability of category membership on a dependent variable.

Results

A sample of 119 respondents participated in the study. In terms of gender, 68.1% of these were male while, considering age, 36.1% of the participants were 18–24 years old, 46.2% were 25–34, 13.4% were 35–44, 4.2% were in 45–54 age group.

Attention checks worked as designed, with participants correctly identifying their assigned (pandemic vs. non-pandemic) scenario ($p < 0.01$). As in Study 1, the independent variable assumed the value of 0 in the case of a non-pandemic scenario, and the value of 1 in the case of a pandemic scenario. Hence, the coefficients capture the effect of the pandemic versus the non-pandemic situation.

[Fig. 3](#) illustrates the results. It also presents the simple mediation model for the personal need for physical distance's effect on tourists' choice of type of accommodation, in which the full flat is selected as a reference group. As in Study 1, the coding for the options was −1 for shared flat, 0 for hotel, and 1 for full flat.

The second hypothesis, which postulates that the effect of the scenario situation (pandemic vs. not) on the choice of different accommodation types is mediated by the personal need for physical distance, is partially supported. The overall effect of the scenario (pandemic vs. non-pandemic) condition on choice of different accommodation types is significant (LR chi-squared = 19.22; Prob > chi-squared < 0.01). More precisely, the results show that being in a pandemic scenario (vs. a non-pandemic one) decreases the likelihood of choosing a shared flat ($\beta = -1.403$, $p < 0.01$; SE 0.481; 95% confidence interval [CI] = [−2.346, −0.460]) and a hotel room ($\beta = -1.154$, $p < 0.05$; SE 0.473; 95% CI = [−2.080, −0.227]) compared to the full flat (baseline). For the shared flat, there is also a significant effect of gender, with female showing to be less prone to choose it ($\beta = -1.394$, $p < 0.05$; SE 0.561; 95% CI = [−2.494, −0.295]).

To test for [H2](#), we run a mediation model in STATA 13. Priming with a pandemic (vs. non-pandemic) condition increases the personal need for physical distance ($\beta = 1.013$, $p < 0.01$; SE 0.280; 95% CI = [−0.459, 1.568]). Furthermore, the results show that the need for physical distance decreases the likelihood of choosing a shared flat ($\beta = -0.514$, $p < 0.01$; SE 0.163; 95% CI = [−0.833, −0.195]) and a hotel room ($\beta = -0.395$, $p < 0.05$; SE 0.157; 95% CI = [−0.702, −0.088]) compared to a full flat (baseline). For the shared flat option, it remains a significant effect of gender, with female participants appearing as less willing to book it ($\beta = -1.356$, $p < 0.05$; SE 0.565; 95% CI = [−2.463, −0.248]).

Including the personal need for physical distance in the overall model shows high explanatory power (LR chi-squared = 26.59; Prob > chi-squared < 0.001). Need for physical distance has a negative and significant effect for the shared flat option ($\beta = -0.416$, $p < 0.05$; SE 0.168; 95% CI = [−0.746, −0.087]) and only marginally negative for the hotel option ($\beta = -0.309$, $p < 0.10$; SE 0.162; 95% CI = [−0.626, 0.008]). The effect of the scenario on the choice of different types of accommodation remains barely significant, suggesting a partial mediation (see, for instance, the coefficient for the hotel choice in [Fig. 3](#): $\beta = -0.895$, $p < 0.1$; SE 0.495; 95% CI = [−1.865, −0.075]).

Study 3

Study 2 has provided laboratory evidence of a relationship between the scenario (non-pandemic and pandemic), the personal need for physical distance, and the choice of the three accommodation types. Study 3 actively manipulates physical distance (i.e., manipulation of a mediator in experimental designs – see [Jacoby & Sassenberg, 2011](#)), to investigate whether it affects the strength of the relationship between the pandemic situation and the accommodation choice.

Method

The experiment was run in mid November 2020, using a stratified sample of people registered with a large university lab in a mid-scale European University, who had at least one booking experience on Airbnb or Booking.com. The rationale to run the experiment in a different lab with respect to Study 1 and Study 2 was to exclude the participants who took place to the first experiment to avoid confounding/learning effects.

The stimuli and procedure were exactly the same as the ones used in Study 1 and 2 to avoid the presence of confounding factors. Physical distance was manipulated in two levels as follows. For level 0, the description of the fictitious Airbnb and Booking.com listings was supplemented with the sentence "The access to the accommodation will not require any form of physical touchpoints with other people", thus implying presence of physical distance. For level 1, the supplemental sentence to the description of the fictitious listings was "The access to the accommodation will require physical touchpoints with others". We included a manipulation check to measure whether participants perceived that the physical distance was guaranteed (or not). We also gave 10 randomly selected participants a gift card of €50 for their chosen offering (Airbnb/Booking.com). Finally, we included an attention check to see whether participants remembered the situation they were assigned to (pandemic or not).

Results

A total of 137 respondents participated in the study. Female gender accounted for 54.7% of the sample. In terms of age, 10.9% of the participants were 18–24 years old, 58.4% were 25–34, 27.7% were 35–44, and 2.9% were in the 45–54 range. We first checked for the manipulation. Compared to the "non physical distance condition", participants in the "physical distance condition" expressed significantly higher perception of physical distance ($M_{\text{nondistance}} = 4.48$, $M_{\text{distance}} = 2.93$, $p < 0.01$).

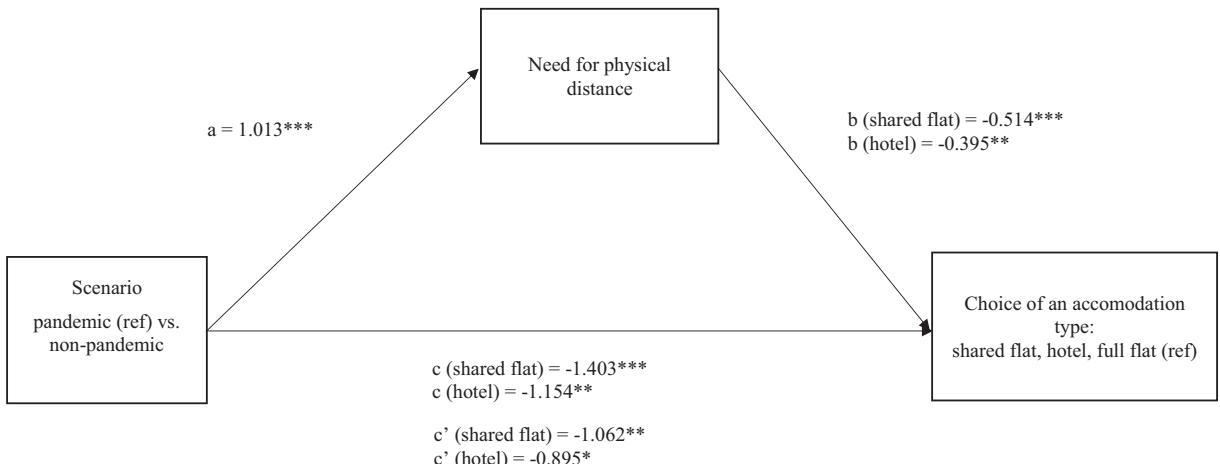


Fig. 3. The impact of different scenarios on tourists' choice of a certain accomodation type and the mediating role of need for physical distance. Note. ref: reference category, * $p \leq 0.1$ ** $p \leq 0.05$ *** $p \leq 0.01$.

Attention checks worked as designed, with participants correctly identifying their assigned (non-pandemic vs. pandemic) scenario ($p < 0.01$).

To test for *hypothesis 3*, given the multinomial nature of the dependent variable (3 options), we conducted a multinomial logistic regression in STATA 13.

Table 2 presents the main results for Study 3. The coding for the variables was consistent with our previous studies: the independent variable was coded as 0 for a non-pandemic scenario, and as 1 for a pandemic scenario; the dependent variable was coded -1 for shared flat, 0 for hotel room, and 1 for full flat.

While the main effect remains consistent to what found in Study 1, including the interaction term between the scenario (pandemic vs. non-pandemic) and physical distance shows how the new compounded variable eats up all the significance (for shared flat $\beta = -2.819$, $p < 0.01$; SE 1.059; 95% CI = $[-4.894, -0.743]$; for hotel $\beta = -1.954$, $p < 0.05$; SE 0.900; 95% CI = $[-3.719, -0.189]$). In other words, the impact of the pandemic on the choice of the accommodation depends on the level of physical distance. As can be seen from the magnitude of the coefficients, the effect is amplified for shared flats, where tourists would clearly need even more assurance compared to hotels.

Discussion and conclusions

This article hypothesizes and finds that - controlling for price - during the pandemic tourists are more inclined to book full flats compared to traditional hotel rooms and shared flats in Airbnb. Furthermore, the paper finds that need for physical distance (Pfattheicher et al., 2020) plays a key role in lessening the concerns to book a hotel room or a shared flat, as can be seen by the manipulated mediation in Study 3.

The results provide two main theoretical implications. First, the paper contributes to the literature on paid peer-to-peer accommodation types (e.g., Dolnicar, 2020; Dolnicar & Talebi, 2020; Ert & Fleischer, 2020; Guttentag et al., 2018), suggesting that this model is not dead but rather will undergo a major change, which is in line with what Dolnicar and Zare (2020) recently proposed. Specifically, the paper adds to the literature on social/physical distance in the accommodation realm (Osman et al., 2019; Pera et al., 2019), highlighting that, due to the COVID-19 pandemic, travellers will increasingly choose the full flat model. This contrasts with the pre-pandemic literature, which suggests that travellers choose peer-to-peer to enjoy social/physical interaction and to live unique social experiences (Tussyadiah & Pesonen, 2016, 2018). Although there are studies on how COVID-19 is impacting peer-to-peer accommodation models, to the best of our knowledge this is the first study focusing on guests. For example, the study of Farmaki et al. (2020) focused on hosts, specifically exploring how COVID-19 is influencing hosts' choices. Second, drawing from psychological theories, this paper has proposed – and found evidence for – the need for physical distance (Pfattheicher et al., 2020) as an important underlying mechanism behind the enhanced choice for full flats on Airbnb during the pandemic. This offers an important contribution to the on-going experimental discourse to understand tourists' responses to COVID-19 (see Nanni & Ulqinaku, 2020). We expect that the need for physical distance will affect travellers and influence their decisions and behaviours in the coming months and years, due to the COVID-19 pandemic. As a consequence, we find an important boundary condition to the work of Liu and Mattila (2017), Tussyadiah and Pesonen (2016) and Yannopoulou et al. (2013) who emphasized the social/physical aspect of paid peer-to-peer models.

The paper offers some actionable implications for operators. First, entire homes are often split into several listings in peer-to-peer models (Horn & Merante, 2017). This leads to inefficiency because, in line with our results, travellers will not choose houses with several rooms rented to different people. Consequently, after COVID-19, we suggest hosts to list entire homes instead of splitting them into different listings. Second, the study shows how the need for physical distance can be actively manipulated.

Table 2

The impact of different scenarios on tourists' choice of a certain accommodation type and explanatory effect of need for physical distance.

Main model (LR chi-squared = 13.27; Prob > chi-squared = 0.1030)					
Independent variables	β	p	SE	95% CI	
DV: type of accommodation chosen (= -1, shared flat)					
Constant	2.309	0.081	1.323	-0.284	4.903
Pandemic**	-1.135	0.011	0.449	-2.016	-0.255
No physical distance **	-0.999	0.026	0.449	-1.879	-0.119
Age	-0.377	0.332	0.039	-0.114	0.039
Female	-0.236	0.595	0.444	-1.106	0.634
DV: type of accommodation chosen (= 0, hotel)					
Constant	1.567	0.236	1.323	-1.026	4.161
Pandemic*	-0.760	0.081	0.435	-1.613	0.094
No physical distance	-0.543	0.211	0.434	-1.394	0.307
Age	-0.026	0.507	0.039	-0.101	0.050
Female	-0.205	0.638	0.437	-1.061	0.651
Model including interaction (LR chi-squared = 22.47; Prob > chi-squared = 0.0129)					
Independent variables	β	p	SE	95% CI	
DV: type of accommodation chosen (= -1, shared flat)					
Constant	1.607	0.230	1.339	-1.019	4.232
Pandemic	-0.013	0.983	0.587	-1.164	1.138
No physical distance	0.167	0.782	0.602	-1.014	1.347
Pandemic x no physical distance ***	-2.819	0.008	1.059	-4.894	-0.743
Age	-0.031	0.427	0.039	-0.109	0.046
Female	-0.265	0.563	0.458	-1.163	0.633
DV: type of accommodation chosen (= 0, hotel)					
Constant	0.932	0.490	1.349	-1.712	3.576
Pandemic	0.244	0.712	0.607	-0.966	1.415
No physical distance	0.473	0.442	0.616	-0.734	1.681
Pandemic x no physical distance **	-1.954	0.030	0.900	-3.719	-0.189
Age	-0.020	0.605	0.039	-0.097	0.057
Female ****	-0.227	0.613	0.448	-1.106	0.652

Note. Type of accommodation chosen (=1, full flat) = baseline. Coefficients in bold represent significant results.

* $p \leq 0.1$.** $p \leq 0.05$.*** $p \leq 0.01$.**** $p \leq 0.001$.

As a result, both peer-to-peer organizations (e.g., Airbnb) and hotels will need to adjust their communication strategies by highlighting guaranteed cleanliness and hygiene aspects, as well as emphasizing measures put in-place to assure physical distance. Indeed, in our experimental Study 3, the variable physical distance proves to be effective in eating up the significance of the pandemic on the different travel choices. Based on our findings (Study 2), women seem to be even more concerned to book a shared flat after the pandemic; thus they represent a priority target to be reassured. Third, hosts will need to rethink their business model to address how the shift from shared flat to full flat will impact their revenues and margins. This will have implications for pricing strategies and margins as, most likely, renting an entire house will generate lower revenues compared with renting several rooms separately. In addition, shared houses (with the host or other individuals) will have to be adapted to meet current regulations and, crucially, to ease the fear of the guests and to second their self-protecting tendency. In a pandemic period, in order to have social interaction and social/physical closeness continuing to motivate the choice of certain types of peer-to-peer accommodation, it might become important to transpose the human connection – that so far was mainly physical – to computer-mediated forms (e.g. connection with hosts in digital form only).

The paper presents some limitations that open up for a rich future agenda. While we have included behavioural realism in the dependent variable by giving a specific incentive (Booking/Airbnb voucher) based on participants' choices, the studies were undertaken during the COVID-19 pandemic, and therefore it was impossible to organize a field study. Future studies might want to look at actual behaviour by collaborating directly with Booking.com and Airbnb. Trying to collaborate with operators directly has been proved difficult for their data policy sharing issues. This might change in the near future due to the pressure to openly share data. At the moment of writing, a promising signal in this sense is the European Commission's announcement ([European Commission, 2020](#) – March) to have reached a landmark data-sharing agreement with vacation and collaborative economy platforms (i.e., Airbnb, Booking.com, Expedia Group and TripAdvisor), which will allow the EU's statistical office – Eurostat – to publish data on short-stay accommodations offered via these platforms. Additionally, it can be argued that full-flats, shared flats, and private hotel rooms serve different needs and people would self-select into these categories a priori. However, what we observe, with a sample of randomized participants, is a clear shift from a model to another (shared flats and hotel room vs. full flats), depending purely on the pandemic situation, i.e., controlling for average price levels and demographical/cultural variables. While

results are robust to different European locations, hotel lobbies are rather different in the US and this might affect tourists' perceptions towards hotels. Finally, the proposed model might appear *naïf* and even obvious/trivial. Nevertheless, to the best of our knowledge, this is the very first study that measures the variation in the tourists' accommodation choice due to the pandemic. A future avenue is introducing a price sensitivity analysis to figure out the necessary price variation that would rebalance accommodation choice.

Declaration of competing interest

None.

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The theme park experience: An analysis of pleasure, arousal and satisfaction

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Received 24 September 2003; accepted 11 May 2004

Abstract

This article analyses how visitor emotions in a theme park environment influence satisfaction and behavioural intentions. Emotions consist of two independent dimensions, i.e. pleasure and arousal. Two competing models were tested. The first model is derived from the environmental psychology research stream as developed by (An Approach to Environmental Psychology, MIT Press, Cambridge, 1974), where the visitor's arousal generates pleasure and, in turn, approach/avoidance behaviour. This emotion-cognition model is supported by Zajonc and Markus (1984). The second model to be tested is based on Lazarus' (Emotion and Adaptation, Oxford University Press, New York, 1991) cognitive theory of emotions. In this latter model, emotions are elicited by visitors' disconfirmation of the theme park. Using confirmatory factor analysis, it was supported that the cognitive theory of emotions better explains the effect of pleasure on satisfaction and loyalty. Additionally, consumers' willingness to pay more for the service is more likely to be induced by disconfirmation than by satisfaction alone. Managerial implications concerning the cognitive-affective sequence of satisfaction are discussed.

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Keywords: Emotions; Satisfaction; Behavioural intentions; Tourist behaviour; Spain; Theme park

1. Introduction

Satisfaction research has recognized the need to incorporate both affective and cognitive components in modelling consumer satisfaction (Wirtz, Mattila, & Tan, 2000). It is suggested that a purely cognitive approach may be inadequate in modelling satisfaction evaluations, so it is particularly important to include emotional variables (Liljander & Strandvik, 1997; Oliver, Rust, & Varki, 1997; Wirtz & Bateson, 1999). However, to date, there is a lack of research on the emotional effects affecting consumer satisfaction and behavioural intentions when consumers are involved in a service setting. Because consumers interact with the

service environment and personnel during the consumption experience, understanding consumers' affective responses becomes critical (Szymanski & Henard, 2001; Wirtz et al., 2000; Zins, 2002). Such understanding is paramount in tourism services, with important emotional involvement regarding the tourist experience (Barsky & Nash, 2002; Ryan, 1999).

Focusing on tourists' subjective experiences (Vittersø, Vorkinn, Vistad, & Vaagland, 2000; Gnoth, Zins, Lengmueller, & Boshoff, 2000a, 2000b), the need to integrate cognitive and emotional concepts in order to explain tourist satisfaction and behavioural intentions is highlighted (Zins, 2002). In fact, one of the objectives of marketing and applied social sciences is to develop knowledge to influence behaviour. Early studies have focused on understanding the bases of action from a theoretical standpoint. Work on behavioural intentions goes back to research carried out by Fishbein and Ajzen

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(1975), who investigated the relationship between beliefs, attitudes, intention and behaviour. Before 1980, the theory was known as the Fishbein–Ajzen behavioural intentions model or as the extended model, which forms part of the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980). The TRA makes ‘attitude-towards-behaviour’ a determinant of intentions and introduces a second determinant, which is referred to as the subjective norm. The latter is the internalised influence of people who are important to a respondent. The Theory of Planned Behaviour (TPB) introduces a further determinant of intention called perceived behavioural control (Ajzen, 1991). A recent study by Perugini and Bagozzi (2001) goes into greater depth and expands the TPB by integrating the achievement of personal goals and introducing emotional variables (i.e. anticipated emotions) as important antecedents in decision-making processes.

Although researchers agree on the importance of relationships between emotional variables, consumer satisfaction and behavioural intentions, there are no conclusive findings. Furthermore, the interplay between emotions and cognition is still unresolved Chebat and Michon (2003). This knowledge gap motivated the present research, whose conceptual contribution involves the identification and development of theoretical linkages between these variables. Drawing on the revision of studies coming out of psychology and marketing (e.g., Bagozzi, Gopinath, & Nyer, 1999; Liljander & Strandvik, 1997; Perugini & Bagozzi, 2001), interesting inter-relationships of emotions with consumer satisfaction and behavioural intentions are to be found. The main purpose of this study is to propose a model that explains the cognitive–affective determinants of satisfaction and their consequences. First of all, a conceptual framework of cognition, emotions and satisfaction is presented. Based on previous studies, two competing models combining emotions and cognition are tested using confirmatory factor analysis. The empirical study is applied in a sample of 200 visitors to a theme park. Theme parks are considered a form of leisure activity because they provide an opportunity for entertainment during an individual's discretionary free time (Milman, 1991). According to Milman (2001) the popularity of theme park and attractions will continue to grow, as they are increasingly associated with new vacation experiences.

2. Conceptual framework and research hypotheses

This research deals with the nature of emotions, disconfirmation and consumer satisfaction, as well as the relationships between them. The principal theories that explain such concepts are explained, because they constitute the theoretical basis for the model. Specifi-

cally, a literature review of the appraisal theories of emotions (see Bagozzi et al., 1999), the cognitive approach to satisfaction (principally, the disconfirmation paradigm) and literature in favour of an affective approach to satisfaction (Westbrook, 1987; Wirtz & Bateson, 1999), all suggest the importance of studying cognitive–affective modes in behaviour formation. Given the diversity of affective variables (Cohen & Areni, 1991), this study centres on emotions. Emotions are considered to be more intense than moods in their relationship to the stimuli that they are provoked by Batson, Shaw, and Oleson (1992).

Emotions consist of two independent dimensions, i.e. pleasure and arousal (Russell & Pratt (1980)), and it is evidenced that arousal influences pleasure Chebat and Michon (2003). A dimensional approach to explaining emotions is reasonable, based on previous studies (Menon & Kahn, 2002). The dimensional approximation presumes that the emotional space is made up of a limited number of non-specific dimensions, such as pleasure, arousal and dominance (Mehrabian & Russell, 1974; Russell, 1980). In recent marketing studies, there has been considerable consensus in respect to their bi-dimensional character (Mano & Oliver, 1993; Mattila & Wirtz, 2000; Wirtz & Bateson, 1999), and this reflects the degree to which different individuals incorporate subjective experiences of pleasantness/unpleasantness and activated/deactivated subjective feelings into their emotional experiences (Feldman, 1998). Whereas pleasure refers to the degree to which a person feels good, joyful or happy in a situation, arousal refers to the extent to which a person feels stimulated and active. In this study, the emotions were measured based on Russell's model (1980), which comes out of environmental psychology (Mehrabian & Russell, 1974), and has been used in later research in marketing (Wirtz & Bateson, 1999; Wirtz et al., 2000). It appears to have a number of advantages for conceptualising service experiences over its competing models, which may be one reason for its popularity in services research (Wirtz & Bateson, 1999).

Consumer satisfaction is a concept that has been widely debated in the literature (Bowen, 2001; Kozak, 2001; Oliver, 1997; Ryan, 1995; Yuksel & Yuksel, 2001). Many studies have suggested definitions without any real consensus (Giese & Cote, 2000), and this leads to a situation of a certain ambiguity as to the nature of satisfaction (Babin & Griffin, 1998). Traditionally satisfaction was considered to be a cognitive state, influenced by cognitive antecedents, and with a relative character, i.e. it is the result of the comparison between a subjective experience and a prior base of reference (Oliver, 1980). Recently, the need to understand satisfaction from a more affective perspective has been highlighted always in connection with cognitive influences (Oliver et al., 1997; Phillips & Baumgartner, 2002; Wirtz & Bateson, 1999). In view of previous studies,

consumer satisfaction can be defined as a cognitive-affective state resulting from cognitive evaluations (including disconfirmation), as well as from emotions these evaluations evoke.

Disconfirmation means that the results of a service experience are inferior (or superior) to what was expected by the consumer when he/she made a decision to purchase (Oliver, 1997). This will have negative (or positive) implications for the evaluation of the service experience. Consumers select services in the hope that these services will offer a series of benefits. The relationship between disconfirmation and emotions has been contrasted in previous studies (Menon & Dubé, 2000; Oliver et al., 1997; Wirtz & Bateson, 1999), corroborating the positive relationship between the magnitude of the disconfirmation and the intensity of the emotion in order to explain consumer satisfaction (Woodruff, Cadotte, & Jenkins, 1983). It would therefore seem coherent to assume that a service short of performance expectations can cause displeasure, and that performance exceeding expectations can cause pleasure (Wirtz & Bateson, 1999). Although this cognitive and affective sequence shows a cognitive appraisal and then creates the emotions, there is evidence for approaching this issue the other way around, i.e. emotions do not always need cognitions (Zajonc (1980).

The debate between the cognitive and affective sequence is an acknowledged and re-emerging research issue (Chebat & Michon, 2003; Dubé, Cervellon, & Jingyuan, 2003). Two schools of thought are confronted in this debate. On one hand, there is the emotion-cognition approach. Zajonc and Markus (1984) contend that an emotion can be generated by biological, sensory or cognitive events. Arousal and motor activities are the 'hard' representations of emotions. The experience of emotion, which requires a cognitive input, is the 'soft' representation of affect. Only arousal is a necessary consequence of the generation of emotion. For Zajonc and Markus (1984), the experience of emotion is simply the cognition of having an emotion. On the other hand, the cognition-emotion school of thought (Lazarus, 1991) posits the causal role of cognition as a necessary but not sufficient condition in order to elicit emotions. External and internal cues must be appraised in terms of one's own experience and goals. "Appraisal of the significance of the person-environment relationship, therefore, is both necessary and sufficient; without a personal appraisal (i.e., of harm or benefit) there will be no emotion; when such an appraisal is made, an emotion of some kind is inevitable" (Lazarus, 1991 p. 177).

In line with the above, a series of hypotheses on the cognitive-affective sequence of satisfaction are proposed, taking into account the two schools of thought. Both perspectives are brought together in two competing models combining emotions and cognition. In the first model, the positive arousal felt by the visitor

influences the visitor's perceptions of the theme park (i.e. disconfirmation) and pleasure. The competing model hypothesizes that disconfirmation influences visitors' arousal, thus enhancing visitors' pleasure. Figs. 1 and 2 show the two competing models. In the first model (see Fig. 1) it is assumed that, independently of appraisal (e.g. disconfirmation), arousal influences visitors' satisfaction through the pleasure dimension. Russell, 1980 found that pleasure and arousal were independent dimensions. Berlyne (Berlyne, 1971; Berlyne, 1974;) hypothesized that arousal influences pleasure. The path from arousal to pleasure is verified in current marketing studies (Babin & Attaway, 2000; Chebat & Michon, 2003; Wakefield & Baker (1998)).

Pleasant feelings are not necessarily correlated with strong arousal (Dubé, Chebat, & Morin (1995); Spangenberg, Crowley, & Henderson (1996)). Considering the large spectrum of arousal, the influence of arousal over pleasure may be either positive or negative (Chebat & Michon, 2003). However, assuming an amusing (enjoyable) theme park experience, the effect of arousal on pleasure should be positive. More formally,

Hypothesis 1. Positive arousal should positively influence visitor pleasure.

Several researchers in psychology (Kahneman, 1973; Mano, 1992, Sanbonmatsu & Kardes, 1988) have

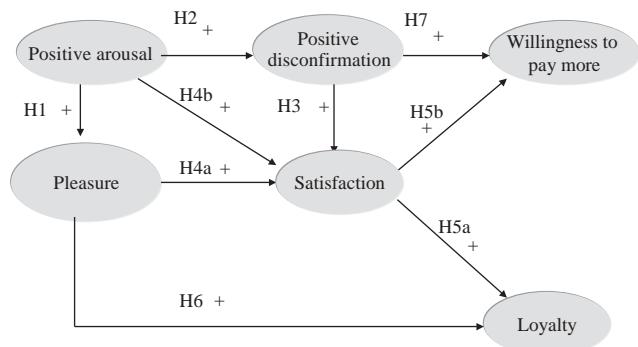


Fig. 1. Proposed model—Model 1.

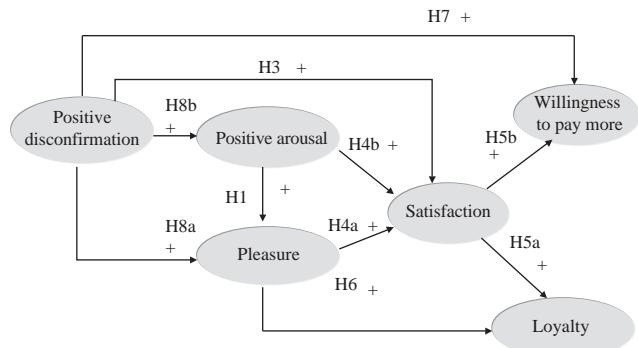


Fig. 2. Competing model—Model 2.

examined the relationship between arousal and subsequent information processing. For example, Kahneman (1973) found that more arousing stimuli elicit more attention and more elaborate network encoding in memory than less arousing stimuli. This is consistent with the view that a positive arousal is expected to provoke a favourable perception of the theme park environment, under the approach/avoidance model (Mehrabian & Russell, 1974; Donovan & Rossiter (1982)). Hence, Hypothesis 2 is stated.

Hypothesis 2. Visitor arousal contributes to positive disconfirmation, which is derived from cognitive evaluations of their theme park experience.

Research into consumer satisfaction from a cognitive point of view has been dominated by the disconfirmation paradigm. This paradigm suggests that consumer satisfaction is a result of the comparison between the perceived performance with some standard before the consumption. A direct causal relationship between disconfirmation and satisfaction has been empirically confirmed (Cadotte, Woodruff, & Jenkins, 1987; Bowen, 2001; Szymanski & Henard, 2001), and therefore this relationship is modelled in the present study as follows:

Hypothesis 3. Positive disconfirmation contributes to the levels of consumer satisfaction.

Whereas the early models of satisfaction were centred mainly on the cognitive processes in order to understand and explain consumer satisfaction (Oliver, 1980), there is also theoretical support for linking emotions with satisfaction (Mano & Oliver, 1993; Liljander & Strandvik, 1997; Erevelles, 1998; Phillips & Baumgartner, 2002; Westbrook & Oliver, 1991). In line with previous research, the proposed model points out that, together with the cognitive component, the emotions (pleasure and arousal) positively impact satisfaction. Therefore,

Hypothesis 4a. The pleasure dimension positively influences visitor satisfaction.

Hypothesis 4b. The arousal dimension positively influences visitor satisfaction.

Based on a multi-stage model of consumer behaviour (Moutinho, 1987; Woodside & King, 2001), the evaluation typically results in strong feelings of dissatisfaction, which has ramifications for tourists coming back or switching to other tourism attractions and for telling others about favourable or unfavourable parts of their experiences (Baker & Crompton, 2000; Kozak, 2001). Given that the cost of retaining an existing customer is less expensive than prospecting for a new customer (Spreng, Harrell, & Mackoy, 1995), behavioural intentions are a very important consideration for marketers. Behavioural intentions are directly influenced by customer satisfaction (LaBarbera & Mazursky, 1983), and

some authors suggest that satisfaction is more influential in forming one's behavioural intentions than service quality (Cronin & Taylor, 1994). Most marketing scholars studying behavioural intentions distinguish different behavioural dimensions, such as loyalty and willingness to pay more (Zeithaml, Berry, & Parasuraman, 1996; Wakefield & Blodgett, 1999; Baker & Crompton, 2000; Dean, Morgan, & Tan, 2002). In summary,

Hypothesis 5a. Visitor satisfaction positively influences the loyalty towards the theme park.

Hypothesis 5b. Visitor satisfaction positively influences the willingness to pay more.

Few empirical studies include both affect and cognition as mediators to consumer behaviour. Some marketing scholars have studied the influence of positive emotions as a moderating variable in the relationship between satisfaction and brand loyalty (Bloemer & de Ruyter, 1999; Oliver et al., 1997), but these are centred solely on positive emotions. The sixth hypothesis is congruent with the approach/avoidance model (e.g., Mehrabian & Russell, 1974) and findings by Donovan & Rossiter (1982). It is believed that visitors deriving pleasure from the experience are more likely to exhibit positive behavioural intentions, such as positive word of mouth and intention to return (i.e. loyalty). Therefore,

Hypothesis 6. The pleasure dimension positively influences visitors' loyalty behaviour.

While there is a significant body of scientific research on the effects of disconfirmation on satisfaction, the research corpus on the effect of disconfirmation on behavioural intentions is much more limited. In the marketing literature, the cognitive sequence of disconfirmation–satisfaction–intentions have been given only passing attention among effects and co-occurrences of satisfaction (Baker & Crompton, 2000; Oliver et al., 1997). Considering that theme parks charge a pay-one-price admission fee to visitors (Camp, 1997), the appropriateness of the perceived price versus what customers really receive (i.e. disconfirmation) remains an interesting and practical issue. Regarding willingness to pay more (Zeithaml et al., 1996; Baker & Crompton, 2000; Dean et al., 2002; Wakefield & Blodgett, 1999), it is supposed that visitors who positively evaluate their theme park experience (positive disconfirmation) are more likely to pay more for the entertainment service. The following hypothesis summarises this expectation:

Hypothesis 7. Positive disconfirmation contributes to the levels of willingness to pay more.

The competing model (Fig. 2) assumes that the disconfirmation or appraisal construct is an antecedent to visitor emotions. Marketing scholars such as Bagozzi

& Moore, 1994 and Bagozzi et al. (1999) have relied on the cognitive theory of emotions to explain consumer behaviour. Consistent with this argument, the following eighth hypothesis is proposed:

Hypothesis 8a. The visitor's positive disconfirmation contributes to the feelings of pleasure.

Hypothesis 8b. The visitor's positive disconfirmation contributes to feelings of positive arousal.

Hypothesis 2 in the proposed model (see Fig. 1, Model 1) posits that the arousal dimension of emotions is an antecedent to cognition (e.g. Zajonc & Markus, 1984), whereas Hypotheses 8a and 8b, in the competing model (see Fig. 2, Model 2), assume that cognitive processes (i.e. disconfirmation) influence both dimensions of emotions (e.g., Lazarus, 1991).

3. Research methodology

3.1. Research approach and sampling frame

As a basis for the methodological approach the present study follows a positivist paradigm. The test of the competing models is carried out by means of an empirical study in the area of leisure and tourism services which, given its hedonic nature (Ryan, 1997; Wakefield & Blodgett, 1999; Gnoth et al., 2000a, 2000b), generates consumer emotions (Hirschman & Holbrook, 1982; Goossens, 2000; Mattila & Wirtz, 2000). Research on tourism attractions is interesting due to the fact that these services allow studying emotional reactions in consumers (Otto & Ritchie, 1996; Vittersø et al., 2000). Moreover, in recent years, the leisure and tourism industry has faced intense competition from a wide range of rapidly emerging innovative leisure products (Milman, 2001; Stevens, 2000). The applied study of visitor experiences in the theme park industry is therefore of theoretical and practical interest.

The intrinsic peculiarities of emotions and consumer satisfaction during a service experience have an effect on research methodology. Thus, a qualitative and quantitative approach has been adopted (Bigné, 2000). On the one hand, ten in-depth interviews were carried out with employees as well as with visitors of theme parks. In addition, two consumer focus groups were set up, with the objectives of analysing visitor experience in tourism attractions, and of marking out as precisely as possible the characteristics of possible responses to the questionnaire used in the quantitative research. On the other hand, a quantitative focus was adopted. Specifically, personal interviews were conducted inside the theme park, i.e., during the experience of the service itself, as the stimulus that evokes visitor emotions. The use of questionnaires for gathering information on consump-

tion emotions is based on the retrieval hypothesis (Solomon, Bamossy & Askegaard (1999)), i.e., by identifying the evaluation of the visitor interviewed during his/her visit to the theme park.

Survey data were collected in a Spanish-Mediterranean theme park from consumers aged 18 or older. A theme park setting was selected as an ideal location for the aim of the study since these parks are generally associated with highly emotional experiences (McClung, 2000). The theme park where the fieldwork was carried out covers a surface area in excess of one million square meters. Inside the theme park, there are attractions for children and adults, shows, restaurants and shops. With the goal of providing a greater sensation of reality, the use of modern technology applied to this type of settings is especially evident: special effects, animated robots, three-dimensional imaging, among others. At the same time, the atmosphere and the activity in the theme park contribute to having the visitors enjoy, generally speaking, an active participation. Visitors usually spend one day in the theme park. In fact, 81% of the visitors interviewed responded that they had spent the whole day there.

Duly trained interviewers arranged the interviews, which were conducted during the 2001 summer season. With the objective of getting up close to the stimuli that triggered the emotions that the consumer experiences as a visitor during his/her enjoyment of the attractions, the interviews were carried out in situ. An interviewer was stationed outside the entrance to the attraction; the interviewees, 200 consumers over the age of 18 (48.5% male, 51.5% female), were selected at random. Other socio-demographic characteristics are as follows: age group 18–34 years (41%), 35–54 years (56%), 55 and older (3%); regarding respondents' monthly incomes, the percentages were: below, similar to, and above US\$ 1082 (26.1%, 32.2% and 41.7%, respectively), and regarding nationality: 91.3% Spanish and 8.7% international visitors. Visitors were mainly accompanied by their families (79.8%) or friends (18.2%).

3.2. Questionnaire and measurement scales

Together with the classification questions related to the socio-demographic variables and the theme park experience (duration of stay, previous experience in theme parks, travel companion, etc.), multiple-item scales of the different constructs dealt with in the proposed conceptual model (emotions, disconfirmation, consumer satisfaction, and behavioural intentions) were included in a structured questionnaire. These constructs were measured as follows.

Emotions were measured by twelve items (Russell, 1980), representing the pleasure and arousal dimensions. Pleasure was measured with a 5-point semantic differential scale, with the following six items: angry–satisfied;

unhappy–happy; dissatisfied–very pleased; sad–joyful; disappointed–delighted, and bored–entertained. Analogously, six items measured arousal: cheerful–depressed; quiet–anxious; enthusiastic–calm; nervous–relaxed; active–passive, and surprised–indifferent.

Perceived disconfirmation was measured using 2 items: Oliver's (1980) 5-point semantic differential scale ranging from "overall, the amusement service was worse than expected" to "better than expected", and Churchill & Surprenant's (1982) 5-point semantic differential scale ranging from "overall, my expectations about the theme park were too high: it was poorer than I thought" to "too low: it was better than I thought".

Satisfaction was measured on a five-item, 5-point Likert-type scale based on Oliver's (1997) scale: (1) this is one of the best theme parks I could have visited, (2) I am satisfied with my decision to visit this theme park, (3) my choice to visit this theme park was a wise one, (4) I have really enjoyed myself in this theme park, and (5) I am sure it was the right thing to visit this theme park.

Behavioural intentions were measured using the Zeithaml et al. (1996) scale. Specifically, loyalty and willingness to pay more were selected, with four and two items, respectively. The loyalty items were: (1) say positive things about the theme park, (2) recommend this theme park, (3) encourage friends and relatives to visit it, and (4) come back to this one in the future. Items for measuring willingness to pay more were as follows: (1) come back to the theme park even if the price increases, and (2) pay a higher price than for other services for the benefits of this theme park.

4. Results

4.1. Measurement analysis

Regarding emotions, and in particular, the *pleasure* dimension, the Cronbach alpha turned out to be high ($\alpha = .91$); in contrast, the reliability of *arousal* with 6 items was low ($\alpha = .68$). Reviewing the values obtained in other studies that have used these scales, it became evident that in these studies the reliability coefficient of arousal was also lower than that obtained for pleasure. For instance, in the study carried out by Dawson, Bloch & Ridgway (1990), the dimension of pleasure achieved a Cronbach's alpha coefficient of .72, whereas for arousal the value of α obtained was .64. In research carried out by Oliver et al. (1997), the α values corresponding to arousal were also low (Study 1: $\alpha = .56$, Study 2: $\alpha = .67$), while the pleasure dimension reached higher values (Study 1: $\alpha = .89$, Study 2: $\alpha = .84$). To improve the reliability for arousal, it was necessary to eliminate two items ($\alpha = .74$). The validity test based on the ten-item scale through the second-order confirmatory factor

analysis (CFA), used the EQS program (Bentler 1995; Byrne, 1994). The dimensionality, construct reliability (pleasure and arousal were: $\rho_c = .93$ and $\rho_c = .80$, respectively), and convergent validity ($S-B\chi^2_{(34)} = 75.04$, $p < .01$, NFI = .94, NNFI = .95, GFI = .92, AGFI = .87, CFI = .96, RMSEA = .08) were verified.

The test for content validity of *disconfirmation* derived from its domain specification in previous literature (see Oliver, 1997), resulted in a relatively low Cronbach's alpha coefficient ($\alpha = .67$). With regard to *overall satisfaction*, content validity, exploratory reliability ($\alpha = .90$), construct reliability ($\rho_c = .90$), unidimensionality, and convergent validity ($S-B\chi^2_{(5)} = 8.03$, $p = .15$, NFI = .98, NNFI = .98, GFI = .98, AGFI = .94, CFI = .99, RMSEA = .07) are all supported. Regarding behavioural intentions, *loyalty* and WPM were also reliable, with 4 ($\alpha = .90$) and 2 items ($\alpha = .87$), respectively.

After analysing each measure separately, a CFA was performed, first of all, with the 23 measurement variables combined into a single factor. The robust Maximum Likelihood was selected for an estimation algorithm. The results obtained in this model were compared with those obtained for the six-factor model (disconfirmation, pleasure, arousal, satisfaction, loyalty and willingness to pay more). The single factor model showed clearly unsatisfactory goodness of fit indices ($S-B\chi^2_{(230)} = 1133.54$, $p < .01$, NFI = .59, NNFI = .59, GFI = .55, AGFI = .46, CFI = .63, RMSEA = .16, AIC = 1005.07). On the contrary, the 6-factor measurement model showed a reasonable fit ($S-B\chi^2_{(215)} = 401.30$, $p < .01$, NFI = .87, NNFI = .91, GFI = .84, AGFI = .80, CFI = .93, RMSEA = .07, AIC = 32.08).

Once the fit of the six-factor measurement model was verified, the construct reliability and construct validity were estimated. First of all, following the recommendations by Anderson & Gerbing (1988) and Hair, Anderson, Tatham, & Black (1995), the construct reliability (ρ_c) is calculated for each factor. These results are shown in Table 1. Taking into account that values above .6 are considered sufficiently appropriate (Bagozzi & Yi, 1988), the scale reliability is verified. Therefore, the items proposed for measurement of the latent variables are providing consistent measures. Second, a scale has construct validity when it has convergent, discriminant, and nomological validity (Peter, 1981; Steenkamp & van Trijp, 1991). Convergent validity exists when the different items of the same latent variable are strongly correlated. Scale convergent validity can be verified by checking the t tests of the factor loadings in such a way that if all of the factor loadings of the manifest variables that are measuring the same construct are statistically significant, they serve as evidence to support the convergent validity of these indicators (Anderson & Gerbing, 1988). In this study, all of the factor loadings are significant for $p < .001$.

Additionally, all of the loadings are above .5, which means convergent validity of all the scales used (Steenkamp & van Trijp, 1991).

The discriminant power of the six factors was assessed based on confidence intervals (Anderson & Gerbing, 1988). All possible correlations between the six factors represented in the scales were calculated, as well as the confidence interval ± 2 standard errors. The condition that there can be no values of 1 within the interval was met in the present research, thus confirming the discriminant validity of the scales analysed. Finally, scales show nomological validity when the construct being measured is capable of bringing to light relationships with other constructs which, conceptual or theoretically, should exist (Peter, 1981). This type of validity needs to be based on theoretical relationships, and for this reason this analysis was consigned to be dealt with after the estimation of the theoretical model, and will be discussed further below.

To illustrate the cognitive and affective paths of the visitor's theme park experience, structural equation modelling (SEM) was used. The variables described in Table 1 were entered in both models. Maximum

Likelihood (ML) Confirmatory Factor Analysis was performed. The ML solution maximizes the probability that the observed covariances are drawn from a population that has its variance-covariances generated from the process implied by the model, assuming a multivariate normal distribution. According to (Golob, 2003, p. 8), "corrections have also been developed to adjust ML estimators to account for non-normality". The competing models were set up and estimated with EQS for Windows 5.7b (Bentler, 1995).

A moderate violation of multivariate kurtosis assumptions showed up in the study sample (Mardia's coefficient 10.42), which could have led to overestimation of chi-square, underestimation of fit indices and underestimation of standard error of parameter estimates (Dubé et al., 2003; West, Finch, & Curran, 1995). Thus, this study utilizes the Satorra–Bentler Scaled chi-square (S-B Scaled χ^2) and robust Comparative Fit Index (Robust CFI), robust statistics and fit indices that are corrected for abnormality. Among the common programs (Hox, 1995), EQS produces a robust chi-square and standard errors to handle non-normal data (Bentler, 1995).

Table 1
Construct measurement summary: CFA and scale reliability^a

Item	Item description summary	Mean	Std. deviation	Std. loading	<i>t</i> value
<i>Disconfirmation ($\rho_C = .70$)</i>					
DISC1	Worse/better than expected	3.44	1.18	.87	10.90
DISC2	Poorer/better than I (had) expected	2.99	1.01	.58	6.83
<i>Pleasure ($\rho_C = .93$)</i>					
PLEA1	Angry–satisfied	3.88	.92	.86	14.74
PLEA2	Unhappy–happy	3.94	.84	.87	13.10
PLEA3	Dissatisfied–very pleased	3.87	.89	.84	14.18
PLEA4	Sad–joyful	3.93	.94	.85	14.12
PLEA5	Disappointed–delighted	3.92	.89	.81	13.67
PLEA6	Bored–entertained	3.96	.89	.81	12.47
<i>Arousal ($\rho_C = .80$)</i>					
AROU1	Depressed–cheerful	3.96	.90	.82	13.84
AROU2	Calm–enthusiastic	3.60	1.08	.55	7.64
AROU3	Passive–active	3.83	.98	.82	14.23
AROU4	Indifferent–surprised	3.56	.93	.60	8.22
<i>Satisfaction ($\rho_C = .91$)</i>					
SAT1	This is one of the best theme parks I have ever visited	3.10	1.15	.52	7.81
SAT2	I'm pleased to have visited this theme park	3.74	.87	.87	13.02
SAT3	I was a good idea to visit this theme park	3.72	.95	.86	12.81
SAT4	I have really enjoyed myself at this theme park	3.68	.94	.89	13.88
SAT5	I don't regret having visited this theme park	3.71	1.03	.88	15.87
<i>Loyalty ($\rho_C = .90$)</i>					
LOY1	Say positive things about the theme park	3.88	.76	.92	11.37
LOY2	Recommend this theme park	3.92	.76	.94	11.28
LOY3	Encourage friends and relatives to visit it	3.88	.75	.85	10.13
LOY4	Come back to this one in the future	3.46	.99	.58	7.68
<i>Willingness to pay more ($\rho_C = .87$)</i>					
PAY1	Come back to the theme park even if the price increases	3.05	1.09	.93	13.99
PAY2	Pay a higher price than for otherservices for the benefits of this theme park	2.97	1.10	.82	10.88

^aFit statistics for measurement model of 23 indicators of 6 constructs: S-B $\chi^2_{(215)} = 401.30$, $p < .01$, NFI = .87, NNFI = .91, GFI = .84, AGFI = .80, CFI = .93, RMSEA = .07, AIC = 32.08.

4.2. Hypothesis testing

Model 1

In the first model, where emotions are antecedent to cognition, the effect of arousal on visitor disconfirmation is significant ($\beta = .429$, $t = 5.15$). Likewise, arousal stimulates visitor pleasure ($\beta = .784$, $t = 14.94$) as anticipated in Hypothesis 1. Thus, visitor arousal improves the positive disconfirmation, which is derived from the cognitive evaluation of the visitor's theme park experience. Positive disconfirmation has significant effects on satisfaction ($\beta = .306$, $t = 5.95$), and pleasure directly influences visitor satisfaction ($\beta = .418$, $t = 4.81$). The arousal dimension has non-significant effects on satisfaction ($\beta = .111$, $t = 1.17$). The combined effect of arousal and pleasure on satisfaction is, however, significant ($\beta = .784 \times .418 = .327$). This path has also been hypothesized in the competing model. Fig. 3 shows the path-standardized parameters. Structural parameter estimates and robust-t values are found in Table 2.

Satisfaction directly influences loyalty behaviour ($\beta = .303$, $t = 3.81$). As assumed, pleasure influences loyalty directly ($\beta = .332$, $t = 5.06$), although an indirect effect through the satisfaction construct ($\beta = .418 \times .303 = .126$) was also evident. The path between satisfaction and willingness to pay more is not significant ($\beta = .131$, $t = 1.22$), and consequently, Hypothesis 5b is not confirmed. However, the direct

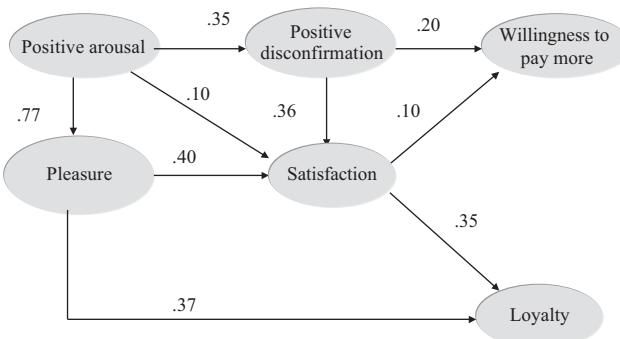


Fig. 3. Model 1 (standardized parameters).

effect of positive disconfirmation on willingness to pay more is significant ($\beta = .220$, $t = 2.72$). Fit statistics associated with this model are good (S-B Scaled $\chi^2 = 9.86$; $df = 5$; $p = 0.07$; NNFI = .96; CFI = .98; Robust CFI = .98; RMSEA = 0.07; CAIC = -21.09).

Model 2

The competing model (Fig. 4) assumes that perceived disconfirmation influences visitor emotions, i.e. pleasure and arousal. This model yields a better fit (S-B Scaled $\chi^2 = 6.32$; $df = 4$; $p = .18$; NNFI = .99; CFI = .99; Robust CFI = .99; RMSEA = .05; CAIC = -18.77) (see Table 3). Positive disconfirmation influences visitor arousal directly ($\beta = .282$, $t = 4.68$). Although the path between cognition and pleasure is not significant, disconfirmation influences visitor pleasure indirectly ($\beta = .282 \times .751 = .212$). As a result, hypotheses 8a and 8b are confirmed. Analogously to the findings of Model 1, cognitive and affective variables have significant effects on satisfaction. Although the influence of disconfirmation on arousal is confirmed, the direct effect of arousal on satisfaction is not significant. Even though the arousal dimension has non-significant effects on satisfaction, the combined effect of arousal and pleasure on satisfaction is significant ($\beta = .751 \times .418 = .313$).

With reference to the non-significant direct relationship between arousal and satisfaction, this can be due to: (a) enjoyment and fun factors weigh more than the

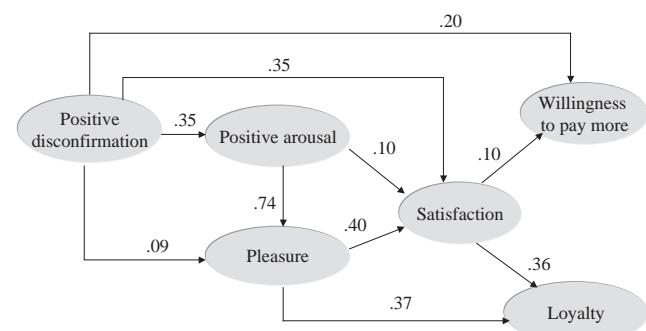


Fig. 4. Model 2 (standardized parameters).

Table 2
Model 1—Affect–cognition structural model estimates (robust-t values)

Disconfirmation	= Arousal .429 (5.15)	+ Pleasure .418 (4.81)	+ Positive disconfirmation .306 (5.95)
Pleasure	= Arousal .784 (14.94)	+ Satisfaction .303 (3.81)	
Satisfaction	= Arousal .111 (1.17)	+ Satisfaction .131 (1.22)	
Loyalty	= Pleasure .332 (5.06)		
Willingness to pay more	= Disconfirmation .220 (2.72)		

Table 3

Model 2—Cognition-affect structural model estimates (robust-t values)

Arousal	= Disconfirmation .282 (4.68)	
Pleasure	= Arousal .751 (13.08)	+ Disconfirmation .078 (1.90)
Satisfaction	= Arousal .111 (1.24)	+ Pleasure .418 (4.77)
Loyalty	= Pleasure .332 (4.86)	+ Satisfaction .303 (3.77)
Willingness to pay more	= Disconfirmation .220 (2.63)	+ Satisfaction .130 (1.22)

excitement ones and, (b) the satisfaction construct has a large impact or is influenced by other non-controlled aspects in this study. In spite of this, an indirect effect of arousal on satisfaction by means of the pleasure dimension is verified. In sum, findings corroborate the cognitive-affective perspective for explaining consumer satisfaction.

As expected, pleasure and satisfaction influence loyalty behaviour directly. Furthermore, an indirect effect of pleasure on loyalty through the satisfaction construct ($\beta = .418 \times .303 = .126$) is also corroborated. However, satisfaction is not a significant antecedent of willingness to pay more. The model reveals that positive disconfirmation influences this behavioural intention directly.

The two models under investigation are constructed from the same latent variables and indicators. They only differ in the order of cognitive and affective variables. The first model follows the primacy of affect versus cognition. Fit statistics are marginal. Despite a strong CFI (.98) and low RMSEA (.07), the S-B Scaled chi-square statistic fits poorly (S-B $\chi^2 = 9.86$; df = 5; $p = 0.07$; CAIC = 21.09). The competing model (Model 2) is more robust than the previous one: the S-B Scaled chi-square statistic provides strong indications of model fit (S-B Scaled $\chi^2 = 6.32$; df = 4; $p = .18$; NNFI = .99; CFI = .99; Robust CFI = .99; RMSEA = .05; CAIC = 18.77). Particularly the Consistent AIC, used to asymptotically compare structural models (Bozdogan, 1987), indicates the better model through a lower CAIC value.

The structural equation model supports Hypothesis 1 (positive arousal influences visitor pleasure) and Hypothesis 2 (visitor arousal improves positive disconfirmation). While the cognitive-affective sequence of satisfaction is corroborated, Hypothesis 3 (disconfirmation influences satisfaction) and Hypotheses 4a/4b (arousal and pleasure influence on satisfaction) are supported. However, arousal influences satisfaction only indirectly through the pleasure dimension. As expected in Hypothesis 5, satisfaction influences loyalty. At the same time, the path from pleasure to loyalty is doubly

significant: directly and indirectly through satisfaction. Thus, Hypothesis 6 (pleasure influences loyalty) is accepted. Finally, the influence of disconfirmation on willingness to pay more (Hypothesis 7) is also supported.

The SEM depicting cognition (i.e. disconfirmation) as an antecedent to emotions supports the hypotheses: a positive disconfirmation influences visitor pleasure (Hypothesis 8a) and visitor arousal (Hypothesis 8b). However, the cognitive effect of disconfirmation on pleasure appears to be fully mediated by visitors' arousal.

5. Discussion and conclusion

This study compared two competing models of the impact of emotions on satisfaction, willingness to pay more and on loyalty. They thus integrate the environmental perspective of Mehrabian & Russell (1974) with general research into consumer satisfaction (Wirtz et al., 2000) and behavioural intentions (Zeithaml et al., 1996). The models differed in terms of the primacy of affect versus cognition on these outcomes.

Since the mid-1980s, an increasing number of consumer researchers have pursued an extension of the mainstream approach in consumer satisfaction, which defined satisfaction primarily as a cognitive construct. The current experiential view offers an integrative framework for explaining consumer satisfaction, considering both the cognitive (i.e. disconfirmation) and affective (i.e. emotional dimensions) antecedents.

The result that (cognitive) disconfirmations evoke arousal which, in turn, influences feelings of pleasure has implications for management and future research. The dichotomy is between entertainment and information and while the experiential side is, no doubt, of major importance, the results suggest that information priming positive disconfirmations can increase satisfaction as well as willingness to pay. In other words, assisting in or improving the perceptual process of the disconfirmation may impact satisfaction as well as willingness to pay.

The form this manipulation can take, however, needs further research as, for example, suggestions to visitors that expectations may have been or will be surpassed (thus increasing the perceived disconfirmation) may also change the anchor of the expectation. Such research is all the more important as our results indicate that not satisfaction but disconfirmation impacts the willingness to pay more. The model may therefore benefit from the inclusion of a value-for-money component in order to see whether the willingness to pay more is mediated by perceptions of value for money the disconfirmation experience may evoke.

Consistent with Russell's model, emotions have two independent dimensions, i.e. pleasure and arousal (Russell & Pratt (1980)). Similar to Chebat & Michon (2003), during the amusing theme park experience, positive arousal influences visitor pleasure positively. Pleasure is strongly linked to consumer satisfaction and loyalty in experiencing tourism attractions. Arousal is, however, a mediator variable in the relationship between disconfirmation and pleasure. In other words, we are reminded that the disconfirmation of the theme park experience should not be over-stimulating so that negative arousal and displeasure occurs.

The strength of the direct impact of pleasure on loyalty is similar to that of satisfaction. It is an indication that the (physiological) experience of pleasure by itself creates loyalty so that both the promise of pleasure and satisfaction (rather than merely satisfaction through pleasure) need attention. It may thus be helpful to assist visitors in remembering the experience through after-sales services such as brochures, certificates or other memorabilia that remind of the physiological pleasure, in order to bolster word-of-mouth propaganda.

The finding that the emotional consequences on behavioural intentions impact loyalty is also indicated in other research dealing with the role of anticipated emotions in decision-making processes (Goossens, 2000) and motivation formation (Gnoth et al., 2000a, 2000b), as well as in the model of goal directed behaviour (MGB) by Perugini & Bagozzi (2001). An interesting contribution of the latter MGB is the introduction of anticipated emotions as important antecedents in decision-making processes. Any form of reminders or evocations of the physiological pleasure one might feel during the experience will therefore assist in generating visits.

The findings have to be considered within the limitations of the research methodology. It includes the singular focus on one leisure and tourism service category, i.e. theme park. The replication of the theoretical structure should be tested for other LTS categories, e.g. museums, adventure tourism. Another limitation stems from the use of self-report measures of affective and cognitive bases (Derbaix & Pham, 1989).

These explicit measures are more likely to be tied to deliberative affect and cognition, because they encourage an active search in memory for specific emotional experiences and cognitive beliefs associated with the focal leisure experience.

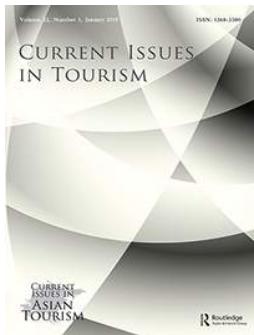
The models depicted in Figs. 1 and 2, with the introduction of disconfirmation, consumption emotions, satisfaction and behavioural intentions, suggest a wide range of research possibilities. First, in order to obtain more generalisable results, it would be interesting to replicate the model for other hedonic services. For example, Barsky & Nash (2002) suggest that the emotions a guest feels during a hotel stay are critical components of satisfaction and loyalty. Second, in building towards a clearer understanding of consumption emotions evoked through experiencing leisure and tourism services, this research would also like to suggest new variables to be taken into account for future enquiries. For instance, pertinent goals for future research would be to study the effects of atmospherics (McGoldrick & Pieros, 1998) on consumption emotions in experiencing tourism attractions. As atmospherics are not directly related to the core experience they may either add together with the core experience or separately on pleasure and satisfaction. Third, the relationship between the dimensions of service excellence (i.e. intangibility, reliability, customer care, among others) and consumer judgment relative to service quality (Dean et al., 2002; Ryan, 1999) is another possible area of future research, linked to consumption emotions. Lastly, and given the growing recognition of the importance of creating and delivering experience-based perceptions of value (Schmitt, 1999; Robinette & Brand, 2001; Woodruff, 1997), the model built for the present study as well as any future model should consider the contributions value-for-money deliberations have on the outcome variables.

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Comparing guests' key attributes of peer-to-peer accommodations and hotels: mixed-methods approach

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To cite this article: Amanda Belarmino, Elizabeth Whalen, Yoon Koh & John T. Bowen (2019) Comparing guests' key attributes of peer-to-peer accommodations and hotels: mixed-methods approach, *Current Issues in Tourism*, 22:1, 1-7, DOI: [10.1080/13683500.2017.1293623](https://doi.org/10.1080/13683500.2017.1293623)

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RESEARCH LETTER

Comparing guests' key attributes of peer-to-peer accommodations and hotels: mixed-methods approach

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(Received 25 November 2016; accepted 1 February 2017)

As peer-to-peer (P2P) accommodations have grown exponentially, it is critical to understand motivations for guests to choose a P2P accommodation instead of a hotel. The current study seeks to understand these motivations by using mixed-methods approach to compare online reviews for P2P accommodations and hotels. Through quantitative analysis, thematic analysis, and text mining, this study provides analysis of 800 reviews from New York, Chicago, Los Angeles, and Houston. The results consistently show that guests in P2P emphasize relationships with hosts, whilst hotel guests place more values on room attributes.

Keywords: sharing economy; peer-to-peer; segmentation; motivation; mixed methods

Introduction

The sharing economy is a worldwide phenomenon, changing how people consume services (Sundararajan, 2016). Peer-to-peer (P2P) accommodation sites such as Airbnb and Homeaway have become one of its fastest-growing segments (Jefferson-Jones, 2015). Airbnb, whose third quarter 2015 revenue exceeded Choice Hotels, grew its revenue by 113% in 2015. It is now seen by many as a lodging alternative to hotels due to convenience and efficiency (McNichol, 2015), despite safety and quality concerns (Carpenter, 2016). As P2P accommodations grow and hoteliers want to compete, they need to understand why guests choose a P2P accommodation instead of hotel.

In order to examine if motivations of guests who choose P2P accommodation are different from those who choose traditional hotels, this study analysed user-generated contents (UGC) using three methods: quantitative analyses, thematic analysis, and text mining. UGC has been frequently analysed with text mining, yet the use of computerized software may lose meaning because words and phrases could be misinterpreted (Banyai & Glover, 2012). Therefore, this study employed three methods to interpret and validate results for 800 online reviews from New York, Los Angeles, Chicago, and Houston. This study will assist lodging managers in allocating resources.

Crowd-based capitalism and P2P accommodations

Crowd-based capitalism is a term developed by economists to understand the shift from traditional economic activities to sharing economy activities (Sundararajan, 2016). This

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concept combines the economic and social aspects of sharing by explaining that consumers wish to engage in more meaningful relationships in their day-to-day economic activity. Additionally, individuals would rather share their possessions as a source of income than working for a company. One of the most prominent forms of the sharing economy is P2P accommodations (Belk, 2014).

Airbnb, founded in 2008, is the marketplace leader in P2P accommodations, offering diverse accommodations: shared rooms, private rooms, and entire apartments/houses (Airbnb, 2016). An integral part of this crowd-based experience is the regulatory effect of UGC. A guest's ability to book on Airbnb relies on the quantity and quality of reviews the guests received from P2P hosts, and the hosts' future ability to sell on Airbnb relies heavily on the UGC (Airbnb, 2016). Therefore, reviews can be studied as a source of information regarding the quality of the guests' experience.

Research into P2P accommodation found that owners are typically motivated by economic reasons. P2P accommodations have been cited as a solution to middle-class stagnation by providing additional income to home owners whose wages are growing at a slower rate than the cost of living (Sperling, 2015). Consumer motivations, however, vary from travelling families receiving better price/value benefits from entire apartments than multiple hotel rooms (Harrington, 2015), guests' desire to help P2P owners (Yannopoulou, Moufahim, & Bian, 2013), and the need for personal relationships (Tussyadiah & Zach, 2016).

Hypothesis: P2P accommodation guests' motivations are different from hotel guests' motivations.

Methodology

Whilst UGC has been actively examined in tourism and hospitality research, including its relationship to booking intentions (Vermeulen & Seegers, 2009) and firm performance (Duverger, 2013), it is relatively new for the P2P segment. A recent study by Tussyadiah and Zach (2016) shows the potential for future research in P2P UGC research. This study further develops this line of research by expanding the geographic scope and utilizing mixed methods to verify the findings.

The UGC for this study came from two sources: Airbnb representing P2P accommodations and TripAdvisor representing traditional hotels. P2P accommodation guests only have the booking website as a venue for browsing guest reviews (Zervas, Proserpio, & Byers, 2014). TripAdvisor is the US leader in online travel reviews because of the scope, depth, and reliability of their reviews (Soler & Craig, 2016). This study used reviews only from this website because some guests leave multiple reviews over multiple websites (Nicol, 2014), which is likely to generate methodological risk from duplicate reviews.

This study used reviews from accommodations located in the city centres in New York, Los Angeles, Chicago, and Houston, the four largest cities in the USA. The P2P units were chosen by number of reviews, location, and placement on the first page: (a) if it had at least ten reviews and (b) it was within three miles of the city centre. Hotels were matched to P2P accommodations based on price and amenities. Extended-stay hotels were matched with apartments/houses because they offer kitchens, comparable sized accommodations, and comparable pricing; limited service hotels were chosen for private rooms because they offer limited food and beverage choices, rooms with basic amenities, free parking, and comparable pricing. Based on this criterion, 10 P2P accommodations were chosen for each city, 5 full apartments/houses and 5 private rooms. This yielded 100 P2P reviews and 100 hotel reviews for each city, making a total of 400 for P2P and 400 for hotels (800 combined). This

sized data set is more reliable than big data for *t*-tests (Moore & McCabe, 1989) and for thematic analysis (Fugard & Potts, 2015).

A mixed-methods approach was used to interpret the UGC: quantitative comparison, thematic analyses, and text mining. For the quantitative comparison, each review was coded by two reviewers and reconciled by a third. Eight factors were used (see Table 1). The first seven factors were established by Radder and Wang's (2006) study on guest-houses. The current research added host/employee name (HN) to study the unique dynamic of P2P interactions in this segment. The reviews were coded with a one for a mention and a zero for no mention. Then, *t*-tests were run between number of mentions for each variable to compare P2P and hotels. Functional skills and abilities (FSA) was removed because it was only mentioned 17 times.

The second analysis sought to find common themes in the online reviews for P2P and hotels, respectively. Thematic analysis is commonly used in analysing the context and richness of UGC (Mkono, 2013). Two reviewers determined the themes separately and reconciled.

Text mining was used to verify the results, following the procedure used by Godnov and Redek (2016). City names were replaced with the word 'city'. For Airbnb, host names were replaced with 'host'. For hotels, employee names were replaced with 'staff'.

Results

When guests choose P2P, quality indicators such as brand are absent, and online reviews are more important. Through a mixed-methods analysis, this research found that reviews for P2P accommodations emerged with different themes than did the hotel reviews. Table 2 synthesizes the results of the three analyses. Across all three (quantitative, thematic analysis, and text mining), relationships with hosts/owners emerged as the most significant factor in P2P reviews. The actual name of the host was mentioned in 315 reviews out of 400 (often multiple times), 'conversations with hosts' emerged as a major theme, and the name of the host(s), term 'host(s)', or adjective referring to the hosts were used 513 times in the reviews (the most mentioned word). Conversely, hotel guests only mentioned a staff member's name in 42 of the 400 reviews and a staff member (by name or generically as an employee, staff, or team member) was mentioned 299 times (3rd most mentioned word). For the hotel reviews, room amenities emerged as the predominant theme. They were mentioned in 351 reviews, with 5 themes emerging for this category from the thematic analysis, and room being the most used word in the reviews (545 times). General amenities were mentioned in 278 hotel reviews, with themes of food and beverage and odour emerging, whilst this

Table 1. Attributes examined.

Attributes	Name	Description
PSA	Professional skills and abilities	Friendliness/professionalism
GA	General amenities	Public areas
RA	Room amenities	Cleanliness, safety/security, quality, noise
CS	Core service	Services offered, service recovery
CO	Convenience	Accuracy, reliability, wait time
FSA	Functional skills and abilities	Training/selection of staff
AB	Ambience	Location, attractiveness
HN	Host/employee name	Host or staff name

Table 2. Consolidated results.

Quantitative analysis		Host/ employee name		Ambience		Professional skills & abilities		Room amenities		Convenience		Core service		General amenities	
* = sig at 0.05		P2P 315 (78%)	Hotel 42 (11%)	P2P 309 (77%)	Hotel 302 (76%)	P2P 307 (77%)	Hotel 297 (74%)	P2P 278 (70%)	Hotel 351 (85%)	P2P 157 (39%)	Hotel 68 (17%)	P2P 71 (18%)	Hotel 83 (21%)	P2P 61 (15%)	Hotel 278 (70%)
Thematic analysis		Host/employee name		Ambience		Professional skills & abilities		Room amenities		Convenience		Core service		General amenities	
Hotel Themes		Personal interaction	Location			Cleanliness		Wait times		Food/Beverage Odour					
						Bathroom; Noise			Price						
						Room amenities									
						Room Specs.									
Properties	Staff	Nearby attractions				Clean/Dirty		Check-in/out				Restaurant quality			
						Maintenance, size		Price/Value				Odour			
						Noisy/Quiet									
						Coffee, toiletries									
						Size, furniture									
Quotes	'Very accommodating staff'	'Excellent location convenient to eateries and subways'				'Room was very clean'		'We arrived 45 minutes before official check-in time. We had to wait'				'Breakfast was embarrassingly minimal'			
						'Loud fan in the bathroom, tiny shower'						'It was old and smelly'			
		Host/employee name		Ambience		Professional skills & abilities		Room amenities		Convenience		Core service		General amenities	
P2P Themes		Personal interaction	Neighbourhoods			Guidebooks				Website photos/ description		Comparison to hotels			

Properties	Conversations with hosts	Local restaurants/stores	Authentic, personal	Matching the description	To hotels
Quotes	‘(The host) made us coffee in the morning and made my family feel welcome’	‘There are MANY shops, bakeries, restaurants, and the subway nearby’	‘He provided us a lot of information’	‘The apartment itself is even more beautiful than the photos’	‘It’s nice to feel like you are living like local people do instead of being in soulless hotels’
Text Mining	Host/employee name	Ambience	Professional skills & abilities	Room amenities	Convenience
P2P	Word Number 513 Rank 1	Host 513 Location 164 7	Place; Apart; Clean. 258; 216; 144 3; 5; 9	Great; Nice; Stay 309; 115; 245 2; 10; 4	Apartment 216 5
Hotel	Word Number 299 Rank 3	Staff 203; 196 City; Location 7; 9	Room; Clean 545; 197 1; 8	Great; Good; Stay 220; 175; 217 5; 10; 6	Breakfast; Hotel 247; 533 4; 2

was less prominent in P2P reviews. Other elements emerged in both reviews but in different ways. For ambience, for instance, P2P guests discussed neighbourhoods and local businesses whilst hotels mentioned proximity to attractions.

By comparing the UGC from Airbnb guests and hotel guests, this study contributes to the literature by comparing the language used to describe these accommodations. This study demonstrates that connectedness is a consistent theme for P2P accommodation guests but not for hotel guests, supporting the crowd-based capitalism ideologies.

Implications and suggestions for future research

For P2P accommodation owners, this study highlights the importance of interaction with their guests. This means that investors who are seeking to earn income through P2P accommodations should provide interaction with their guests. Hospitality literature has shown a direct, positive relationship between positive online reviews and increased revenue (Ogut & Tas, 2012); therefore, this investment in guest relationships can increase income. Secondly, this study explains why guests would choose a P2P accommodation. By demonstrating that guests who stay at each of these types of accommodations generate different types of UGC, this research indicates that P2P guests value the host, neighbourhood, and local experience. If hoteliers want to attract these guests, they need to put a premium on personal interactions (Neild, 2016).

This work supports Sundararajan's (2016) proposition that consumers in the sharing economy are seeking to re-engage in relationships with others, where economic activities have become increasingly impersonal since the industrial revolution. Whilst Tussyadiah and Zach (2016) suggest that hotels are better at providing additional services and P2P are better at building relationships, this research contends that guests at these accommodations place a different value and emphasis on these benefits.

Future research should evaluate whether these are truly different groups of travellers, and also investigate the cultural, sociological, and economic reasons behind these choices. As crowd-based capitalism strives to add personal interactions back to our daily economic activities (Sundararajan, 2016), future studies can investigate if guests in P2P accommodations engage in other sharing economy activities.

This study is not without limitations. This study used Airbnb for P2P reviews and TripAdvisor for hotel reviews. Although both are recognized as authorities in their areas, future research could compare different P2P sites to determine if different themes emerge across different platforms. The double-blind method of reviews for Airbnb could also impact the nature of the reviews since host and guest reviews occur simultaneously.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Pleasure, arousal, dominance: Mehrabian and Russell revisited

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DOI

[10.1007/s12144-014-9219-4](https://doi.org/10.1007/s12144-014-9219-4)

Publication date

2014

Document Version

Accepted author manuscript

Published in

Current Psychology: a journal for diverse perspectives on diverse psychological issues

Citation (APA)

Bakker, I. C., van der Voordt, DJM., de Boon, J., & Vink, P. (2014). Pleasure, arousal, dominance: Mehrabian and Russell revisited. *Current Psychology: a journal for diverse perspectives on diverse psychological issues*, 33(3), 405-421. <https://doi.org/10.1007/s12144-014-9219-4>

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Pleasure, Arousal, Dominance: Mehrabian and Russell revisited

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Abstract

This paper presents a discursive review of the dimensions pleasure, arousal and dominance that Mehrabian and Russell developed in 1974 to assess environmental perception, experience, and psychological responses. Since then numerous researchers applied these dimensions to assess the experience of the physical environment and its perceived qualities. Although the dimensions appeared to be useful, there is a long-lasting debate going on among environmental psychologists about the interpretation of pleasure, arousal and dominance and its underlying mechanisms. Due to the lack of clarity researchers use different adjectives to describe environmental experiences, which makes any comparison between research findings difficult.

This paper shows that the three dimensions can be linked to the current ABC Model of Attitudes: pleasure, arousal and dominance can be respectively related to affective, cognitive and conative responses, i.e. Affect, Cognition and Behaviour (ABC). In addition, connecting the three dimensions to the triad feeling, thinking and acting, can also help to improve our understanding, interpretation and measurement of pleasure, arousal and dominance. Based on this review, it is proposed to re-introduce the three dimensions and to replace the nowadays often used two dimensional model with pleasure and arousal by a three dimensional model, including dominance as a third dimension, to represent the complete range of human responses.

Keywords: pleasure, arousal, dominance, ABC psychology, tripartite view of feeling, thinking, acting, experience

1. Introduction

An often applied approach to assess and describe environmental experiences is the environmental psychology method of Mehrabian and Russell (1974). They use three emotional dimensions - pleasure, arousal and dominance - to describe human perceptions of physical environments. In the last four decades, pleasure, arousal and to a lesser extent dominance have been used and are still used by numerous researchers in the field of environmental psychology (Bellizi, 1983; Bradley, 1992; Baker, 1992; Donovan, 1994; Dubé, 1995; Berleant, 1997; Floyd, 1997; Eastman, 1997; Kaplan et al., 1998; Wirtz, 2000; Mattila, 2001; Chebat, 2003; Stamps, 2003; Bigné, 2005; Laroche, 2005; Ryu, 2007; Arifin, 2007; Kuppens, 2008; van Hagen, 2009; Morisson, 2011; Hyun, 2011). Pleasure and arousal are also applied in other disciplines such as the neurological and neuropsychological sciences (Bradley, 1992; Bonnet, 1995; Costa, 2010; Walter, 2011), marketing research (Menon, 2002; Laroche, 2005; Wu, 2008; Lin, 2010; Ha, 2010; Penz, 2011), computer systems (Palacios, 2011) and psychological research (Reisenzein, 1994; Bradley, 2008).

In the field of environmental psychology, pleasure, arousal and dominance are conceived as three basic dimensions of emotional responses that indicate peoples' state of feeling (Mehrabian and Russell, 1974; Russell, 1980; Russell and Pratt, 1980; Zajonc, 1980; Russell, Ward and Pratt, 1981; Bell et al., 2001; Gifford, 2001). However, since 1974 discussions are going on among (environmental)

psychologists such as Russell, Ward, Pratt, and Lanius (1980, 1981, 1984, 1989, 1999, 2003) and Zajonc (1984) about the exact interpretation of the dimensions in connection to cognition and affect and the role of dominance. Whereas based on a critical review of the literature including findings from recent studies conducted in England and Venezuela Yani-de-Soriano & Foxall (2006) show that dominance is as legitimate an environmental descriptor as pleasure and arousal, in much research less attention is paid to dominance or even not at all (Russell, 1980; Russell, Ward and Pratt, 1981; Chebat, 2003; Mattila and Wirtz, 2006; Kuppens, 2008). In these studies models are used (see for example figure 1) with two axes: horizontally the degree of pleasure and vertically the degree of arousal.

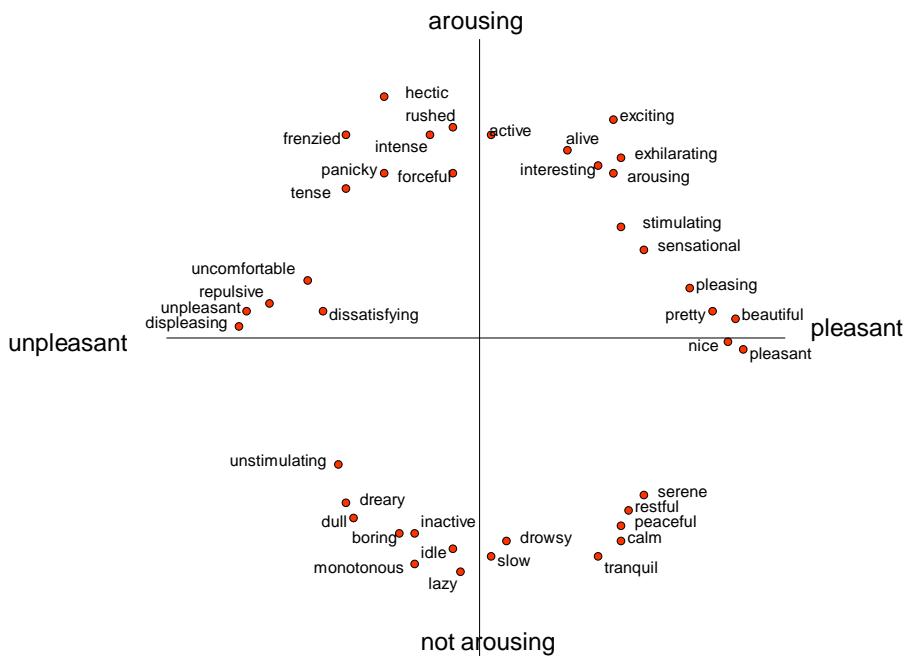


Figure 1: Example of an environmental psychology model with two axes that shows various adjectives to indicate the level of pleasure (X-axis) and arousal (Y-axis) (Russell & Lanius, 1984).

2. Pleasure, Arousal and Dominance revisited

In the literature a huge variety of different adjectives is used to operationalise pleasure, arousal and dominance. This makes research findings about the experience and perception of the physical environment difficult to compare. In order to gain a better understanding of the three dimensions, this paper analyses various adjectives related to pleasure, arousal and dominance that were applied by Mehrabian and Russell and other authors. Furthermore this paper explores the underlying mechanism in connection to the ABC Model of Attitudes i.e. a tripartite view with the three indicators affect, behaviour and cognition. As such it tries to answer the following questions:

1. What were the original operationalization's of pleasure, arousal and dominance defined by Mehrabian and Russell in 1974?
2. How are pleasure, arousal and dominance being applied by other researchers?
3. What are the main causes for different applications?
4. Which underlying mechanisms and psychological phenomena can be found to improve our understanding of pleasure, arousal and dominance?

3. Interpretations by Mehrabian and Russell (1974)

Mehrabian and Russell introduced pleasure, arousal and dominance as three independent emotional dimensions to describe people's state of feeling. They conceived pleasure as a continuum ranging from extreme pain or unhappiness to extreme happiness and used adjectives such as happy – unhappy, pleased-annoyed, and satisfied-unsatisfied to define a person's level of pleasure. Arousal was conceived as a mental activity describing the state of feeling along a single dimension ranging from sleep to frantic excitement and linked to adjectives such as stimulated-relaxed, excited- calm and wide awake-sleepy to define arousal. Dominance was related to feelings of control and the extent to which an individual feels restricted in his behaviour. To define the degree of dominance Mehrabian and Russell used a continuum ranging from dominance to submissiveness with adjectives such as controlling, influential and autonomous. Mehrabian (1996) mentioned the noun 'relaxation' as indicator for all three dimensions pleasure, arousal and dominance.

4. Comparison with the factors mentioned by Osgood et al.

Mehrabian and Russell (1974) compared the three dimensions pleasure, arousal and dominance with the three factors evaluation, activity and potency used by Osgood, Suci and Tannenbaum (1957) and Osgood (1963)(see Table 1). The first scientists who used these three factors were Solomon (1954) in analysing sonar signals and Tucker(1955) in his experiments judging paintings. Whereas both triads show some similarities, some dissimilarities come to the fore as well.

Table 1: Relationships between the three dimensions used by Mehrabian & Russell and the three factors used by Osgood

Three dimensions mentioned by Mehrabian & Russell (1974)	Three factors mentioned by Osgood et al. (1957)
Pleasure	Evaluation
Arousal	Activity
Dominance	Potency

Pleasure <-> Evaluation

Mehrabian and Russell described pleasure purely in terms of positive or negative feelings. The evaluation factor applied by Osgood *et al.* (1957) is quite ambiguous. It is based on factor-analysis and linked to a broad spectrum of adjectives such as good-bad, optimistic-pessimistic, positive-negative, complete-incomplete and timely-untimely . Twenty years after their first joint paper on this issue, Mehrabian (1996) operationalised pleasure in a rather different way and used connotations such as excitement, relaxation, love, and tranquillity versus cruelty, humiliation, disinterest and boredom. Table 2 shows different interpretations of pleasure according to Mehrabian and Russell. The number of different interpretations in the literature of the term 'pleasure' is smaller rather than the terms 'arousal' and 'dominance'.

Table 2: Interpretations of pleasure by Mehrabian and Russell

Pleasure	
affective (emotional) responses	Mehrabian and Russell, 1974
affective (emotional) responses	Russell and Mehrabian, 1977
pleasantness-unpleasantness is analogous to the semantic differential dimension of evaluation	Russell and Mehrabian, 1977
pleasure is a continuum ranging from extreme pain or unhappiness at the one hand to extreme happiness or ecstasy at the other end.	Russell and Mehrabian, 1977
positive versus negative affective states (e.g. excitement, relaxation, love, and tranquility versus cruelty, humiliation, disinterest, and boredom)	Mehrabian, 1996

Arousal <-> Activity

Although Mehrabian and Russell (1974) conceived arousal as a feeling state, they applied primarily adjectives that concern mental activity. In 1977 they described arousal as ranging from sleep and intermediate states of drowsiness and alertness to frenzied excitement. However, in 1996 Mehrabian defined arousal as a combination of mental alertness and physical activity. He operationalised arousal by using adjectives ranging from sleep, inactivity, boredom and relaxation at the lower end to wakefulness, bodily tension, strenuous exercise and concentration at the high end. Osgood (1957) defined activity as attention and used adjectives such as fast-slow, active-passive, excitable-calm, hot-cold. In his vision activity has also 'some relation to physical sharpness or abruptness as well' (see also Osgood, 1963). As such, Osgood used the activity factor for different types of activity, varying from physiological activity and mental activity to physical activity. Other authors used the activity factor in their research as well, with different interpretations (e.g. Lindsley, 1951; Duffy, 1957; Berlyne, 1966, 1970; Thayer, 1967; Bellizi, 1983; Mano, 1992; Bigné, 2005; Ryu, 2007). Lindsley (1951) and Duffy (1957) conceived activity as a physiological activity. Berlyne (1966, 1970) linked activity to attentiveness and connected activity to the arousal potential, known as the Wundt curve of 1874. This arousal potential concerns all types of stimulus properties that tend to raise alertness. Thayer (1967) used adjectives such as wide awake, aroused, aflame, impassioned, alert, and roused. Mano (1992) also related arousal to capacity. Table 3 shows different interpretations of pleasure by different researchers.

Table 3: Interpretations of arousal by different researchers

Arousal	
Wundt curve (1874) showing the arousal potential related to novelty and complexity (in Berlyne, 1970)	Wundt (1874)
arousal connected to attentiveness; relation between arousal and exploratory activities evoked by novel, complex and ambiguous stimuli. An animal's arousal level concerns wide-awake, attentive, excited.	Berlyne, 1966
arousal described in terms such as: wide awake, aroused, aflame, impassioned, alert, roused.	Thayer, 1967 in Russell, 1979
arousal related to novelty and complexity as hedonic value based on the Wundt curve	Berlyne, 1970
activity factor	Mehrabian and Russell, 1974
initially proposed to account for the intensity, but not the quality or direction, of a behavior	Mehrabian and Russell, 1974
feeling state varying along a single dimension ranging from sleep to frantic excitement such as stimulated, relaxed, excited and sleepy	Mehrabian and Russell, 1974
affective (emotional) responses	Russell and Mehrabian, 1977
the arousal dimension is analogous to the semantic differential dimension of activity	Russell and Mehrabian, 1977
responsiveness	Russell and Mehrabian, 1977
Arousal ranges from sleep through intermediate states of drowsiness and then alertness to frenzied excitement at the opposite extreme.	Russell and Mehrabian, 1977
relation with attentional capacity	Mano, 1992
level of mental alertness and physical activity. (e.g. sleep, inactivity, boredom, and relaxation at the lower end versus wakefulness, bodily tension, strenuous exercise, and concentration at the higher end).	Mehrabian, 1996
activity or activation	Russell and Carroll, 1999
arousal items: active, alert, attentive, excited.	Russell and Carroll, 1999

Dominance <-> Potency

Mehrabian and Russell (1974) connected dominance to feelings of control and behaviour restrictions caused by physical or social barriers. The adjectives they used to indicate a person's level of dominance - controlling, influential, autonomous - are different from the adjectives used by Osgood (1957) who described the potency factor by adjectives such as hard-soft, heavy-light, masculine-feminine, severe-lenient, strong-weak, tenacious-yielding. Thayer (1967) used potency in the same way as Osgood did. In 1996 Mehrabian interpreted dominance also in line with Osgood but he used different adjectives such as anger, relaxation, power and boldness versus anxiety, infatuation, fear and loneliness. Table 4 shows different interpretations of dominance according to different researchers.

Table 4: Interpretations of dominance by different researchers

Dominance	
Dominance described as dominant, controlling, influential, important, autonomous; submissiveness described as: submissive, controlled, influenced, awed, guided (in Russell, 1979)	Thayer, 1967
connected to behavior such as controlling, influential, autonomous	Mehrabian and Russell, 1974
potency	Russell and Mehrabian, 1977
ranges from feelings of total lack of control or influence on events and surroundings to the opposite extreme of feeling influential and in control.	Russell and Mehrabian, 1977
a third factor is not only dominance, but a number of dimensions such as locus of causation, importance of the emotion, and locus of control. These dimensions are interpretable as cognitive rather than affective (in Russell)	Russell 1978
perceptual cognitive dimension	Russell, Pratt, 1980
perceptual cognitive dimension	Russell, Ward, Pratt, 1981
a feeling of control and influence over one's surroundings and others versus feeling controlled or influenced by situations and others (e.g., anger, relaxation, power, and boldness versus anxiety, infatuation, fear, and loneliness).	Mehrabian, 1996

5. Reflections on possible causes of different applications and interpretations

The different applications and interpretations might be due to different ideas about how people perceive and assess their environment and how this is expressed in their individual internal representations. A third issue that points out to differences between the three dimensions of Mehrabian and Russell and the three factors of Osgood et al. can be found in different levels of explained variance.

a. Affect and cognition

Russell, Ward, Pratt and Lanius (1980, 1981, 1984, 1989, 1999, 2003) and Zajonc (1984) conceived pleasure and arousal as indicators of affect, and considered dominance to be a more cognitive indicator (Russell, Pratt, 1980; Russell, Ward, Pratt, 1981). In environmental psychology research affect is a central theme (Russell and Pratt, 1980; Baker, 1992; Ang, 1997; Chebat, 2003; Ryu, 2007). According to Ulrich (1983), *"Affect is central to conscious experience and behaviour in any environment, whether natural or built, crowded or unpopulated. Because virtually no meaningful thoughts, actions, or environmental encounters occur without affect"*. In addition, the cognitive component is of considerable value in experiencing the physical environment as well, because a building has a function and a meaning with a cognitive recognition (Ittelson, 1973; Russell and Pratt, 1980; Russell, 1980; Russell, Ward and Pratt, 1981). Mehrabian (1996) used the term 'disinterest' as a noun to explain pleasure. This term concerns primarily a mental effect that is related to cognition. In 1974 Mehrabian and Russell described arousal as a mental activity in terms of 'a dimension ranging from sleep to frantic excitement'. Due to their references to Berlyne (1966, 1970) and Thayer (1967) and the adjectives Mehrabian and Russell used, such as stimulated, excited and wide awake, it can be concluded that arousal refers to a cognitive and not to an affective factor. This is in contrast to their original description of arousal as a state of feeling, but in accordance to the mental terms Mehrabian and Russell used in 1977, namely responsiveness and alertness. Mehrabian and Carroll (1999) linked 'activity' to adjectives such as alert, attentive and excited which are all focused on mental activity and as such refer to a cognitive response. Arousal explained by nouns such as attentiveness, awakeness and alertness has also to be conceived as a mental processor and a

cognitive factor that may contribute to physiological activity. Whereas Mehrabian and Russell (1974) interpreted arousal as an affective factor, it shows to be a cognitive one that can be connected with thinking and thoughts. Regarding dominance, it can be questioned whether dominance has to be conceived as affective or cognitive, and how to measure this dimension (Russell and Pratt, 1980; Russell, Ward and Pratt, 1981). In the literature dominance is consequently related to freedom or limitations regarding someone's behaviour. This means that dominance is neither affective, nor cognitive, but conative.

b. Stimulus or response

The dimensions pleasure, arousal and dominance used by Mehrabian and Russell describe the state of feeling of the observer and as such concern a response, whereas the factors evaluation, activity and potency used by Osgood concern a judgment of the appearance of the (physical) environment and as such represent a stimulus. For instance the evaluation factor of Osgood represents a rather evaluative and contemplative dimension and values the positive and negative characteristics of the stimulus. This means that evaluation and pleasure can be considered as different terms with different interpretations. Mehrabian and Russell (1974) linked arousal to mental activity ranging from sleepy to excited, while Osgood described activity with stimulus characteristics such as fast-slow and warm-cold, and physical aspects such as sharpness or abruptness. Mehrabian and Russell (1974) used the dimension dominance to express the degree of restriction of behaviour i.e. to responses, whereas Osgood did not directly link his potency factor to behaviour but interpreted potency as a factor to describe aspects of general nature like hard-soft and heavy-light. As a consequence, dominance and potency are not comparable as well. Later on, Russell, Ward and Pratt (1981) considered dominance also as more related to the stimulus.

c. Different levels of explained variance

A third indication of incomparability between Mehrabian and Russell and Osgood et al. can be found in the different proportions of variance. According to Russell and Pratt (1981), both pleasure and arousal account for a large proportion of variance, whereas dominance showed a small percentage of explained variance (Russell, 1980; Russell and Pratt, 1980; Russell, Ward and Pratt, 1981). This might be due to the fact that dominance was not clearly interpreted and defined by an unclear mix of adjectives. Due to the low contribution to explained variance, many researchers do not pay attention to the influence of the dominance dimension. However, Osgood mentioned 'evaluation accounting for approximately double the amount of variance than potency or activity, these two in turn being approximately double the weight of any subsequent factors'. Apparently, potency did not have a low proportion of explained variance, whereas dominance did. It thus can be concluded that potency and dominance are different dimensions. Overall it can be concluded that serious differences exist between the triple pleasure, arousal and dominance and the triple evaluation, activity and potency.

6. In search of underlying mechanisms of pleasure and arousal

In order to be able to understand the relationship between environmental characteristics (stimuli) and the way people experience these characteristics (responses) and to clarify what actually happens in the mental processes between stimuli and response, this section discusses possible underlying mechanisms of pleasure and arousal. Figure 2 shows a diagram that is often used to valuing the physical environment by the dimensions pleasure and arousal (Russell, 1979; Russell, 1980; Mano, 1992; Barrett and Russell, 1998; Knez, 2002) Our assumption is that the centre (the grey square)

represents the conditions which people experience as harmonious. The outside area shows the area of disharmony, whereas the area in between shows the transition zone. A very low degree of pleasantness will cause feelings of disharmony; whereas too much pleasantness may also cause feelings of disharmony as people get lazy and bored without any challenges (Soesman, 2005). A very low degree of arousal makes people feel drowsy and a very high degree of arousal makes them highly agitated (Kandel, 2000).

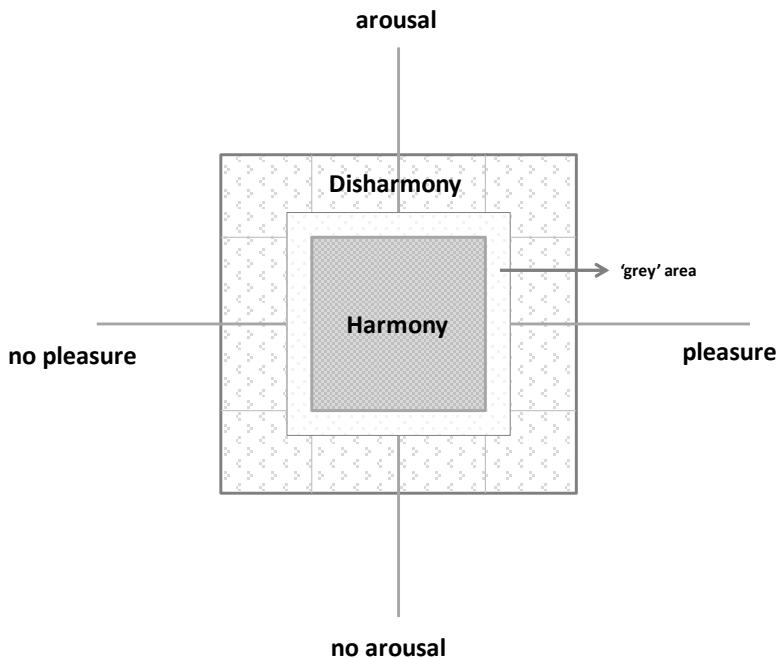


Figure 2: Pleasure and arousal as indicators for harmony and disharmony in the physical environment (Bakker and de Boon, 2012)

An underlying mechanism to explain pleasure and arousal might be the degree of order and variation. Regarding the environment, anthropologists make a distinction between the ‘planet’ which is shaped by natural forces and the ‘world’ which is built by human effort (Csikszentmihalyi, 1981). Both in the planet and the world an identical phenomenon can be observed: living creatures and man-made things can be recognized although all creatures and things are unique. Every oak for instance is unique and a particular building always differs from any other building. They both belong to a particular concept or archetype with a particular order (Goethe, 1810; Bortoft, 1996). Due to these concepts recognition is possible. We recognize any oak as an oak and we recognize any building as a building. Within these concepts, variations occur, both in planet and in world, which results in different appearances of the concepts caused by specific conditions and contexts. For the planet for instance, every oak shows a unique appearance while all features of this particular oak can be attributed to the oak concept. Also in the world due to the existence of concepts, recognition is possible as for instance the concepts of the old Egypt or the Islam, while the appearances of a particular Egyptian pharaoh image or a specific Islamite mosque all are unique. It can be concluded that the physical environment comes up with two characteristics: order based on concepts and variations as a result of unique conditions and contexts. The way we experience the environment depends on the degree of order and variation (Van Wegen, 1970; Steffen, 1980).

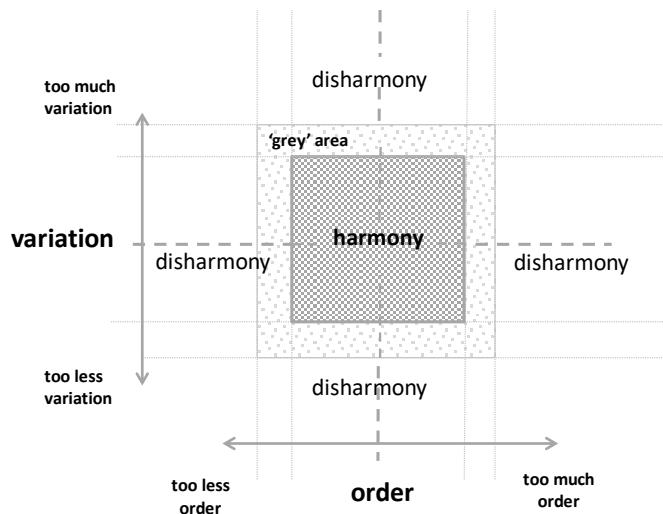


Figure 3: The degree of order and variation as indicators for harmony and disharmony in the physical environment (Bakker and de Boon, 2012)

Figure 3 shows the degree of order (horizontal axis) and variation (vertical axis) in connection to the experience of harmony and disharmony. An environment with a well-balanced level of order and variation (the grey square in figure 3) will be experienced as an harmonious environment (van Eyck, 1962). The outside area shows the area of disharmony: a too low degree of order means chaos, whereas too much order means rigidity (Schneider, 1987). A low degree of variation evokes dullness and a high degree means overstimulation. The area in between shows the transition zone. Although the axes in figure 2 and 3 are different, both grey squares represent a positive response. Our assumption is that judgments of individuals regarding degrees of dominance and arousal can be linked to the degree of order and variation of the physical environment. If this assumption is true, the level of order and variation can explain why people get pleased and how the feeling state of the observer is influenced by environmental features.

Another psychological phenomenon that influences pleasure and arousal are our expectations (Steffen, 1972; Wilson, 1989; Vonk, 2003). Expectations can also be related to order and variation. During a lifetime people get accustomed to concepts and people build up recognitions which form people's expectations. Psychological evidence shows that affect induces when people recognize things even when they are not aware of their recognitions (Zajonc, 2001). Deviations of expectations lead to arousal (Vonk, 2003). A positively experienced deviation leads to pleasure and a negatively experienced deviation leads to displeasure (Vonk, 2003). It is hypothesized that expectations are connected with learnt habits and mental representations (Vonk, 2003) and behaviour and as such are connected to the dimension dominance.

7. Connections with general theories in psychology

In 1960 Rosenberg and Hovland developed the so-called ABC-psychology that adds behaviour as a third dimension, in addition to affect and cognition. This tripartite view includes behaviour as a conative dimension (Allport, 1940; Wolff, 1980; Hilgard, 1980; Baumgarten, 1980; Arriaga et al, 2001; Gerdes, et al, 2008). Since then, many authors pay attention to the interrelated role of affect, cognition and behaviour (Ostrom, 1969; Breckler, 1984; Knopf, 1987; Fiedler et al, 1988; Polivy, 1998; Gabriel et al, 1999; Thompson, 1999; Farley et al, 2003; Stangor, 2013). The ABC psychology demonstrates a strong affinity with the three functions of the soul that were already mentioned by Plato: feeling, thinking and acting. The distinction between feeling, thinking and acting is used since a long time until nowadays as a common view on psychological experience, e.g. by Wolff (17th century); Baumgarten (18th century), Bain (19th century), Allport (1940), Smith (1947), Harding et al. (1954), Katz and Stotland (1959), Rosenberg et al, (1960b), Ostrom (1969), Brodwin (1976), Ajzen (1988), Hilgard (1980), Breckler (1984), Kay (1993), Arriaga et al. (2001), Jorgensen and Stedman (2001), van de Grindt (2004), Sno (2008), and Gerdes et al. (2008). According to this view, people show three types of responses while interacting with stimuli: affect, behaviour and cognition (ABC factors). These experiences lead to feelings, thoughts and/or acting (Ostrom, 1969; Brodwin, 1976; Schneider, 1987; Ajzen, 1988; Kay, 1993; Arriaga et al, 2001; van de Grindt, 2004; Covey, 2005; Smidts, 2002; Csikszentmihalyi, 1999). Asking people about their experiences results in expressions such as verbal statements of affect, perceptual responses and verbal statements of belief (cognition) and reports of behavioural intentions and commitment (Ostrom, 1969; Jorgensen and Stedman, 2001).

The ABC trilogy shows similarities with the three response dimensions of Mehrabian and Russell. Pleasure corresponds with affect. Arousal appeared to express cognition. When dominance is interpreted as Mehrabian and Russell originally did, dominance refers to the degree in which people experience their environment as being restrictive versus supporting to the way they want to act, their drives and their behaviour. As such, dominance represents a conative dimension, a term that Mehrabian and Russell did not use. Table 5 shows the relationships between the original three dimensions of Mehrabian and Russell (1974), the three factors of Osgood et al. (1957), the ABC psychology and the three functions of the souls according to Plato.

Table 5: Connections between the three dimensions of Mehrabian & Russell, the three factors of Osgood, the tripartite ABC-psychology and the triad mentioned by Plato

Three dimensions mentioned by Mehrabian & Russell to describe human responses	Three factors mentioned by Osgood to describe stimuli	ABC-psychology	Plato
Pleasure	Evaluation	Affect	Feeling
Arousal	Activity	Cognition	Thinking
Dominance	Potency	Behaviour (Conation)	Acting

8. Conclusion

This paper demonstrated that the original ideas of Mehrabian and Russell (1974) about pleasure, arousal and dominance can be connected to the ABC psychology and the distinction between feeling, thinking and acting that is used since ages and are still useful to describe environmental experiences. Both tripartite views bring us back to the first models in environmental psychology that included the dominance dimension as well, but now based on a better understanding of all three dimensions. For this reason it is suggested to replace the often used two dimensional model with pleasure on the horizontal axe and arousal on the vertical axe (see figure 1) by a three dimensional model with dominance on the third axe (see figure 4).

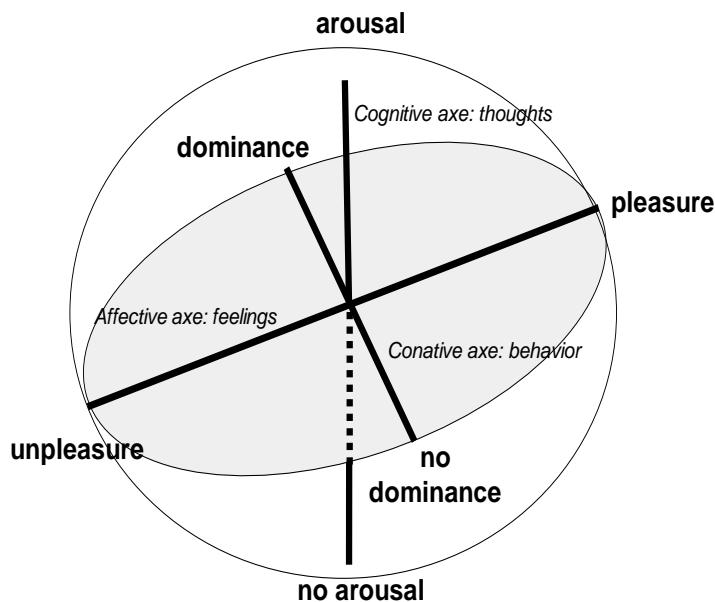


Figure 4: Three dimensional model of pleasure, arousal and dominance as tripartite view of experience (Bakker & de Boon, 2012)

Although different interpretations of pleasure, arousal and dominance can be found in literature, the original meanings developed by Mehrabian and Russell in 1974 are still valid. In future research pleasure and arousal have to be conceived as respectively affective and cognitive concepts. Regarding dominance, many researches showed the importance of feelings of control related to behaviour (Seligman, 1975; Frijda, 1988; Gaillard, 2003) and health (Johnson & Hall, 1988; Furda et al, 1994; Warr, 1994; Gaillard, 2003; De Lange et al, 2003; De Lange et al, 2004). These aspects were also mentioned by Karasek and related to workload and stress in his model together with Theorell in 1990 (in Gaillard, 2003). In research concerning topics such as picture processing (Bradley et al, 1994) or defining the effects in advertising (Morris et al, 2002) the dimension dominance plays an important role as well. It is recommendable that also in environmental psychology dominance is conceived as an influential factor which deserves serious attention and that this dimension will be rehabilitated. Additional research is needed to validate the proposed three-dimensional model. In current research a new list of adjectives is being tested on its applicability to measure the perceptual qualities of a meeting room (Bakker et al., forthcoming). The first findings confirmed the relevance of the triple pleasure, arousal and dominance.

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An Experimental Approach to Making Retail Store Environmental Decisions

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Retailers spend millions of dollars each year designing, building, and refurbishing stores. Millions more are spent hiring, training, and compensating employees that interact with retail customers. Yet retailers do not generally engage in systematic research that enables them to determine the appropriate mix of environmental factors that may influence the patronage decision. This paper extends the extant literature on retail store atmospherics with the express purpose of providing an experimental method that can be utilized by retailers to examine various aspects of store atmospherics and their impact on the retail patronage decision. As an application of this methodology, the Mehrabian and Russell (1974) affect model is examined. Specifically, the effects of two retail atmospheric factors: (1) ambient cues (lighting and music), and (2) social cues (number/friendliness of employees) on respondents' pleasure, arousal, and willingness to buy were examined. The results indicate that the ambient cues interact with the social cues to influence respondents' pleasure and the social cues influence arousal in the store environment. These affective states (pleasure and arousal) are in turn

The authors wish to thank Diana Grewal, Charles Lamb, Howard Marmorstein, Arun Sharma, the three *Journal of Retailing* reviewers, and the Editor for their helpful suggestions on previous versions of the manuscript. Dhruv Grewal was partly funded by a James W. McLamore summer grant in business and social sciences at the University of Miami.

found to have a positive relationship with respondents' willingness to buy. Finally, the results provide initial support that arousal and pleasure may mediate the effects of store environment on respondents' willingness to buy.

INTRODUCTION

In a time when retailers are finding it increasingly difficult to create a differential advantage on the basis of merchandise, price, promotion, and location, the store itself becomes a fertile opportunity for market differentiation. Millions of dollars are spent each year by retailers designing, building, and refurbishing stores. For instance, Neiman Marcus will spend more than \$200 million within five years to renovate its 23 stores (Lawson 1990). In an era of increasing competition, retailers must be certain that their stores are up-to-date and portray an image that is appealing to their target markets. Despite these large investments, retailers do not generally engage in systematic research that enables them to examine the environmental factors that may influence the patronage decision.

In the academic environment, several factors have been shown to affect the retail patronage decision. Among these factors are: location, service level, pricing policies, and merchandise assortment (e.g., Craig, Ghosh, and McLafferty 1984; Morey 1980; Schary and Christopher 1979). The patronage decision has been shown to also be influenced by the store environment. For instance, a study by Darden et al. (1983) found that consumers' beliefs about the physical attractiveness of a store had a higher correlation with patronage intentions than did merchandise quality, general price level, selection, and six other store/product beliefs. This lends support to the notion that store patronage is influenced, at least to some degree, by the store environment. It may be that this influence is manifested more when consumers are choosing between stores of the same type rather than between stores in different categories. For example, the store environment may create a significant margin of difference when consumers are choosing between a Kmart and a Wal-Mart, but not when the choice is between Kmart and Neiman Marcus. To improve its competitive position vis-a-vis Wal-Mart, Kmart has embarked on an image improvement strategy that emphasizes the store's atmosphere (*Discount Store News* 1990).

The influence of retail store environments on consumer perceptions and behavior is a topic that has received relatively little attention since Kotler (1973) introduced the "atmospherics" concept. The retailing literature has supported the notion that store image is an important component in the store choice decision (e.g., Stanley and Sewall 1976, Nevin and Houston

1980, Malhotra 1983) and elements of the physical environment are important components of store image (e.g., Lindquist 1974, Darden et al. 1983; Zimmer and Golden 1988), but these studies provide neither a framework nor a methodology to determine how these cues might impact store patronage.

This paper describes an experimental procedure using videotapes that retailers may use to utilize scarce financial resources more efficiently. First, the methodological approaches used by retailers and academicians to develop and test store environments are described. Then, an adaptation of the Mehrabian and Russell (1974) affect model is presented and five hypotheses are proposed. The videotape methodology is then applied to test these hypotheses.

APPROACHES FOR DEVELOPING AND TESTING STORE ENVIRONMENTS

In practice, retailers utilize several disparate methods for making store design decisions. The most expensive and time consuming is the prototype. Available to multiple store chains such as The Limited, a prototype store is developed and customer acceptance is determined before the new design is adopted throughout the chain. Other retailers, such as General Nutrition Centers, develop prototypes for each section of the store (*Chain Store Age Executive* 1988).

At the other end of the expense/time continuum, stores can be designed on computers with input from executives, buyers, store planners, and/or customers. Computer assisted design (CAD) drawings make this method relatively inexpensive and quick. Yet, since the techniques and software of CAD are relatively new, its full potential for experimental purposes has yet to be tapped (*Visual Merchandising and Store Design* 1990).

Another relatively inexpensive and quick approach is to use a lab experiment in which subjects respond to verbal descriptions of a store (Gardner and Siomkos 1985). The external validity of this type of research is limited because the verbal descriptions can be value laden. While this approach allows researchers to examine the effects of specific design/atmosphere elements in a lab setting, it has limited application for retailers. This approach has also been used to examine the effects of retail store environment on consumers' brand evaluations (e.g., Akhter, Andrews, and Durvasula 1991).

In addition to the prototype, CAD, and scenario approaches to store design, psychologists have examined several environmental factors in controlled laboratory settings. For example, Griffitt (1970) examined the ef-

fects of temperature. In another experiment, Bellizzi, Crowley, and Hasty (1983) found that color can physically attract shoppers to a retail display. Showing pictures to manipulate retail or service environments seems to be growing in popularity. For example, Hui and Bateson (1991) used slides to manipulate levels of consumer density in a service setting. Finally, Carpmann, Grant, and Simmons (1985) used a videotape method to examine hospital design issues.

Today, the availability, low cost, and relative simplicity of using video technology enables researchers to gather data from multiple respondents easily. As noted earlier, the use of video technology in an experimental setting has been used effectively to examine hospital design issues (Carpman et al. 1985). To our knowledge, however, it has not been embraced by store planners or academics doing research on store atmospheric issues. This approach is much less expensive and quicker to implement than developing prototypes. In addition, crucial input from customers is utilized. This videotape methodology is used to test a set of hypotheses based on the Mehrabian and Russell (1974) affect model.

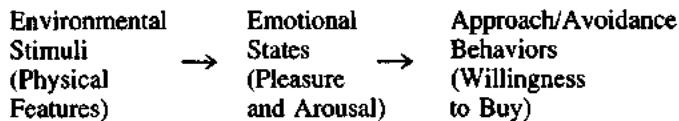
THE MEHRABIAN-RUSSELL AFFECT MODEL

Research in environment psychology has produced a body of knowledge that has examined the interaction between the physical environment and human behavior in many different settings (e.g., housing, offices, schools, prisons). Remarkably, however, little research has been conducted regarding the effect of store environments on customer attitudes and/or behavior. Given that store choice may precede brand choice (Darden et al. 1983), and that many purchase decisions are made within the retail store (Keller 1987), this lack of attention in both marketing and environmental psychology is surprising. The store environment has the potential to be an effective and powerful marketing tool if retailers can better understand how to utilize it.

Originating in environmental psychology, an affective approach has been used to study store environments (Donovan and Rossiter 1982). This approach maintains that an individual's perceptions of, and behavior within, a given environment are the result of emotional states created by that environment (e.g., Mehrabian and Russell 1974). Specifically, environmental stimuli are said to affect the emotional states of pleasure and arousal, which, in turn, affect approach or avoidance behaviors.

The stimulus factors in the model are physical features (e.g., color, store layout, lighting, etc.) in the environment. The emotional states that are induced by the physical environment are pleasure and arousal (Mehrabian

and Russell 1974, Russell and Pratt 1980, Donovan and Rossiter 1982). Pleasure refers to the extent to which a person feels good in the environment, and arousal relates to the extent to which a person feels excited or stimulated. Approach behavior includes a willingness or desire to move towards and explore the environment (e.g., propensity to buy).



Several marketing studies have explored the effects of store environment-induced emotional states on consumers. Donovan and Rossiter (1982) found support for the Mehrabian-Russell model in a retailing context by investigating the relationship between emotional states induced by eleven different store environments and statements of behavioral intention in those environments. They found that store-induced pleasure was positively associated with willingness to buy. Store-induced arousal influenced the time spent in the store and willingness to interact with sales personnel. A crowded service environment reduced consumers' pleasure (Hui and Bateson 1991). Yalch and Spangenberg (1990) found that different types of music in a store setting created different emotional responses in consumers. Similarly, subjects in an experimental study reacted emotionally to warm and cool-colored walls (Bellizzi et al. 1983).

Donovan and Rossiter's (1982) study made a major contribution to the literature regarding retail environmental effects by establishing the validity of the relationship between store environments, emotional states, and behavioral intentions. A limitation of the study, however, was that store atmosphere was examined at a global level, but didn't offer guidelines to retailers regarding which environmental elements create different types of affective responses. The studies that examined single elements of the environment have provided some guidelines, but only two address elements (music and color) that retailers can easily control. Furthermore, the single-element studies do not take into consideration the interactive effects likely to occur between different elements in the same store environment.

The next logical step is to examine some of the specific stimulus variations in retail settings that are thought to produce changes in store-induced emotions, and hence, behaviors. Our study refines and extends Donovan and Rossiter's work by testing the Mehrabian-Russell model through the manipulation of two specific store environment factors in an experimental setting. Retailers can use this experimental method to explore other environmental factors that may be germane to their particular environment.

HYPOTHESES

One of the limitations of the Mehrabian-Russell (1974) model is the lack of a classification system of specific environmental features. This study attempts to overcome that limitation by using a framework of environmental factors developed by Baker (1986) to examine the effects of specific environmental stimuli on emotional states. The variables included in this study are easily controlled by retailers.

The Baker framework suggests that three critical dimensions of the store environment are ambient, social, and design factors. Ambient factors are background conditions in the environment (e.g., temperature, scent, noise, music, and lighting). Customers may notice ambient factors when they exceed an acceptable range, such as when the lighting becomes too bright or the music too loud. Social factors represent the "people" component of the environment, including both store employees and customers. The number, type, and behavior of people is proposed to influence consumers' perceptions of stores. Design factors include functional and aesthetic elements such as architecture, style, and layout. Retailers could choose various combinations of these factors according to their needs. For illustration purposes, we chose to look only at ambient and social factors. These factors are relatively easier and less expensive to change for most retailers than are the design factors.

The Ambient Factor

Music and lighting were the variables chosen to operationalize the ambient factor in this study. We operationalize a high ambient store environment as one playing background classical music with soft lighting, and a low ambient store environment as one using foreground top-40 music and bright lighting. Foreground music uses original artists and lyrics; whereas background music uses studio musicians playing instrumentals. It should be noted that the tempo of the music was held constant.

Music is capable of evoking affective and behavioral responses in consumers (Bruner 1990). An ethnographic study of a gift store found that music was played by the store owner to manipulate customers' feelings (McGrath 1989). Background music tends to be soothing, which creates a pleasurable atmosphere (Milliman 1982, 1986). Yalch and Spangenberg (1990) found that background music produced a more pleasant mood than did foreground music (although the difference was statistically nonsignificant). Similarly, peaceful classical music created positive moods in experimental subjects, leading to greater helping behavior (Fried and Berkowitz 1979).

Individuals' preference for lighting levels has been shown to differ for various behaviors and situations (Butler and Biner 1987). Furthermore, soft lighting tends to create a more relaxing, pleasant mood than does bright lighting (Meer 1985).

The two emotional responses in the Mehrabian and Russell (1974) model of interest are arousal and pleasure. We expect the ambient factor to affect only pleasure in this study. No predictions were made regarding the relationship between the ambient factor and arousal because the tempo of the music was kept constantly at a relatively slow level. Thus, it is proposed that:

H1: A high-image ambient store environment will provide greater pleasure than a low-image ambient store environment.

The Social Factor

The social factor in this study was operationalized in terms of the number and affability of retail salespeople. The high social store environment was operationalized using three employees, one of whom greeted the respondents as they "entered the store." The low social store environment had only one employee who ignored the respondents. Retailers of all types are paying more attention to customer service as a method of establishing a differential advantage. The number, appearance, and behavior of store employees may help shape a customer's perception of the service level within a retail store (Baker 1986). The social factor has been investigated in terms of other customers in the store, as exemplified by crowding research (e.g., Harrell et al. 1980).

The model predicts that a store environment that is complex, novel, surprising, and active will increase feelings of arousal (Mehrabian and Russell 1974). An environment that creates a high level of arousal is likely to be more interesting to customers, thus they may stay longer in the store. Retailers may benefit when customers stay longer because they may purchase more (Milliman 1986). The greater the number of store employees, the more active and arousing the store environment. In addition, employees whose behavior is friendly would be likely to create a more active, arousing store environment than would employees who are aloof or unfriendly. Thus, it is proposed that:

H2: A high-image social store environment will provide greater arousal than a low-image social store environment.

Undermanning theory suggests that the number of employees present in a store setting is important to consumers' satisfaction. Wicker (1973) iden-

tified undermanning as a condition that occurs when the number of people in an environment is less than the setting requires. The result of undermanning is dissatisfaction, because the setting is not functioning as it should. Thus, a more pleasant shopping atmosphere is likely to result when an adequate number of employees are present (a high social store environment). It is also likely that the friendly employees in the high social store environment result in a more pleasant shopping experience for customers. Thus, it is proposed that:

H3: A high-image social store environment will provide greater pleasure than a low-image social store environment.

Behavioral Intention

The final two hypotheses address the effects of arousal and pleasure on consumers' approach/avoidance behaviors (Mehrabian and Russell 1974). As did Donovan and Rossiter (1982), we measured intentions to behave rather than actual behavior. Specifically, we chose to measure store patronage intentions, which is a type of approach behavior. Thus, it is proposed that:

H4: There will be a positive relationship between consumers' arousal and their willingness to buy.

H5: There will be a positive relationship between consumers' pleasure and their willingness to buy.

Mediation Issues

The Mehrabian and Russell (1974) model suggests that the effects of store environment factors on approach/avoidance behavior is mediated by their affective responses (i.e., arousal and pleasure). In this study, we specifically test whether the effect of the ambient and social factors on respondents' willingness to buy is mediated by their arousal and pleasure.

RESEARCH METHOD

Research Design

The hypotheses were tested using a 2×2 between subjects factorial design, with two store ambient levels (low and high) and two store social levels (low and high). The characteristics for the ambient and social levels were derived from the literature (e.g., Levy and Weitz 1992). In addition, two focus groups (one student and one non-student) and a pretest were

conducted. The results of this preliminary investigation indicated that the attributes used to manipulate the ambient and social factors were appropriate.

Videotape Experimental Procedures

The 2×2 factorial design used 147 undergraduate students (35–39 subjects/cell). This sample is appropriate in this illustration since a retail card and gift store (the context for this study) is within the realm of shopping experiences for students. Retailers embracing this method would, of course, choose samples that closely reflected characteristics of their target markets.

Four videotape versions of a retail card and gift store were developed to represent the four experimental treatments. A professional video technician slowly walked through the store with a videocamera to simulate a shopping trip. The tape was approximately five minutes long. No customers were present in the store when the tape was made. Actual store employees were used. The number and friendliness (greeting at the door) were manipulated to create the low and high social conditions. The music selections were dubbed on the tapes at a later time by the technician. Lighting levels were manipulated by changing the brightness controls on the television monitor during the experiment, since it was not possible to physically change the lighting in the store.

Each group of subjects was exposed to one of the four videotapes in a laboratory setting. After the subjects viewed the videotape, they completed a self-administered questionnaire containing items measuring pleasure, arousal, and willingness to buy. In addition, the questionnaire contained items to assess the effectiveness of the manipulations.

Dependent Variables

Willingness to buy was assessed using the scale developed by Dodds, Monroe, and Grewal (1991). The scale was reliable ($\alpha = 0.86$). Using a seven-point scale (7 = strongly agree and 1 = strongly disagree), subjects indicated their level of agreement to the following three statements:

- The likelihood that I would shop in this store is high;
- I would be willing to buy gifts at this store; and
- I would be willing to recommend this store to my friends.

Subjects evaluated their affective response to the store's environment using Russell and Pratt's (1980) scales. They rated how accurately the particular items represented the physical environment using a six-point

scale (6 = extremely accurate and 1 = extremely inaccurate). Arousal was measured using the following six items: alive, inactive (r), drowsy (r), idle (r), lazy (r), and slow (r). Pleasure was measured using the following six items: nice, dissatisfying (r), displeasing (r), repulsive (r), unpleasant (r), and uncomfortable (r). (r is used to indicate the item was reverse scored).

As suggested by Churchill (1979), the six indicators for arousal and six indicators for pleasure were assessed for internal and external consistency using correlation analysis, confirmatory factor analysis and Cronbach's α . The inter-item correlations within the measures of arousal and pleasure were higher than the intra-item correlations across those measures. Causal modeling procedures (see Bagozzi 1980, Bagozzi and Yi 1988, Finn 1992, Joreskog and Sorbom 1986) with LISREL indicated that the two factor model, arousal and pleasure were separate, yet correlated factors ($r = .18$, $p < .05$), fit the data better than a one factor model ($\chi^2_{\text{difference}} = 191.32$, $df = 1$, $p < .001$). Furthermore, Anderson (1987) has suggested the following criterion for discriminant validity: the correlation between two latent constructs plus or minus two standard errors does not include one. The data met this criterion. Also, for the two factor model, the factor loadings (lambda's) were high and significant ($p < .01$). Finally, the reliability estimates were acceptable (arousal $\alpha = 0.80$ and pleasure $\alpha = 0.84$).

RESULTS AND ANALYSES

Manipulation Checks

Subjects evaluated the store ambient factor using three items ($\alpha = .91$) and the store social factor on a four item scale ($\alpha = .86$). Analysis of the manipulation check scores suggested that the manipulations of the two independent variables were perceived as intended (ambient: $F_{(1,145)} = 18.33$, $p < .001$, and social: $F_{(1,145)} = 40.65$, $p < .001$).

Hypotheses Tests

The hypotheses were tested using ANOVA and regression (Table 1). The results are discussed next.

Ambient Factor. There was a statistically significant ambient/social interaction on subjects' pleasure ($F_{(1,143)} = 4.91$, $p < .05$). Thus, the ambient effect was interpreted within levels of the social factor (see Rosenthal and Rosnow 1984). The effect of the ambient environment factor on subjects' pleasure was significant for the low social factor (means

TABLE I
ANOVA and Moderator Analysis^a

	ANOVA	ANOVA	ANOVA	ANCOVA
	Arousal	Pleasure	Willingness to Buy	Willingness to Buy
Ambience (A)	1.02	3.46	.14 $\omega^2 = 0.0$	0.40 $\omega^2 = 0.0$
Sociability (S)	4.10*	3.48	2.46 $\omega^2 = .01$	0.23 $\omega^2 = 0.0$
A × S	1.58	4.91*	13.39** $\omega^2 = .078$	7.98** $\omega^2 = .036$
Covariates				
—Arousal	—	—	—	4.85*
—Pleasure	—	—	—	32.34**
Error (df)	143	143	143	141

^a Table contains F-values unless indicated otherwise.
 * $p < .05$
 ** $p < .01$

were 5.04 versus 5.47, $F_{(1,143)} = 8.23, p < .005$), but not significant for the high social factor (means were 5.46 versus 5.43, $F_{(1,143)} = 0.07$, n.s.). This provides partial support for the first hypothesis.

Social Factor. The results indicated that the high social store environment enhances subjects' arousal (means were 3.14 versus 3.47, $F_{(1,143)} = 4.10, p < .05$). Thus, hypothesis 2 was supported. As mentioned earlier, there was a significant ambient/social interaction on subjects' pleasure. The effect of the social factor on subjects' pleasure was significant for the low ambient factor (means were 5.04 versus 5.46, $F_{(1,143)} = 8.23, p < .005$) but not significant for the high ambient factor (means were 5.47 versus 5.43, $F_{(1,143)} = 0.07$, n.s.). Thus, the third hypothesis was partially supported.

Willingness to Buy. The effects of arousal and pleasure on subjects' willingness to buy are examined using regression analysis ($F_{(2,144)} = 23.73, p < .001$, adjusted $R^2 = .25$). The results support the hypotheses that as pleasure and arousal increase, subjects willingness to buy is en-

hanced (arousal; beta = .43, $t_{(144)} = 2.52, p < .01$; pleasure; beta = .19, $t_{(144)} = 5.84, p < .001$), thus supporting H4 and H5.

Mediation Tests

Procedures suggested by Baron and Kenny (1986) and Hastak and Olson (1989) were followed to assess whether arousal and pleasure mediate the effects of the environmental stimuli (ambient and social) on subjects' willingness to buy. The results, presented in Table 1, indicate that the store environment factors affect both the mediators (arousal and pleasure) and willingness to buy. Furthermore, when the mediators (arousal and pleasure) are included as covariates, the effect of the store environment on willingness to buy is reduced (i.e., a reduction in F-values and ω^2). For example, the interaction of the ambient and social factors on subjects' willingness to buy was reduced from $F_{(1,143)} = 13.39 (\omega^2 = .078)$ to $F_{(1,141)} = 7.98 (\omega^2 = .036)$. This is a 53.85% reduction in ω^2 . Thus, the results provide some support that arousal and pleasure may mediate the effect of store environment on subjects' willingness to buy, although they are not perfect mediators. Therefore, other factors, such as perceived quality, value and price may also mediate the store environment/willingness to buy relationship.

LIMITATIONS AND AVENUES FOR FUTURE RESEARCH

To achieve a more realistic environmental simulation, we simultaneously manipulated several store ambient and social elements. As a result, some technical and interpretational clarity is sacrificed since it is difficult to separate the effects of each element. For example, we did not separate the effects of music and lighting since they were combined to operationalize the ambient factor. This and other similar issues, however, could be addressed in future research.

A related concern is that certain elements in the environment naturally covary, and thus it may be difficult to separate these effects. For example, color perceptions are determined by the color (cool vs. warm) as well as the level of lighting in a room. This concern will be important to address in future research.

The domain of applicability is also limited in this experiment. Clearly, there are choice variables other than the physical environment that influence consumers' willingness to buy in a retail store. Some of these variables include merchandise assortment, relative pricing levels, location, service, and overall store image. This study did not address the importance of store environment in conjunction with these other variables. Future

research should focus on how these other variables interact with the store environment in affecting patronage decisions.

Retailers have several options for utilizing the research approach presented here. First, because emotional states induced by the store environment influence consumers' willingness to buy, it is important to continue trying to determine which environmental elements produce positive and negative affective responses so that retailers have some guidance in planning pleasant, arousing environments. Ambient elements other than music and lighting should be explored (e.g., scent, temperature). Design elements such as color, layout, architectural style, or type of furnishings may also be important factors in affective response. Second, retailers interested in the music factor should explore other aspects such as loudness, tempo, or respondents' liking/disliking of specific music selections. Third, future research should also pay attention to the specific atmospheric cues provided by the store exterior. Finally, retailers should explore how these factors impact specific target markets. Although this study used a student sample, other market segments might react differently to the stimuli.

Computer aided design (CAD) is a relatively new method of exploring retail environmental alternatives that shows great promise for future research as computer software becomes more readily available. Researchers can maintain the realistic strength of the videotapes, yet the experimental manipulations can be achieved with greater ease.

DISCUSSION

The use of experiments using videotapes provides retailers with a relatively easy, inexpensive, and realistic method of examining the impact of several store environmental situations on customers. Our refinement of the Mehrabian-Russell (1974) model and the Donovan and Rossiter's (1982) methodology shows promise for both retailers and consumer researchers. We have applied a strong theoretical base from environmental psychology, examined the effects of *specific* ambient and social variables, and utilized an experimental laboratory/store environment to systematically measure the impact of various atmospheric factors on purchase intentions. Other ambient, design, and social factors could be easily manipulated in a store setting using the theory and methodology discussed in this study.

Overall, this study supports Donovan and Rossiter's (1982) finding that the Mehrabian-Russell model is applicable to a retail setting: affective states produced by the store environment do influence consumers' willingness to buy. Brinberg and McGrath (1985) emphasize the need to examine research issues using different methodologies—triangulation of methods. Since Donovan and Rossiter's (1982) correlational methodology

and the experimental methodology in this study found similar results, it strengthens the conclusions. While the relationship between ambient and social conditions on arousal were clear, results were more ambiguous for the effects of these conditions on pleasure.

The model predictors for the social factor on subjects' arousal was supported. The high social store environment (more employees on the floor, friendly employees) initiated greater feelings of arousal in respondents than did the low social store environment (one employee, ignoring customers). This result has important implications for retailers. Donovan and Rossiter (1982) argue that arousal can increase time spent in the store and a willingness to interact with store personnel. By controlling the number of employees in the store, and rewarding pleasant, helpful behavior in employees, retailers can create an environment that is arousing.

Retailers utilizing this experimental approach can uncover some interesting relationships that may not be apparent otherwise. For instance, the interactive effects of the ambient and social factors on respondents' pleasure indicate that when the social environment is low, the ambient factor becomes important. Similarly, when the ambient environment is low, the social factor becomes important. This result suggests that creating a store environment that is high on one of these factors may be as good at providing a pleasurable shopping experience as creating one that is high on both factors. Retailers should evaluate the costs associated with the various alternatives and offer a high level on the atmospheric characteristics that are most cost efficient.

The videotape methodology is ideal for smaller retailers with only one or a few outlets. In addition to being relatively quick and inexpensive, it is unobtrusive. These retailers cannot afford to disrupt their operations by experimenting with alternative prototypes. This method can also be utilized by multi-unit retailers in conjunction with the more costly and time consuming prototype method. After obtaining results from videotape experiments, these retailers can roll out changes in store configurations one store at a time or even part of a store at a time.

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The Role of Emotions in Marketing

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Emotions are mental states of readiness that arise from appraisals of events or one's own thoughts. In this article, the authors discuss the differentiation of emotions from affect, moods, and attitudes, and outline an appraisal theory of emotions. Next, various measurement issues are considered. This is followed by an analysis of the role of arousal in emotions. Emotions as markers, mediators, and moderators of consumer responses are then analyzed. The authors turn next to the influence of emotions on cognitive processes, which is followed by a study of the implications of emotions for volitions, goal-directed behavior, and decisions to help. Emotions and customer satisfaction are briefly explored, too. The article closes with a number of questions for future research.

This article addresses emotional behavior in marketing. In comparison to information processing and behavioral decision research, we know much less about the role of emotions in marketing behavior. Much of what we do know is confined to consumer behavior, as opposed to the behavior of salespeople or marketing managers.

Nevertheless, emotions are central to the actions of consumers and managers alike. Our goal in this article will be to present a framework for thinking about emotions; to discuss the measurement of emotions; to review how emotions function as causes, effects, mediators, and moderators

in marketing behavior; and to provide suggestions for future research.

THEORY AND FUNCTION OF EMOTIONS

Little consistency can be found in the use of terminology related to emotions. For purposes of organization and discussion, we begin with a definition of emotions and then turn to a framework for interpreting emotional behavior.

Definitions

The term *affect* will be conceived herein as an umbrella for a set of more specific mental processes including emotions, moods, and (possibly) attitudes. Thus, affect might be considered a general category for mental feeling processes, rather than a particular psychological process, *per se*.

By emotion, we mean a mental state of readiness that arises from cognitive appraisals of events or thoughts; has a phenomenological tone; is accompanied by physiological processes; is often expressed physically (e.g., in gestures, posture, facial features); and may result in specific actions to affirm or cope with the emotion, depending on its nature and meaning for the person having it. For a similar perspective, see Lazarus (1991) and Oatley (1992).

The line between an emotion and mood is frequently difficult to draw but often by convention involves conceiving of a mood as being longer lasting (from a few hours up to days) and lower in intensity than an emotion. Yet, exceptions to this construal can be found. Still another distinction

between emotions and moods is that the former typically is intentional (i.e., it has an object or referent), whereas moods are generally nonintentional and global or diffused (Frijda 1993). Also, moods are not as directly coupled with action tendencies and explicit actions as are many emotions.

Finally, attitudes, too, are often considered instances of affect, with the same measures used on occasion to indicate emotions and attitudes (e.g., pleasant-unpleasant, happy-sad, or interested-bored semantic differential items). However, some authors take a narrower view of attitudes and define them as evaluative judgments (measured, e.g., by good-bad reactions) rather than emotional states. Cohen and Areni (1991), for instance, reserve the term *affect* for "valenced feeling states," with emotions and moods as specific examples. Attitudes are evaluative judgments in their view. Nevertheless, other researchers do not make a distinction between affect and evaluative judgments. For example, Eagly and Chaiken (1993) point out that Fishbein and Ajzen (1975) and other social psychologists have "regarded affect as isomorphic with evaluation itself and used the terms interchangeably" (p. 12). Still others propose that attitudes have two distinct, but generally highly correlated, components: affective and cognitive (or evaluative) dimensions. Some empirical support exists for this interpretation (Bagozzi and Burnkrant 1979; Batra and Ahtola 1990; Breckler and Wiggins 1989; Crites, Fabrigar, and Petty 1994; Eagly, Mladinic, and Otto 1994).

It should be recognized that the terms *affect*, *emotions*, *moods*, and *attitudes* have frequently been used inconsistently in the literature. We will revisit this issue when we consider both measurement issues and customer satisfaction research below. For now, we stress that when reading the literature, it is important to pay attention to how authors define affective (and related) terminologies and how they measure the variables to which the terminologies refer. One's definition of terms permits an interpretation of their meaning, but equally important is how the variables to which the terms refer are operationalized. Some authors have defined key variables as emotions, moods, or attitudes but have used operationalizations corresponding to different concepts. Other authors have used operationalizations for a single variable that cut across two or more instances of affect. To make clear our definition of emotions and how it differs from definitions of mood and attitudes, we present the following point of view.

Organizing Framework

Above we noted that emotions are mental states of readiness. But so, too, are moods and attitudes. How then might we distinguish between these affective states? For one thing, the state of readiness characterized by an emotion tends to be more intense than that characterized by moods or attitudes. It is more intense in the sense of

strength of felt subjective experience, plus magnitude of physiological response (e.g., autonomic nervous system activity) and extent of bodily expression (e.g., facial displays), when these latter reactions accompany an emotion.

Probably the most important factor differentiating emotions from moods and attitudes is the way emotions arise. Emotions are said to have a specific referent (e.g., a consumer becomes pleased when a new detergent removes grass stains from clothing; he or she is angered by poor service in a restaurant). Specifically, emotions arise in response to appraisals one makes for something of relevance to one's well-being. By appraisal, we mean an evaluative judgment and interpretation thereof. By something of relevance, we mean an incident or episode that happens to oneself (e.g., an unplanned event); a behavior one performs or a result one produces (e.g., engaging in an activity or receiving or failing to receive a planned outcome); or a change in an object, person, or thought that has personal meaning.

It is important to stress that although categories of events or physical circumstances are frequently associated with particular emotional responses, it is not the specific events or physical circumstances that produce the emotions but rather the unique psychological appraisal made by the person evaluating and interpreting the events and circumstances. Different people can have different emotional reactions (or no emotional reactions at all) to the same event or happening. Note, too, that appraisals can be deliberative, purposive, and conscious, but also unreflective, automatic, and unconscious, depending on the person and eliciting conditions for emotional arousal. The central role of appraisals in the formation of emotions has come to define what are aptly called appraisal theories in psychology (e.g., Frijda 1986; Lazarus 1991; Ortony, Clore, and Collins 1988; Roseman 1991; Smith and Ellsworth 1985).

Appraisal theorists maintain that the critical determinant of any emotion is the resultant evaluation and interpretation that arise after comparing an actual state with a desired state. Two appraisals are particularly crucial at this stage of emotion formation: goal relevance and goal congruence (Lazarus 1991). That is, a necessary condition for an emotional response to an event or happening is that a person has a personal stake in it and at the same time judges the event or happening to facilitate or thwart this stake. Again, the appraisal can occur consciously or unconsciously.

A distinctive feature of appraisal theories is their specification of the conditions leading to discrete emotional responses. Forced to be brief, we focus on Roseman's (1991) version of appraisal theories, which differs in relatively minor ways from other leading theories. Roseman hypothesized that particular combinations of five appraisals determine which of 16 unique emotions will be experienced in any given situation. Figure 1 summarizes his theory, where the five appraisals are labeled motive

FIGURE 1
**Roseman's (1991) Appraisal
Theory of Emotions**

SOURCE: Roseman (1991:193). Reprinted with permission.

consistent/motive inconsistent (i.e., positive emotions versus negative emotions), appetitive/aversive (i.e., presence of a reward vs. absence of a punishment), agency (i.e., outcome is perceived caused by impersonal circumstances, some other person, or the self), probability (i.e., an outcome is certain or uncertain), and power (i.e., strong versus weak coping potential).

For example, pride occurs when one evaluates his or her own performance of an action or achievement of an outcome in a positive light (e.g., a feeling of having done well). Here the positive emotion is motive consistent, either appetitive (e.g., having attained a positive goal) or aversive (e.g., having avoided a punishment), self-produced under weak or low coping potential, and either certain or uncertain, depending on the circumstances. Sadness happens when one experiences a loss for which one recognizes that nothing can be done to restore it. The loss, which is of something or someone valued, is experienced negatively and with high certainty under conditions of low coping power. It is perceived to be caused by impersonal circumstances.

One value of appraisal theories is that it is possible to account for most emotions. Indeed, subtle combinations of appraisals yield discrete emotional responses. Anger and regret, for example, differ primarily in only one type of appraisal and share in the other four, namely, anger occurs when a person sees another person as the source of injury to oneself or to another person viewed as a victim of injustice, whereas regret results when one's negative outcome is attributed to actions or inactions of the self.

Not every emotion is accounted for by Roseman's framework (or by any other framework for that matter). For instance, pride is regarded as a positive emotion in Roseman's framework, yet excessive or exaggerated pride (sometimes termed *hubris*) can invite retribution. Likewise, shame and guilt are thought by Roseman to be produced by similar appraisals, but other researchers have found important distinctions between shame, guilt, and embarrassment (e.g., Lewis 1993). Likewise, disgust has been studied extensively and found to differ from distress (e.g., Rozin, Haidt, and McCauley 1993). Nevertheless, in contrast to other theories of emotion that conceive of it in bipolar terms (e.g., pleasure-displeasure and high arousal-low arousal [Russell 1980] or high negative affect-low negative affect and high positive affect-low positive affect [Watson and Tellegen 1985]), Roseman's framework and other appraisal theories not only allow for many discrete emotions but specify conditions for their occurrence.

An elaboration of appraisal theories that is especially relevant for marketing is the treatment of goals, which may be defined as "internal representations of desired states, where states are broadly defined as outcomes, events, or processes" (Austin and Vancouver 1996:338). Oatley and Johnson-Laird (1987) proposed what they termed a *communicative theory of emotions* wherein events are evaluated in relation to a person's goals. Emotions are thought to function to coordinate parts of one's cognitive system so as to manage responses to events and in so doing change from ongoing to new activities or to maintain desired states or activities. The self-regulation of goals is believed to be the main function of emotions:

Each goal and plan has a monitoring mechanism that evaluates events relevant to it. When a substantial change in probability occurs of achieving an important goal or subgoal, the monitoring mechanism broadcasts to the whole cognitive system a signal that can set it into readiness to respond to this change. Humans experience these signals and the states of readiness they induce as emotions. (Oatley 1992:50)

According to Oatley and Johnson-Laird (1987), emotions are evoked "at a significant juncture of a plan . . . typically . . . when the evaluation (conscious or unconscious) of the likely success of a plan changes" (p. 35). Positive emotions (e.g., happiness, elation, joy) are associated with the attainment of a (sub)goal, which usually leads to a decision to continue with the plan, whereas negative emotions (e.g., frustration, disappointment, anxiety) result from problems with ongoing plans and failures to achieve desired goals (see also Stein, Liwag, and Wade 1996).

Emotions have implications for action and goal attainment. Lazarus (1991) identifies coping responses as

important mechanisms in this regard. When we experience a negative emotion (e.g., anger, sadness, fear), we are in disequilibrium and wish to return to our normal state. Either one or both of two coping processes are typically used: problem-focused coping, where we attempt to alleviate the sources of distress, or emotion-focused coping, where we either change the meaning of the source of distress (e.g., deny that a threat exists, distance oneself from the source of distress) or avoid thinking about a problem.

By contrast, coping with positive emotions often involves sharing one's good fortune, savoring the experience, working to continue or increase the rewards, and increasing physical activity. Positive emotions are sometimes accompanied as well by higher levels of physiological arousal, expanded attention, increased optimism, enhanced recall, and a shift from self- to other-centered orientations (e.g., becoming friendlier, caring about others), when compared, say, to sadness. Indeed, positive emotions, particularly happiness, frequently stimulate helping or altruistic actions. Why? Schaller and Cialdini (1990) offer two explanations: "First, we may propose that positive mood leads to enhanced helping via the more positive outlook and enhanced activity that appear to spring automatically from the experience of happiness," and second, "we argue that happiness is associated with a motivation toward disequilibrium—toward the possible attainment of additional personal rewards that transcend the basic concern over one's mood" (pp. 284-285). The personal rewards referred to here concern such self-enrichment motives as affiliation, achievement, competence, and esteem.

Closely related to coping responses are action tendencies. An action tendency is "a readiness to engage in or disengage from interaction with some goal object" and includes "(i)m pulses of 'moving towards,' 'moving away,' and 'moving against'" (Frijda, Kuipers, and ter Schure 1989:213). Some theorists maintain that emotions are not merely reactions to appraisals of events but also include action tendencies as part of their meaning (Frijda 1986). Others go further and maintain that action tendencies are automatic, "prewired" responses connected to emotions (LeDoux 1996). And in Frijda's (1986) treatment, emotions are conceived as the entire process from stimulus event to action and arousal:

Stimulus event → event coding → appraisal (evaluation of relevance, context, and urgency/difficulty/seriousness of event) → action readiness ↗
↓
arousal

Much as emotions arise in response to patterns of appraisals, Frijda (1986; Frijda et al. 1989) has shown that patterns of action readiness correspond to distinct emotion

categories (e.g., avoidance with fear, helping with caring, helplessness with sadness, assault with anger, withdrawal with shame).

Finally, it has been argued that many coping responses to emotions are volitional (Bagozzi 1992:186-189). The process begins with outcome-desire units and appraisals of changes or anticipated changes in goal attainment or goal progress. Four appraisal classes can be identified. Outcome-desire conflicts happen when one fails to achieve a goal or when one experiences an unpleasant event. One or more emotional reactions occur to outcome-desire conflicts (e.g., dissatisfaction, anger, shame, guilt, sadness, disappointment, disgust, regret), depending on attributions of the source of goal failure or the unpleasant event (i.e., self, other person, or external cause). The coping response(s) to these emotions, in turn, is selected from the following: intent to remove or undo harm, obtain help or support, decrease outcome, reevaluate goal, or redouble effort, if appropriate, depending on the specific emotion involved.

Outcome-desire fulfillment takes place when one achieves a goal, experiences a pleasant event, or avoids an unpleasant event. One or more emotional reactions come about when outcome-desire fulfillment happens (e.g., satisfaction, joy, elation, pleasure, pride, relief, caring, love), again depending on attributions of the source of good fortune. The coping responses to these emotions include an intention to maintain, to increase, to share, or to enjoy the outcome.

Outcome-desire conflicts and fulfillment refer to outcomes in the past or present. The following two appraisal classes go on with regard to planned outcomes. Outcome-desire avoidances transpire in anticipation of unpleasant outcomes or goals. Fear or its variants (e.g., worry, anxiety, distress) are the emotional reactions to this appraisal. The coping responses to these emotions entail either an intention to avoid undesirable outcomes or to reinterpret the threat.

The final class of appraisals, outcome-desire pursuits, happen in anticipation of pleasant goals or outcomes. Hope is the emotional reaction to such appraisals. The coping response(s) to hope includes intentions to realize or facilitate outcome attainment and to sustain one's commitment and vigilance.

The theory of self-regulation suggests that unique volitional responses underly coping for each particular emotion or class of emotions (Bagozzi 1992). In addition, the specific intention enacted depends on one's degree of self-efficacy in executing the coping responses. Somewhat analogous (appraisal → emotional reactions → coping) responses occur for outcome-identity conflicts, fulfillments, avoidances, and pursuits in social situations related to normative expectations (Bagozzi 1992:191-194).

Returning to the distinction between emotions and moods and attitudes, we might say that in addition to the

things mentioned earlier, emotions differ from moods and attitudes in the manner in which they arise and in their representation in memory. Emotions occur in response to changes in specific plans or goal-relevant events. As Oatley (1992) points out, emotions are manifest as "transitions from one sequence of action and another," but moods occur "when the cognitive system is maintained in an emotion mode for a period" (pp. 64, 91-92). Indeed, moods are often resistant to changes in events surrounding them. One reason for this is that moods "depend on the dissociability of control emotion signals from semantic information about causation" (Oatley 1992:64). In general, moods are elicited by "(a) after effects of emotions; (b) organismic conditions such as illness, fatigue, previous exercise, and good health, or pharmacological agents; (c) general environmental conditions and side-effects of activities: heat, noise, environmental variety, stressful conditions" (Frijda 1986:289).

Like emotions, attitudes can arise from changes in events, but attitudes also occur in response to mundane objects. In addition, arousal is a necessary part of emotions but not necessarily attitudes. Moreover, attitudes seem to have the capacity to be stored during long periods of time and retrieved, whereas emotions are not experienced in this way (i.e., emotions are ongoing states of readiness; they are not stored and retrieved, *per se*, although it is possible to recreate the conditions originally producing them in our memory and react emotionally to the thoughts so generated, at least up to a point; emotions can, however, be classically conditioned, but it is unclear whether attitudes can). Finally, the connection of emotions to volition and action is stronger and more direct than it is for attitudes. Emotions directly stimulate volitions and initiate action, but attitudes may require an additional motivation impetus, such as desire (Bagozzi 1992).

MEASUREMENT OF EMOTIONS

The measurement of emotions could focus on a full set of signs or evidence, including evaluative appraisals, subjective feelings, body posture and gestures, facial expressions, physiological responses, action tendencies, and overt actions. Whatever measurements one uses should, of course, be tied to an underlying theory of emotions.

Some authors (e.g., most appraisal theorists) construe emotions as mental states or processes, and thus it would be prudent to directly measure the cognitive activities comprising the emotional content of these states or processes, from this perspective. Self-reports of one's subjective experiences constitute the most frequently used procedures in this regard, although other methods for indicating emotional memory processes might be used as well (e.g., response time, subliminal priming). From the point of view of mental conceptualizations of emotions,

physiological, motor, or biological indicators would be at best considered correlates or indirect measures of emotions.

Other researchers who interpret emotions in broader terms, as either the whole process from the coding of events to action responses (e.g., Frijda 1986) or as complex patterns of physiological responses (e.g., Cacioppo, Berntson, and Klein 1992) maintain that emotional experience is a function of somatovisceral activation, afferentiation, and cognitive operations; LeDoux 1996 emphasizes brain processes, especially the role of the amygdala) stress the need for measurement processes going beyond self-reports. Depending on the theorist, overt behaviors or physiological reactions may be considered either a part of what it means to have an emotion or antecedents, concomitants, or possibly even effects of an emotion. More behaviorally or physiologically oriented researchers obviously employ measures of emotions consistent with these interpretations.

Marketers have tended to take an empirical approach to the measurement of emotions and to rely on self-reports (i.e., either unipolar or bipolar items on questionnaires). In the typical application, many items cutting across numerous positive and negative emotions are administered to measure reactions to a stimulus, and such methods as factor analysis, multidimensional scaling, or cluster analysis are used to identify the underlying emotional dimensions for the sample at hand. The number of items investigated in this regard has been as large as 180 (Aaker, Stayman, and Vezina 1988), while a paper-and-pencil technique (basically a single item measured continuously while viewing an ad) has even been suggested to register "warmth" toward a stimulus ad (Aaker, Stayman, and Hagerty 1986; see also Russell, Weiss, and Mendelsohn 1989).

Two influential studies in the measurement of emotional responses toward advertisements are those by Edell and Burke (1987) and Holbrook and Batra (1987). Edell and Burke (see also Burke and Edell 1989) developed a 52-item scale for measuring emotions towards ads, while Holbrook and Batra worked with a 94-item scale, which was later reduced to 34 items (Batra and Holbrook 1990).

With so many items measuring emotions, a question arises whether a small number of basic dimensions underlie people's responses. Edell and Burke (1987) analyzed the items in their scale and found three factors: upbeat feelings, negative feelings, and warm feelings. Likewise, Holbrook and Batra (1987) used factor analysis, but in a slightly different way. Their 94 items were first generated a priori to measure 29 emotional indices. For example, joyful, happy, delighted, and pleased were hypothesized to indicate a joy index, and ashamed, embarrassed, and humiliated were hypothesized to indicate a shame index. Then, based on factor analyses of the 29 indices, a three-factor solution for emotions was found: pleasure, arousal, and domination. Similarly, Batra and Holbrook (1990)

factor analyzed 12 emotional indices (largely a subset of those revealed in Holbrook and Batra, with a few exceptions) and discovered three factors corresponding closely to those discovered by Edell and Burke. Other researchers (e.g., Oliver 1994; Westbrook 1987), also using factor analysis, have found emotional items to load on two factors: positive affect and negative affect.

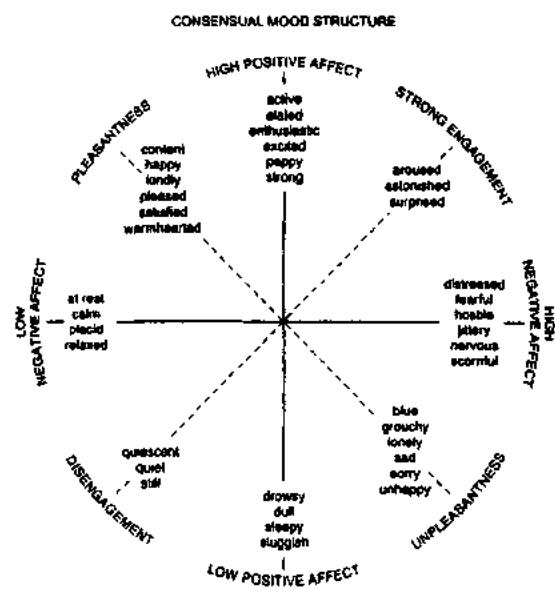
Richins (1997) recently argued that consumption-related emotions are more complex than the two- and three-factor solutions observed in studies of reactions to ads or customer satisfaction. Moreover, because exploratory factor analyses often yield a small number of factors, she used a multidimensional scaling procedure, in conjunction with examination of clusters based on location and semantic similarity of emotional descriptors in two-dimensional space. Sixteen clusters of emotions were identified, each measured by 2 to 8 indicators (in Study 4): anger, discontent, worry, sadness, fear, shame, envy, loneliness, romantic love, love, peacefulness, contentment, optimism, joy, excitement, and surprise.

Although the approaches used by marketers to date have been largely empirically driven (e.g., Edell and Burke 1987; Holbrook and Batra 1987; Oliver 1994; Richins, 1997; Westbrook 1987), they are consistent in certain senses with leading perspectives on emotions in psychology. For example, Holbrook and Batra's (1987) three-factor pleasure-arousal-domination findings are somewhat similar to Russell and Mehrabian's (1977) three-factor pleasure-arousal-dominance model. However, some differences can be pointed out. The most important are the high loadings of sadness and fear on the domination factor in Holbrook and Batra's study, in contrast to the more common outcome of sadness loading on or near the negative pole of a pleasure-displeasure factor, and fear loading about 45 degrees away from displeasure and toward greater arousal (e.g., Russell, 1997).

Similarly, the three factors found in Edell and Burke's (1987) study (i.e., upbeat feelings, negative feelings, and warm feelings), correspond roughly to the high positive affect-low positive affect, high negative affect-low negative affect, and pleasantness-unpleasantness dimensions, respectively, of Watson and Tellegen's (1985) circumplex model; the positive-affect and negative-affect factors observed by Oliver (1994) and Westbrook (1987) also align to a great extent with factors on the circumplex model (see also Mano and Oliver 1993).

The circumplex structure of emotions is shown in Figure 2. This representation of emotions has also been called the two-factor model, because, based on the techniques used to generate it (e.g., factor analysis or multidimensional scaling), emotions can be arranged around two orthogonal axes. Russell (1997) terms the axes pleasure-displeasure and arousal-sleepiness, while Watson and Tellegen (1985) label them high positive affect-low positive

FIGURE 2
Watson and Tellegen's Two-Factor Structure of Affect



SOURCE: Watson and Tellegen (1985:225). Copyright © 1985 by the American Psychological Association. Reprinted with permission.

affect and high negative affect-low negative affect. Russell's interpretation is essentially the same as Watson and Tellegen's pleasantness-unpleasantness and strong engagement-disengagement axes, which are rotated 45 degrees from their primary axes (but see Larsen and Diener 1992).

The idea behind the circumplex model is that emotions exist in bipolar categories (e.g., happy-sad, nervous-relaxed) and can be arranged in a continuous order around the perimeter of a two-factor space. The closer emotions are to each other on the perimeter, the more similar they are. For example, excited and aroused are more similar than are content and aroused (see Figure 2). The origin or center of the circumplex is thought to represent a neutral point or adaptation level.

The circumplex model is appealing because it is intuitive, simple, and provides a description of which emotions are similar and which are dissimilar. However, it has drawbacks. The most serious limitation is that it is based on empirical associations among experienced emotions and has nothing to say about the conditions (e.g., appraisals) producing emotions. Then, too, the circumplex model can obscure subtle differences in emotions. Depending on eliciting conditions and people's appraisals, each of the emotions grouped together within any particular category on the circumplex can be distinct from its cocategory members. For example, it is possible to feel fearful without

feeling hostile (see "high negative affect" in Figure 2). Then, too, the circumplex contains categories that may not correspond to emotions. For instance, surprised, drowsy, and sleepy do not seem to reflect emotions. On the other hand, the circumplex fails to represent well instances of emotion important in everyday life and marketing. It does not accommodate love, disgust, pride, hope, guilt, shame, or embarrassment very well, to name a few. The various two- and three-factor summaries of emotions disclosed in marketing also include variables not reflective of emotions and exclude instances generally recognized as emotions.

Richins's (1997) Consumption Emotions Set (CES) with its 16 descriptors is appealing because it covers most emotional reactions one encounters in consumption, and its measures achieved satisfactory reliability (except for measure of envy, loneliness, peacefulness, and contentment). The CES would be best used within the context of a particular theory of emotions to operationalize specific categories of emotions hypothesized to serve as antecedents, consequences, or moderating variables. The CES could also be used to operationalize emotions in more empirically oriented studies, but whether measures of each dimension would achieve discriminant validity is problematic. Most studies incorporating multiple instances of both positive emotions and negative emotions find that the measures load on two factors corresponding to positive and negative emotions (e.g., Bagozzi, Baumgartner, and Pieters, 1998; Oliver, 1994).

This raises the question of when one can expect discrete emotional reactions versus amalgamated groupings of, say, positive emotions and negative emotions (e.g., highly correlated feelings of anger, sadness, and fear). The advantage of a theory-based approach to emotions is that specific conditions can be specified for the occurrence of distinct emotions, and these hypotheses can be tested. It is for these reasons that we used appraisal theories as our organizing framework for looking at emotions. Discrete emotional reactions are likely to happen when one manipulates conditions producing specific appraisals or when naturally occurring events correspond to unique appraisal conditions. Gopinath and Bagozzi (1999), for example, were able to induce independent emotional reactions toward three targets in a moviegoing context. On the basis of Roseman's (1991) theory, distinct emotional reactions were produced as a function of three-way interactions between motive consistency-inconsistency, appetitive-aversive, and self-other agency conditions. For example, admiration, affection, dislike, and contempt resulted toward a group member in decision making with regard to movie choice, and pride, shame/guilt, and regret resulted toward the self in group decision making, depending on the three appraisal conditions. Likewise, happiness, satisfaction, annoyance, or frustration occurred toward the

movie, and pleasure, contentment, irritation, or anger occurred toward the theater, depending on the three appraisal conditions. Scenarios were used to create the appraisal conditions.

By contrast, research not based on manipulations of appraisal conditions or based on reactions to a single stimulus frequently finds that emotions cluster in two and, on occasion, three factors (e.g., Edell and Burke 1987; Holbrook and Batra 1987; Oliver 1994; Westbrook 1987). Furthermore, research examining the construct validity of measures of discrete emotions obtained in nonexperimental survey settings shows that discriminant validity is often lacking among measures of different positive or different negative emotions (e.g., Bagozzi 1993) or between measures within a particular subcategory of positive or negative emotions, such as among measures of elation, gladness, and joy (Bagozzi 1991a).

What accounts for the differences in findings between experimental research based on appraisal theories and survey research or research based on reactions to a single stimulus measured by inventories of emotional items? One possibility may be that discrete emotional reactions are short-lived or, once activated, stimulate other emotional reactions closely related to them. Consider, for example, sadness: "[W]hen we experience loss, we rarely feel a single emotion such as sadness. We grieve, are angry, anxious, guilty, envious, even hopeful, and defensive" (Lazarus 1991:250). A reason why these emotions may go in tandem is that coping processes for sadness may involve active struggle or even protest against loss, which results in other emotions. Alternatively, the absence of discrete emotions may simply reflect how difficult it is to create them. As Izard (1972) noted, pure emotions are "virtually impossible to obtain in the laboratory or in any research setting" (p. 103). However, as noted above, researchers have recently found that the use of scenarios in an experimental context can generate discrete emotional responses (e.g., Gopinath and Bagozzi 1999; Roseman 1991).

Another factor that might account for a coalescence of multiple positive emotions and multiple negative emotions in two corresponding groupings is the nature of the stimulus under study. Most stimulus ads, products, or brands are complex, and the appraisals engendered are typically variegated, but related. Also the way in which items are presented on some questionnaires makes it difficult to uncover discrete emotional components. When multiple measures of a single discrete emotional response (e.g., happy, pleased, and joyful for "joy") are interspersed throughout a questionnaire, this tends to reduce correlations among items purported to indicate the same response and to increase correlations of these items with measures of other responses. The result is predictably a reduction in discriminant validity and high correlations among items

measuring positive emotions and among items measuring negative emotions. The alternative is to group items by the emotional response they are intended to tap, which tends to increase correlations among measures of the same thing and decrease correlations among measures of different emotional responses. Thus, a trade-off is entailed by use of either practice.

An issue that has received little attention in marketing is whether to use unipolar or bipolar items to measure emotions. The choice can influence findings and their interpretation in fundamental ways. Some leading scholars claim that emotions are in the final analysis bipolar states or processes. We are either happy or sad, for example, and any other pattern (e.g., independence or concomitance) is thought to be an artifact of measurement error. Although a number of studies have shown that pleasant and unpleasant emotions are independent (e.g., Bradburn 1969; Diener and Emmons 1985; Zevon and Tellegen 1982), Green, Goldman, and Salovey (1993) and Barrett and Russell (1998) argue and present findings demonstrating that emotions are bipolar, once random or both random and systematic errors are taken into account.

Bagozzi, Wong, and Yi (1998) challenge the conclusions made by Green et al. (1993) and Barrett and Russell (1998). They hypothesize that bipolarity, independence, and concomitance depend on gender, culture, and the target of one's emotions. Briefly, Bagozzi, Wong, and Yi found that positive and negative emotions were highly negatively correlated for American women but highly positively correlated for Chinese women. The former pattern is evidence for bipolarity (i.e., either positive or negative emotions occur but not both), the latter for concomitance (i.e., both positive and negative emotions occur at the same time). For men, the correlations between positive and negative emotions were much smaller in magnitude but in the same direction across ethnicity, that is, slight negative correlations were found for American men, slight positive correlations for Chinese men. Thus, the relationship between positive and negative emotions for men was nearly independent. Bagozzi, Wong, and Yi argued that differences in culture (i.e., a tendency for Americans to view things in dichotomies or discrete categories, i.e., in opposition; and a tendency for Chinese to view things dialectically, i.e., in balance or harmony) interact with gender differences (i.e., a tendency for women to be more knowledgeable and skilled in the use of emotions than men) to produce the divergent patterns. The above findings resulted when people were asked to express how they felt at the moment according to their idiosyncratic reasons, which is the standard procedure used in the literature. That is, the stimulus for each person could be considered heterogeneous across individuals. However, when Americans and Chinese were asked to give their emotional reactions

to eating in fast-food restaurants (a common, singular stimulus), positive and negative emotions were independent for men and women alike.

It is perhaps too early to give definitive recommendations on which emotional scales to employ in empirical work, but for now, we think that it is advisable to recommend use of unipolar scales that ask respondents to express to what extent each emotion describes their own subjective feelings, rather than bipolar scales that can obscure differences in emotional responses across the various dimensions. Also, at least five, preferably seven to nine, scale steps should be used for each item to enhance the chances that optimal distributional properties of measures will be achieved. In addition, at least three, preferably more, items should be used for each emotional subcategory.

A final measurement issue we wish to raise is the following. To what extent are emotions blends of categories? For ease of discussion, we consider the categories of emotions presented on the circumplex. Pleasantness-unpleasantness might combine, for instance, with arousal to produce different kinds or intensities of emotion. To take a particular example, consider happiness, an instant of pleasantness on the circumplex. Intense forms of happiness occur when pleasantness combines with high arousal: elated, excited, enthusiastic, euphoric, gleeful, joyous, ecstatic, and exultant are examples. Mild forms of happiness occur when pleasantness combines with low arousal: peaceful, calm, serene, or quietude of mind are examples. Happiness, itself, might be at an intermediate level of arousal. Other perspectives on blended emotions, based not on a blend of arousal with emotion categories but rather on combinations of "basic" emotions, can be found in Izard (1991, 1992) and Plutchik (1980).

What more general role, if any, does arousal play in emotions (Bagozzi 1991b)? We turn to this issue next.

AROUSAL

An early, influential point of view on emotions was professed by James ([1890] 1950) who claimed that "*bodily changes follow directly the perception of the exciting fact, and... our feeling of the same changes as they occur IS the emotion*" (p. 449, emphasis in original). For James, different stimuli lead to different bodily responses (e.g., sweaty palms, racing heart, etc.), these physiological responses are then detected as bodily sensations in our mind, and the result is interpreted by us as emotional experiences. But it is important to note that James reserved this interpretation for what he termed the "coarser" emotions (e.g., "grief, fear, rage, love"), which involve strong bodily perturbations; he was less clear about what he termed the "subtler" emotions

(e.g., "moral, intellectual, and aesthetic feelings" (James [1890] 1950:468).

An equally influential theory of emotions was proposed by Schachter and Singer (1962), who argued that emotion is essentially bodily arousal plus a cognitive label one provides to diagnose his or her felt arousal, a perspective consistent with James's point of view. The idea is that we first experience physiological arousal, and, especially when we are unaware or uncertain of the origin of the arousal, we look for evidence in the physical and social situation accompanying the arousal to label our emotional state. Although this theory had considerable impact in psychology for nearly three decades, it has largely been discredited and has not received much supporting evidence beyond Schachter and Singer's original experiment (e.g., Manstead and Wagner 1981; Reisenzein 1983). One exception to the above observation is the frequently repeated finding that arousal misattributed to an extraneous source intensifies emotions (e.g., Cantor, Bryant, and Zillman 1974; Dutton and Aron 1974; Zillman 1971).

An important contribution of James ([1890] 1950) and Schachter and Singer (1962) was the recognition that arousal plays an essential role in emotion. Before we address arousal more fully, we should mention research in marketing that addresses the acquisition of affect, without necessarily involving concepts of arousal or information processing. Both in the practice of marketing and marketing research, considerable emphasis has been placed on the effects of various stimuli on consumer behavior. Retail store environment cues, advertising, background music, brand names, packages, celebrity endorsers, and other stimuli are frequently administered to produce emotional reactions in consumers. The premise is that emotions or moods trigger buying responses (e.g., Gardner 1985; Hill and Gardner 1987).

If not by appraisal processes or direct arousal, *per se*, how does presentation of a stimulus under repetitive conditions induce affect? A seductively simple explanation was provided by Zajonc, who argued that "when objects are presented to the individual on repeated occasions, the mere exposure is capable of making the individual's attitude toward these objects more positive" (Zajonc and Markus 1982:125). This "mere exposure" effect has been found primarily when the stimulus is simple and previously unknown or else has little or no semantic content (e.g., nonsense syllables, foreign words of Chinese characters). One mechanism that has been offered to explain the mere exposure effect is familiarity: we come to like things that are familiar to us, perhaps because of feelings of security (Zajonc 1968). However, a full theoretical explanation for the mere exposure effect has not been developed. When a person is exposed to meaningful stimuli, it has been more difficult to produce the mere exposure effect (e.g., Obermiller 1985). This is, in part, a consequence of the cognitive processing that occurs in response

to awareness of the meaningful stimuli. Repeated exposure to a meaningful stimulus can lead to increased or decreased positive or negative feelings, depending on its meaning. Mere exposure, thus, loses its utility in such cases, both as a theory and a practical tactic.

Based loosely on the notion that emotions or moods induced by one stimulus become attached to another, some researchers have investigated the effects of (a) music on length of stay and money spent in supermarkets and restaurants (e.g., Milliman 1982, 1986) and (b) affective tone of stores on purchase intentions (e.g., Donovan and Rossiter 1982) and evaluations (e.g., Gardner and Simokos 1986). How can the observed attachment of affect from one stimulus to another be explained? Shimp (1991) reviews seven studies in consumer research that test various facets of classical conditioning explanations. The idea behind classical conditioning is that the repeated pairing of a conditioned stimulus (e.g., a new brand name) with an unconditioned stimulus (e.g., an attractive spokesperson) will eventually lead to the new brand name, on its own, stimulating the unconditioned response (e.g., positive affect) originally induced by the unconditioned stimulus. Very few studies have been performed in marketing that conform to the conditions required to test classical conditioning. It is unclear whether classical conditioning studies can be designed to rule out such rival explanations as demand characteristics or cognitive interpretations of the results. Allen and Janiszewski (1989) provide some evidence that at least one type of cognitive mediation is necessary for classical conditioning to occur: namely, subject awareness of the contingency between the conditioned stimulus and unconditioned stimulus. On the other hand, classical conditioning, particularly for fear responses, has been shown to involve unconscious arousal processes connected with the amygdala (LeDoux 1996).

Another way to explain the observed attachment of affect from one stimulus to another is by Zillman's (1971) excitation-transfer model. Briefly, Zillman proposed that exposure to one stimulus may produce arousal. If a second stimulus is presented close on that also is capable of producing arousal on its own, the two sources of arousal may combine to produce intensely experienced arousal. Under certain conditions (e.g., unawareness of the source of arousal from the first stimulus, recency of the second), a person may attribute the arousal to the second stimulus. Zillman (1983) interpreted arousal as undifferentiated sympathetic activation.

An issue in need of resolution is whether emotions can occur without arousal. Cognitive theories of emotions (e.g., appraisal theories) seem to allow that emotions can be produced by cognition alone, without arousal (e.g., Parrott 1988). But does arousal always accompany the experience of emotions?

Recent research suggests that arousal is an essential component of emotion and is manifest in neural systems in

the brain. LeDoux (1996) reviews evidence suggesting that there are at least five arousal systems in the brain contributing complexly to emotional experience. Four of these are in regions of the brain stem and rely respectively on acetylcholine, noradrenaline, dopamine, and serotonin for activation. A fifth (the nucleus basalis) is in the forebrain and also relies on acetylcholine to arouse cortical cells. LeDoux notes that the arousal systems act in nonspecific ways throughout the forebrain to make cells more sensitive to incoming signals. In a sense, the nonspecific arousal interacts with the information processing of a particular stimulus. The amygdala acts as a kind of central processor and interacts with the prefrontal cortex (working memory and attention), hippocampus (long-term explicit memory), and sensory cortex (perception and short-term storage) to influence emotional responses. The amygdala not only influences cortical areas of the brain but also receives input from arousal networks (which themselves also influence the forebrain) and feedback from bodily expression of emotions. In addition, signals from the amygdala are sent to muscles and internal organs and glands.

Most of the research to date into the role of arousal systems and the amygdala in emotional behavior has been limited to a small number of emotions (e.g., fear). But it is believed that each emotional response is mediated by separate neural systems, although each may overlap or resemble each other in many respects. In sum, LeDoux (1996) and other brain researchers (e.g., Damasio 1994) construe emotions as biological functions of the nervous system (see also Zajonc 1998).

To our knowledge, there has been little work to either integrate or reconcile cognitive theories of emotions with neural and biological theories. Much remains to be done in psychological research before we can make definitive statements about the precise role of arousal in emotional experience and behavior.

At least three studies have examined limited aspects of arousal in marketing-related contexts. Sanbonmatsu and Kardes (1988) found that arousal may govern attitude formation in persuasive message settings. Attitudes were based on peripheral cues when respondents were highly aroused but on argument strength when they were moderately aroused. It is unclear whether arousal functioned here to reduce information-processing capacity of external arguments or focused attention on internal reactions.

Bagozzi (1994) found that consistent with predictions by knowledge-assembly theory (Hayes-Roth 1977), arousal transformed a two-dimensional, affective-cognitive representation of evaluations of giving blood into a one-dimensional, unitized representation. Likewise, arousal increased the association between attitudes and positive beliefs about the consequences of giving blood and decreased the association between attitudes and negative beliefs. These predictions on the associations between

attitudes and beliefs were explained by the implications of spreading activation effects of arousal and coping responses, wherein individuals attempt to avoid negative and facilitate positive associations of beliefs with attitudes. In another study, Bagozzi (1996) found that for attitudes toward giving blood, high arousal tends to enhance a halo effect from attitudes to positive beliefs and reduce the halo from attitudes to negative beliefs about the consequences of giving blood.

Clearly, arousal is a fundamental aspect of behavior related to emotions. We must acknowledge that appraisal theories have not done a good, or at least complete, job of incorporating arousal into their frameworks. In their defense, however, we should mention the following. Appraisal theorists recognize that the intensity of emotional experience consists of two components: arousal and self-control (e.g., Frijda 1994:120). Likewise, researchers accept that "autonomic nervous system and other physiological processes" at least accompany subjectively felt emotions (e.g., Oatley 1992: 21) and that "[i]f the criterion of physiological activity was eliminated from the definition, the concept of emotion would be left without one of the important response boundaries with which to distinguish it from nonemotion" (Lazarus 1991:58-59). But is there more to arousal in emotion than this?

Some psychologists and marketers have been quick to dismiss Zajonc's (1980) claim that "preferences need no inferences" (see Cohen and Areni 1991:215-216; Lazarus 1982; Marcel 1983; Zajonc 1984). However, we believe it is important, at the present, to recognize that emotional meanings can be processed subconsciously, emotions can be activated automatically, and responses to emotions (e.g., coping, action tendencies, actions) also can occur automatically. We leave open the possibility that "emotion and cognition are best thought of as separate but interacting mental functions mediated by separate but interacting brain systems" (LeDoux 1996:69; see also Oatley 1992, chap. 1). It appears that arousal is a key part of emotional functions in the brain that underlies much of its automaticity. Cognitive appraisals and arousal need to be better incorporated into our theories of emotion.

EMOTIONS AS MARKERS, MEDIATORS, AND MODERATORS OF CONSUMER RESPONSES

Based on content, most advertisements can be divided into two categories: (a) thinking ads, where focus is placed on either factual information (e.g., product attributes) or utilitarian consequences of product/service use (e.g., savings in time or money) or (b) feeling ads, where concentration is placed on the emotions one will experience through use or ownership of a product (see Puto and Wells's [1984] similar distinction between informational and

transformational advertising). Rather than focusing on the stimulus, *per se*, it is more important to emphasize the processes and experiences comprising a person's response to ads, to better understand the emotional meaning of ads (e.g., Friestad and Thorson 1986).

Paralleling the above differentiation between types of ads and the emotional-cognitive division in mental processes mentioned earlier, Batra and Ray (1986) developed a framework and coding scheme for classifying affective responses to ads, as a complement to cognitive responses. Specifically, Batra and Ray (1986) identified three positive affective response categories: surgency-elation-vigor/activation (SEVA), deactivation, and social affection feelings. The SEVA feelings refer to upbeat, happy mood reactions (e.g., "the ad's music was 'catchy,' the ad was 'fun to watch or breezy,' or . . . a likable use of humor"); deactivation includes soothing, relaxing, quiet, or pleasing reactions; and social affection encompasses feelings of warmth, tenderness, and caring (Batra and Ray 1986:241). The three positive affective responses were used along with six cognitive responses (i.e., support arguments, counterarguments, execution discounting, execution bolstering, neutral distracters, and other reactions) in a study of the impact of television commercials on consumers. A total of 12 percent of reactions to ads were classified as positive affect: SEVA (3.7%), deactivation (2.5%), and social affect (6.1%).

One use of emotional reactions in the above sense might be as markers or indicators of the effectiveness of advertising copy, particularly with respect to the overall persuasiveness of the ad, the appeal of spokespersons, evaluation of particular product claims, and appraisals of other aspects of the execution (Wiles and Cornwell 1990). Also, the program surrounding an ad (e.g., happy versus sad content) has been found to have main effects on one's evaluation of an ad and recall (e.g., Goldberg and Gorn 1987). Future research is needed to identify how program content and advertising appeals interact to influence consumer emotional responses.

A research question that has received quite a bit of attention in recent years is how and to what extent emotional reactions to ads influence consumer decision making. Most often these reactions have been measured as attitudes (e.g., liking) toward the ad (e.g., Brown and Stayman 1992; Mitchell and Olson 1981; Shimp 1981).

Attitude toward the ad (A_{ad}) is thought to be a function of feelings (and thoughts) about the ad itself (e.g., Batra and Ray 1986; MacKenzie, Lutz, and Belch 1986). In fact, Batra and Ray (1986) found that the three affective responses discussed above significantly predicted A_{ad} even after controlling for the effects of cognitive responses. A number of researchers have examined the conditions under which emotions influence A_{ad} . For instance, under low-involvement viewing conditions, feelings about the ad have been found to be more important determinants of

A_{ad} than thoughts (e.g., how informative or useful the ad is), but under higher involvement viewing, both feelings and thoughts may be important (e.g., Miniard, Bhatla, and Rose 1990). Presumably, high involvement promotes cognitive processing of the usefulness of the ad and its content.

A majority of research has addressed the effects of A_{ad} , especially on attitudes toward the brand (A_b). Classic attitude theory maintains that A_b is a function of beliefs about brand attributes or consequences of product use. Mitchell and Olson (1981) and Shimp (1981) were the first to find that A_{ad} provided additional explanatory power for A_b over and above brand beliefs (see also Edell and Burke 1987). Batra and Ray (1986) found, however, that affective responses toward the ad influenced A_b only indirectly through A_{ad} .

Some research has addressed the conditions under which A_{ad} influences A_b . For example, Brown and Stayman (1992) revealed in their meta-analysis that the effects of A_{ad} on A_b are greater for novel than well-known brands and for durable and other goods versus nondurables. Some evidence also exists showing that A_{ad} influences A_b indirectly through its effect on beliefs about the brand (MacKenzie et al. 1986). Finally, Stayman and Aaker (1988) showed that repetition governs the feelings to A_{ad} relationship. Under levels of low versus high repetition, feelings have a stronger effect on A_{ad} . This may be a consequence of greater information processing under high versus low repetition.

In addition to the transfer of affect from ad emotions to A_{ad} , research shows that brand names and feelings toward ads can become linked in memory. Stayman and Batra (1991) found that respondents exposed to an affective, as opposed to an argument, ad were able to retrieve brand attitudes faster, when primed with the brand name. In addition, the positive retrieved affect had a stronger influence on choice in low- than in high-involvement contexts. In a second study, Stayman and Batra demonstrated that viewers of an ad who were in a positive affective state more strongly evoked the affect when given the brand name as a subsequent retrieval cue than viewers exposed to the ad while not in a positive affect state.

Olney, Holbrook, and Batra (1991) investigated a hierarchical model explaining advertising viewing time. The effects of ad emotions (i.e., pleasure and arousal) were mediated by A_{ad} and reactions to ad content. Interestingly, arousal had both indirect and direct effects on viewing time, even after controlling for ad content and A_{ad} . Arousal was measured by self-reports.

Emotions have been found to serve as moderators in their impact on A_b . Batra and Stayman (1990), in one of the few studies to examine mood and print ads, found that positive moods enhance A_b through their interaction with two cognitive processes: "(1) a bias against the generation of negative thoughts (such as evoked by weak arguments),

leading to a more favorable evaluation of message arguments, and (2) a reduction in total cognitive elaboration, making processing more heuristic than systematic" (pp. 212-213). An interesting finding was that positive moods seem to reduce counterargumentation when weak arguments are used in ads (see also Worth and Mackie 1987). Batra and Stephens (1994) also investigated the moderating effects of mood on A_b . Specifically, they showed that mood and motivation (the latter conceived as degree of relevance of the product category for consumers) interacted to govern A_b when consumers watched television ads. The greatest impact on A_b occurred when positive moods ensued under conditions of low motivation. The rationale is that positive moods and low motivation suppress counterargumentation (and therefore lead to more favorable A_b) in comparison with high-motivation conditions.

Following the elaboration likelihood model (ELM) (e.g., Petty and Cacioppo 1986), we might expect emotions to have one or both of two effects. Emotions might operate centrally to influence cognitive processes (e.g., with regard to argumentation), or emotions might function peripherally (perhaps through associative or affect transfer mechanisms). Early predictions under the ELM took an either-or perspective and stressed that when the processing of information in a communication is low (e.g., due to low motivation, distraction, low need for cognition, weak arguments), emotional content in the communication (e.g., an attractive spokesperson) is processed directly and transfers to, or influences, attitude toward the product or message. When issue-relevant thinking is high, attitude change is thought to be a function of the balance of pros and cons in the communication, a largely rational process, and emotion may not be a factor.

Over time, the role of emotion in persuasive communication has been found to be more complex than the simple central versus peripheral processing alternatives specified in the ELM (e.g., Wegener and Petty 1996). For example, when the likelihood of information processing is moderate, emotions have been found to affect the extent to which arguments in a communication become elaborated. Positive (versus neutral) moods tend to lead to less processing of arguments (e.g., Bless, Bohner, Schwarz, and Strack 1990; see also discussion below on the effects of emotions on cognitive processes). By contrast, when people process the arguments in a message closely, mood might bias information processing or even function as an argument itself (Forgas 1995). Another explanation for mood effects is that sad or neutral (versus happy) moods lead to more effortful processing, which is believed to be done spontaneously (e.g., Bohner, Chaiken, and Hunyadi 1994). Note that this prediction seems to conflict with the observations made by Schaller and Cialdini (1990), who analyzed mostly nonpersuasive communication studies. Some clarification for the discrepancy in interpretations can be seen

in a study by Wegener, Petty, and Smith (1995). Wegener et al. (1995) discovered that happy (versus sad) moods lead to the processing of more arguments in a message when a "proattitudinal/uplifting" position was taken, but happy (versus sad) moods lead to less processing of arguments when a "counterattitudinal/depression" position was taken. Wegener et al. (1995) explain the findings, in part, by suggesting that when in a happy mood, people try to maintain their mood and thus process less of the counterattitudinal/depression content.

In addition, interactions of emotions sometimes occur with other variables, such as motivational or ability factors. For instance, Wegener, Petty, and Klein (1994) found that for people high in need for cognition, messages framed positively (i.e., good things will happen if people adopt the advocacy) were more persuasive when the audience was happy (versus sad), but messages framed negatively (i.e., bad things will happen if people do not adopt the advocacy) were more persuasive when the audience was sad (versus happy). Wegener et al. (1994) explained these findings by claiming that good outcomes seem better and more likely to occur while in a good (versus sad) mood, and bad outcomes seem worse and more likely to occur while in a sad (versus happy) mood.

Finally, even when the likelihood of information processing is low (due, e.g., to low need for cognition or low relevance of a product for a consumer), the mood of the audience can have a direct effect on A_b , but when the likelihood of information processing is high, the mood of the audience affected message-generated thoughts consistent with the mood (Petty, Schumann, Richman, and Strathman 1993). Mood was induced by a television program or music.

THE EFFECTS OF EMOTION 1: INFLUENCES ON COGNITIVE PROCESSES

A person's emotional state can influence various aspects of information processing including encoding and retrieval of information, different strategies used to process information, evaluations and judgments, and creative thinking. In this section we examine the influence of affective states on various aspects of cognitive processes.

Emotion/Mood Effects on Memory

The influence of mood states on memory can be broadly classified into three categories: retrieval effects, encoding effects, and state-dependent learning effects. In the following section, we review some of the studies that have investigated these effects and discuss the mechanism by which affect influences memory.

Retrieval effects. Affect has been shown to influence retrieval of information, whereby persons in a positive mood state at the time of retrieval have been found to show superior recall of positive material learned during encoding, relative to neutral or negative material (Isen, Shalker, Clark, and Karp 1978; Laird, Wagener, Halal, and Szegda 1982; Nasby and Yando 1982; Teasdale and Russell 1983). For example, Isen et al. (1978) had respondents study positive, negative, and neutral words. Either positive, neutral, or negative mood states were induced in these respondents. Respondents in the positive-mood condition retrieved more positive words compared with neutral or negative words. Isen et al. (1978) suggest that thinking about mood-incongruent material involves shifting one's focus, which is cognitively taxing, and therefore people are more likely to focus on mood-congruent material. Another mechanism proposed to explain the retrieval effects of positive affect suggests that positive mood at the time of retrieval functions as a cue that primes the positive material in memory, making these material more accessible (Isen 1989; Isen et al. 1978; also see Tulving and Pearlstone 1966 for a discussion on the effects of priming on accessibility). The easier accessibility of positive material may then influence other cognitive processes such as evaluations and decision making, and also subsequent behaviors. While retrieval effects have been replicated by many researchers using different mood induction and testing techniques, a few prominent studies have failed to detect retrieval effects (Bower, Monteiro, and Gilligan 1978; Bower, Gilligan, and Monteiro 1981), leading Isen (1984) to speculate that this failure may have been caused by the specific material and induction methods (such as hypnosis) used in these studies.

Encoding effects. Mood states have also been shown to exhibit encoding effects whereby the affective state at the time of learning is associated with superior memory for similarly valenced material (Bower and Cohen 1982; Forgas and Bower 1987). Nasby and Yando (1982) found that positive mood at the time of learning led to an improved recall of positive material at a later point in time regardless of the mood state at the time of recall. Bower et al. (1981) found evidence for the encoding effect of both positive and negative affect. Respondents were made to feel happy or sad and then read descriptions of various psychiatric interviews. Happy respondents learned many more happy facts than sad facts, while sad respondents learned many more sad facts than happy facts.

How can the encoding effects of mood be explained? Bower and colleagues (e.g., Bower and Cohen 1982) have suggested that mood-congruent material is likely to be more semantically elaborated relative to mood-incongruent material. Forgas and Bower (1987) found that in impression formation situations, sad individuals spent more time examining negative rather than positive

information, and they subsequently recalled the negative information better. Conversely, happy individuals spent more time on the positive information and recalled that better at a later time. The greater levels of associations evoked by mood-congruent material may have caused a more extensive elaboration, which, in turn, requires more time. However, Isen et al. (1978) and Srull (1983) failed to find any encoding effects of affect.

State-dependent learning effects. A third memory effect of mood is the state-dependent learning effect of affect, where any material regardless of its affective valence learned under a particular mood state is recalled better when the person is again in that affective state (Bartlett, Burleson, and Santrock 1982; Bartlett and Santrock 1979; Bower, Monteiro, and Gilligan 1978; Bower, Gilligan, and Monteiro 1981). Bower et al. (1978) had respondents learn two sets of words, one while they were in a positive affective state and the other in a negative mood. When respondents who learned the two lists in different moods recalled the words in the wrong mood (e.g., when words learned in a positive mood were recalled while respondents were in a negative mood), they experienced interference and the average recall rate was less than 50 percent. When respondents who learned two lists in different moods recalled the words in the correct mood, the average recall rate was more than 70 percent. Control respondents who learned and recalled both lists while in the same mood showed an average recall rate between 50 and 60 percent. Bower and Cohen (1982) suggest that the respondents' mood at the time of learning becomes associated with the learned material and that these associations facilitate the recall of learned material when the mood state at recall matches the mood state at encoding (also see Bower 1981 for a description of his semantic-network theory).

Evidence for mood state-dependent learning has been ambiguous. Many studies have failed to find any state-dependent effects of mood state (Bower and Mayer 1985; Isen et al. 1978; Laird et al. 1982; Nasby and Yando 1982). Eich and Birnbaum (1982) and Isen (1984, 1989) have suggested that when the material to be learned has semantic meaning, the stimulus will be encoded according to this meaning, and the influence of the mood state in the encoding and subsequent retrieval processes will be minimal. However, when the stimulus lacks meaning, contextual cues such as affective states at the time of learning may be more strongly encoded with the learned material. At the time of retrieval, these memory items, which have few semantic associations, are more primed by the matching affective state at recall.

Asymmetric effects of positive and negative moods. While positive affective states have been shown to have significant influences on recall, negative affect has sometimes been found to have either no effect or a much smaller

effect on the recall of negative material from memory. Asymmetric effects of positive and negative moods have been found for retrieval effects (Isen et al. 1978; Nasby and Yando 1982; Teasdale and Fogarty 1979), encoding effects (Nasby and Yando 1982), and state-dependent learning effects (Bartlett and Santrock 1979; Bartlett et al. 1982). Isen (1984) speculated that positive affect is structured in a broad and extensive manner (i.e., highly interconnected with other memories), while negative affect is more narrowly and less well connected with other material, and that specific negative affective states such as anger and sadness may be organized separately in memory. This, in turn, would make it difficult for any given negative mood to act as an effective retrieval cue. It is not readily apparent why negative affect would be less well connected in memory and positive affect more widely interconnected as Isen suggests, considering that negative affect usually signals problematic environmental conditions that may require problem solving (Schwarz and Clore 1983; Wegener et al. 1995). One of the side effects of this hypothesized interconnectedness of positive memories is the greater creativity and cognitive flexibility demonstrated by people in positive moods, a topic we review briefly later in this article.

Mood maintenance and repair have also been put forward as explanations for the asymmetric effects of positive and negative moods. Isen (1984) has suggested that happy individuals attempt to prolong their positive affective state by focusing on the positive aspects of their stimulus (mood maintenance), while individuals in a negative mood try to improve their situation by not focusing on negative memories (mood repair). Isen (1989) noted that in some of the studies showing symmetrical effects of positive and negative mood (Bower et al. 1978, 1981), respondents were instructed to maintain their induced moods, and this may have discouraged them from engaging in mood repair strategies. However, the mood repair explanation is not without problems. If sad respondents engage in mood repair, why is there no evidence for mood-incongruent recall effects? After all, an effective strategy to improve a depressed mood state is to engage in pleasant thoughts and memories. Yet, evidence seems to show that negative mood inhibits the recall of positive memories (e.g., Isen et al. 1978). The competing explanations of memory structure differences and mood maintenance/repair have also been used to explain differences in information-processing strategies of happy and sad individuals, a topic we discuss later in this article.

Mood, Categorization, and Creativity

Various studies investigating the influence of mood on categorization have found that people in positive mood

states, compared with those in neutral or negative mood states, tend to be better at integrating information, finding relationships among stimuli, and at finding creative solutions (Isen and Daubman 1984; Isen, Daubman, and Nowicki, 1987; Isen, Johnson, Mertz, and Robinson 1985; Isen, Niedenthal, and Cantor 1992; Murray, Sujan, Hirt, and Sujan 1990). For example, respondents in positive mood conditions tended to group a wider range of neutral stimuli together (Isen and Daubman 1984). They also rated words such as *cane*, *ring*, and *purse* as being better exemplars of the category "clothing," than did the neutral-mood respondents. Murray et al. (1990) found that positive-mood respondents, compared with respondents in other mood states, formed broader categories when focusing on similarities among exemplars and narrower categories when focusing on differences, prompting them to suggest that what positive mood promotes is not broader categorization but rather cognitive flexibility. Isen et al. (1985) found that positive-mood respondents tended to give more unusual responses to neutral words in word association tests. For example, in response to the word *house*, positive-mood respondents were more likely than were neutral-mood respondents to mention unusual first associates such as *security*, *residence*, and *apartment*, suggesting that positive-mood states may influence cognitive organization, resulting in more flexible interpretation of relationships among stimuli. This cognitive flexibility also results in enhanced creativity. Isen et al. (1987) found that respondents in positive-mood states outperformed those in neutral- and negative-mood states on tests requiring creative solutions. These researchers suggest that positive-mood respondents were better at creative problem solving since such tasks required the ability to see relatedness among seemingly unrelated stimuli, and as we have seen earlier, positive affect results in more flexible cognitive organization.

Mood Effects on Evaluation

One of the best-recognized and most robust effects of mood is its influence on evaluation. Individuals in positive-mood states have been shown to evaluate stimuli more positively than individuals in neutral- or negative-mood states, whether the stimuli being studied are other people (Clore and Byrne 1974;Forgas and Bower 1987), consumer goods (Isen et al. 1978; Srull 1983), life satisfaction (Schwarz and Clore 1983), or past life events (Clark and Teasdale 1982). The reliability of mood effects on evaluation is perhaps best illustrated by the fact that evaluations of the pleasantness of neutral/ambiguous stimuli are used as checks for mood manipulation (e.g., Isen et al. 1985, 1987). Isen et al. (1978) found that respondents in whom positive mood was induced were more likely to rate their cars and televisions more favorably

compared with respondents in neutral-mood states. In the case of memory-based evaluations, if the recalled information is biased by the mood (as discussed in the following section), then evaluations that follow will be biased too. On-line processing of evaluations can also be influenced by mood states through the retrieval of information congruent with the mood (Clore, Schwarz, and Conway 1994).

A competing explanation based on the feelings-as-information model (see Schwarz 1990; Schwarz and Bless 1991; Schwarz and Clore 1983) suggests that individuals may assume that their mood states are affective reactions to the object being evaluated and thus base their evaluations on their affective states. For example, a happy individual when asked to evaluate a painting may ask the question, "How do I feel?" and infer that his or her positive mood is a reaction to the painting and therefore come to the conclusion that he or she likes the painting. The feelings-as-information hypothesis suggests that when individuals attribute their mood state to something else other than the object being evaluated, the effect of mood on evaluation should disappear. Schwarz and Clore (1983) found support for this hypothesis when they showed that although people called on sunny days reported more life satisfaction than people called on cloudy days, the differences disappeared when the interviewer casually mentioned the weather to the individuals. Presumably, the casual mention of the weather made people attribute their mood to the weather, and hence the mood lost any diagnostic value in evaluating life satisfaction. In other words, people may use their moods as the basis for forming evaluations of objects unless the diagnostic value of the mood is discounted. Clore et al. (1994) compared the two explanations for mood effects on evaluation and suggested that individuals may use feelings as information when the evaluation task is affective in nature, when other information is lacking, when the information is complex, or when there are time constraints.

Although mood effects on evaluation have been replicated often, a few prominent studies have shown that mood states will not influence evaluation when the object being evaluated is highly familiar and for which past evaluations exist in memory (e.g., Salovey and Birnbaum 1989; Srull 1983, 1984). Srull (1984, Experiment 3) found that the evaluations of a car made by novices, but not by experts, were influenced by mood state. Novices, by definition, are unfamiliar with the product category and are more likely to engage in on-line evaluations, which are more susceptible to mood influences. Experts, on the other hand, have prior evaluations available in memory and so do not engage in on-line evaluations and are less likely to be influenced by mood. Similar findings have been obtained by Salovey and Birnbaum (1989, Experiment 3) and Schwarz, Strack,

Kommer, and Wagner (1987). We discuss this and other related issues in greater detail later in this article.

Mood Effects on Information Processing

It has been suggested that the mood maintenance strategy used by people in positive moods may also cause them to avoid investing cognitive effort in tasks unless doing so promises to maintain or enhance their positive mood (e.g., Isen 1987; Wegener et al. 1995). Consequently, people in positive-mood states may not be motivated to engage in systematic processing of information and may use heuristic processing instead. Positive affect usually denotes a benign environment that does not require any action. On the other hand, negative affective states act as information signaling that the environment poses a problem and may motivate people to engage in systematic processing, which is usually better suited to handling threatening situations (Schwarz 1990; Schwarz and Clore 1983). Various studies have found evidence suggesting the use of heuristic processing by people in positive moods and systematic processing by people in negative moods (e.g., Bless et al. 1990, 1996; Mackie and Worth 1989). Bless et al. (1990) presented happy and sad individuals with either strong or weak counter-attitudinal arguments. Sad individuals were influenced only by strong arguments, while happy individuals were equally influenced by strong and weak arguments. These effects have been consistently replicated and have been interpreted as providing evidence for reduced systematic processing by individuals in positive affective states. The two major mechanisms that have been used to explain mood effects on information-processing strategies are the same as those used to explain the asymmetric effects of mood effects on memory, namely, the highly interconnected nature of positive memories and mood maintenance.

In discussing the asymmetric effects of positive and negative affect on memory, we had briefly discussed Isen's (1984) contention that positive concepts are more highly interconnected in memory relative to negative ideas. Isen (1987) and Mackie and Worth (1989) have argued that since positive memories are highly interconnected, positive mood will prime and activate some related and many unrelated positive memories, thus leading to cognitive capacity constraints. Because individuals do not have the cognitive resources to engage in systematic processing, they resort to the less demanding heuristic processing.

A second explanation for mood effects on cognitive processing is based on the concept of mood maintenance. Isen (1987) has suggested that individuals in a positive affective state are motivated to maintain their mood and may avoid cognitive activity that could interfere with their positive mood. Thus, individuals in a happy mood are

unlikely to engage in systematic processing of information (also see Bohner, Crow, Erb, and Schwarz 1992).

Another motivation-based explanation for the reduced processing under positive mood has been offered by Schwarz and colleagues (e.g., Schwarz and Clore 1983) using their feelings-as-information hypothesis. Negative affective states inform people that they may be facing a problem and this may provoke systematic processing of information that is better suited to problem solving. Positive mood, on the other hand, informs the individual that the environment is benign and thus he or she may not be motivated to engage in effortful cognitive processing. A fourth hypothesis suggests that the motivation to simplify processing is not what causes the reliance on heuristic processing; rather, it is the increased use of heuristic processing by these happy-mood individuals that results in simplified processing (e.g., Bless et al. 1996).

Although the increased reliance on heuristics by individuals in positive moods has been replicated many times, there have been studies that have shown that positive moods could lead to both increased or diminished levels of cognitive processing (e.g., Martin, Ward, Achee, and Wyer 1993). Wegener et al. (1995) have presented empirical support for their hypothesis that positive moods could lead to either lesser or greater levels of information processing, depending on whether happy individuals believe that systematic processing will lead to the maintenance or destruction of their positive mood. People in a positive-mood state, who believe that systematic processing of a message would help maintain their mood, may engage in more detailed processing. However, if they view systematic processing of that message as a threat to their positive-mood state, they would avoid elaborate processing. This hedonic contingency mood management is especially likely to be seen in positive-mood individuals who have the most to lose by incorrectly engaging in systematic processing. Sad individuals, by contrast, have less to lose, since processing messages might make them feel better (Wegener and Petty 1994). Wegener et al. (1995) suggest that most of the previous research in which positive moods have been shown to lead to reduced message processing have involved counterattitudinal or otherwise unpleasant cognitions (e.g., Mackie and Worth 1989). Since the systematic processing of counterattitudinal or unpleasant messages is unlikely to help maintain a positive mood, individuals choose not to use systematic processing.

Forgas (1994, 1995), building on Fiedler's (1990) dual-force model, has recently presented the *affect infusion model*, which suggests that the various explanations for mood effects on memory and information processing (such as mood maintenance, feelings as information, affect priming) are not necessarily competing models but could rather be complementary explanations. He suggests that affect infusion into judgmental processes takes place

when the judgments require a high degree of constructive (on-line) processing. Affect does not influence those judgments that call for the retrieval of preexisting evaluations or for information processing that is highly specific and not requiring constructive processing. Forgas (1994, 1995) suggests that *direct-access processing* (a low-affect infusion strategy) is used when the evaluative target is familiar and when there are no strong cognitive, affective, or situational factors that call for systematic processing. Accordingly, individuals who evaluate very familiar objects would be using direct-access processing, and hence mood effects would not be found in such cases (cf. Srull 1984). Another low-affect infusion strategy is *motivated processing*, where the information search and the evaluative outcome are guided by prior motivational goals such as mood repair (see Forgas 1995 for a detailed discussion). When the evaluative target is simple, the personal relevance is low, the individual has limited cognitive capacity, or the accuracy requirements are not high, the individual may resort to *heuristic processing*, a high-affect infusion strategy. Under these circumstances, evaluations may be based on the existing mood, as in the feelings-as-information hypothesis (cf. Schwarz and Bless 1991). When the judgmental situation requires the individual to learn and process novel information, and when he or she has adequate cognitive capacity and motivation to process the information, *substantive processing* is predicted to take place. According to Forgas (1995), this default strategy, which is used if other less effortful strategies are inadequate, involves constructive processing and is one that is susceptible to affect infusion (cf. Srull 1984).

THE EFFECTS OF EMOTIONS 2: INFLUENCE ON VOLITIONS, GOAL-DIRECTED BEHAVIOR, AND DECISIONS TO HELP

Sometimes emotions spur one onto action; at other times emotions inhibit or constrain action. But only recently have researchers devoted much attention to studying how this occurs.

Bagozzi, Baumgartner, and Pieters (1998) investigated the role of anticipatory emotions in goal striving. In a panel study of consumers' efforts to lose or maintain their body weight, people first reacted to the possibility of achieving or not achieving their goals with well-defined positive and negative anticipatory emotions. The anticipatory emotions then energized volitions in the form of intentions, plans, and the decision to expend energy in the service of goal striving. Volitions, in turn, were shown to influence goal-directed behaviors related to exercising and dieting. Next, the intensity of execution of these behaviors contributed to degree of goal attainment. Goal-outcome emotions subsequently followed.

Anticipatory emotions functioned in the following manner. Respondents indicated which emotions they anticipated they would experience if they were to achieve their goal (i.e., excitement, delight, happiness, gladness, satisfaction, pride, and self-assurance) and which emotions they anticipated they would experience if they were to fail to achieve their goal (i.e., anger, frustration, guilt, shame, sadness, disappointment, depression, worry, uncomfortableness, and fear). The key processes are similar to forward-looking counterfactual thinking processes (e.g., Roese and Olson 1995) or what Gleicher et al. (1995) term "prefactuals." The decision maker begins by "imagining the possible" (i.e., identifying and evaluating the consequences occurring if one were to achieve one's goal or not). The alternative consequences to imagined goal success and goal failure serve as input to appraisal processes and felt emotional experiences. People are then motivated to choose actions promoting the positive affect and avoiding the negative affect associated with goal attainment and goal failure, respectively.

Four other studies support the above role for prefactuals in decision making. Boninger, Gleicher, Hetts, Armor, and Moore (1994) discovered that prefactuals with regard to the purchase of insurance in a laboratory game influenced subsequent action to take insurance. Gleicher et al. (1995) found that prefactuals concerning condom use affected positive attitudes; however, intentions to use condoms were not influenced by prefactuals, although the difference in means between experimental and control groups was in the predicted direction. Perugini and Bagozzi (1998) also showed that anticipated emotions were instrumental in influencing desires, volitions, and behavior in a study of exercising and an investigation of studying behaviors (see also Parker, Manstead, and Stradling 1995; Richard, van der Pligt, and de Vries 1995). Finally, Brown, Cron, and Slocum (1997) replicated the model proposed by Bagozzi, Baumgartner, and Pieters (1998) in a study of goal pursuit by salespeople.

Although emotions often function in broad categories of positive and negative affect, specific subcategories may have special relevance in certain contexts. Verbeke and Bagozzi (1998) studied the behavior of 458 salespeople in Europe who sold financial services and found that two negative emotions were particularly important: shame and embarrassment. These self-conscious emotions encompass personal standards with regard to acceptable thoughts, feelings, and actions. Shame occurs when one fails to live up to an ideal and another person whose approval is important to oneself judges this failure critically. Embarrassment is generated either when the self does something inappropriate in public or the other with whom one interacts does something inappropriate, but in contrast to shame, the threat under embarrassment is less fundamental and involves relatively trivial and even humorous behaviors (e.g., passing gas audibly while in a

sales negotiation). With embarrassment, the threat is to the "presented self," and one feels foolish and awkward; with shame, the threat is to the "core self," and one feels quite pained, perhaps even humiliated or devastated. Verbeke and Bagozzi (1998) found that salespersons' propensity to experience shame and embarrassment led to particular protective or coping responses: the greater the shame and embarrassment, the greater the impulse to hide, to withdraw, and to avoid contact with customers. These coping responses, in turn, negatively influenced sales performance.

The study by Verbeke and Bagozzi (1998) illustrates dysfunctional effects of negative emotions (see also Verbeke and Bagozzi 1999). Yet, negative emotions can have pro-social consequences in certain instances. Bagozzi and Moore (1994) investigated the role of negative emotions and empathy on decisions to give help to abused children. In Study 1, the effects of a negative emotional-appeal ad were compared with those of a rational-appeal ad; in Study 2, the effects of three levels of intensity of negative-emotion appeals were examined. The negative emotional ads featured a young boy in his home running away from his father in terror. Both studies demonstrated that four negative emotions (anger, sadness, fear, tension) and four aspects of empathy (perspective taking, compassion/pity, protection motivation, fantasy elaboration) mediated the effects of viewing negative emotional ads on decisions to help. Stronger felt negative emotions in the audience led to greater feelings of empathy, and this, in turn, enhanced the decision to help victims of child abuse.

A final area where emotions play a key role in promoting action is in goal setting. We can think of goal setting in terms of a hierarchy of three classes of goals (Bagozzi and Dholakia 1998; Pieters, Baumgartner, and Allen 1995). A focal or basic-level goal answers the question, "What is it that I strive for?" For example, a consumer may have a goal to lose body weight. The means for achieving this goal can be interpreted as subordinate goals and answer the question, "How can I achieve that for which I strive?" Various types of exercising behaviors and dieting activities are examples of subordinate goals for the focal goal of losing weight. Superordinate goals constitute reasons for pursuing a focal goal and answer the question, "Why do I want to achieve that for which I strive?" Bagozzi and Edwards (1998) investigated the hierarchical structure for superordinate goals governing body weight maintenance and found that happiness was an important goal toward which the focal goal and other more concrete superordinate goals pointed (other superordinate goals included, for example, social acceptance, self-esteem, look good, feel good, and fit into clothes). Happiness, or more generally personal welfare, seems to be a central motive spurring one onto action. We turn now to the role of happiness and other emotions in customer satisfaction.

EMOTIONS AND CUSTOMER SATISFACTION

Early research viewed customer satisfaction as a key outcome of product/service purchase, whereby a comparison is made between expectations of performance and actual performance, and satisfaction arises when actual performance is greater than or equal to expected performance, and dissatisfaction occurs otherwise (e.g., Oliver 1980; Yi 1990). Westbrook (1987) explored the influence of positive affect and negative affect on satisfaction, along with expectation beliefs and disconfirmation beliefs. Satisfaction with automobiles was a function of positive affect, negative affect, expectations of receiving benefits and liabilities, and disconfirmation beliefs. Satisfaction with cable television was determined by positive affect, negative affect, and disconfirmation beliefs. Westbrook and Oliver (1991) found that three emotional responses were important antecedents of satisfaction of newly purchased automobiles: pleasant surprise, interest, and hostility.

Oliver (1993) expanded the determinants of satisfaction to include positive affect (interest and joy) and negative affect (anger, disgust, contempt, shame, guilt, fear, sadness), as well as disconfirmation beliefs. In addition, attribute satisfactions and attribute dissatisfactions were hypothesized as direct determinants of satisfaction, as well as indirect (through positive and negative affect) determinants. Satisfaction with automobiles was found to be a function of attribute satisfaction, attribute dissatisfaction, positive affect, negative affect, and disconfirmation. Satisfaction with a required university course was also found to be determined by these antecedents, except attribute dissatisfaction.

The investigation of the impact of emotions on postpurchase reactions is an important development in marketing. However, it is unclear whether satisfaction is phenomenologically distinct from many other positive emotions. Satisfaction is neither a basic emotion nor a central emotional category in leading theories of emotions (e.g., Frijda 1986; Lazarus 1991; Oatley 1992; Roseman 1991; Smith and Ellsworth 1985). Furthermore, Shaver, Schwartz, Kirson, and O'Connor (1987) found that satisfaction shares much common variance with such positive emotions as happiness, joy, gladness, elation, delight, and enjoyment, among others. Likewise, Nyer (1997b) discovered that measures of joy and satisfaction loaded on one factor.

Although we leave open the possibility that measures of satisfaction can achieve discriminant validity from measures of joy, happiness, and other positive emotions, we believe that this will be very difficult to produce in practice. Also, no theory exists for specifying the conditions

under which satisfaction exists uniquely from many other positive emotions. We suspect that previous studies finding discriminant validity for measures of satisfaction can be explained by the way items were presented on the questionnaire (e.g., separation of measures of satisfaction from measures of other positive emotions) or the lack of inclusion of a sufficient number of positive emotions. No study to date has performed either a rigorous experimental or survey (e.g., multitrait-multimethod) examination of construct validity of measures of satisfaction, joy, and related positive emotions.

The centrality of satisfaction in marketing studies is perhaps more due to being the first emotion to receive scrutiny in postpurchase behavior research than to constituting a unique, fundamental construct in and of itself. Indeed, it is likely that—depending on the situation, product, and person—other positive and negative emotions are more important outcomes of purchase. Under certain conditions, frustration, anger, disappointment, alienation, disgust, anxiety, alarm, guilt, shame, joy, happiness, hope, pride, jubilation, excitement, relief, amusement, and pleasure, among many other negative and positive emotions, might be more valid reactions consumers have to purchases. By the same token, the implications of emotional reactions in purchase situations on complaint behaviors, word-of-mouth communication, repurchase, and related actions may differ for various positive and negative emotions and be of more relevance than reactions to satisfaction or dissatisfaction, per se.

Research by Nyer (1997a, 1997b) addresses appraisal theories and their role in postconsumption responses. Nyer found that such postconsumption responses as repurchase intentions, word-of-mouth intentions, and other reactions are predicted best by using measures of satisfaction plus measures of other emotions. Other studies of note investigating the role of specific emotions in customer satisfaction include those done by Dubé, Bélanger, and Trudeau (1996); Folkes, Koletsy, and Graham (1987); and Taylor (1994).

We are uncertain whether a single, summary emotional response such as satisfaction is feasible or even desirable. But if one is to be discovered, it may lie more in emotions more closely connected to human welfare or emotional well-being (e.g., Diener and Larsen 1993). In this regard, for example, a case could be made for happiness as a fundamental emotion related to the purchase of goods and services, in particular, and emotional well-being, in general (Bagozzi forthcoming).

SOCIAL BASES OF EMOTIONS

Although people can experience emotions privately, such as in response to physical danger, a case can be made

that emotions are most often interpersonal or group-based responses. Unfortunately, the vast majority of research into emotional behavior has had an individualistic slant to it (e.g., Parkinson 1995). Marketing relationships seem to be contexts where more social conceptualizations of emotions would be worth pursuing. For example, Ruth, Otnes, and Brunel (1998) review studies where discrete emotions are central in gift exchanges, and they show how appraisals lead to emotions and how emotions relate to interpersonal relationships and disposition of gifts. A related area in need of study is the management of emotions by organizations and by the self (e.g., Bagozzi 1992; Hochschild 1983; Locke 1996). Finally, cultural aspects of emotions deserve further inquiry (e.g., Markus and Kitayama 1994).

CONCLUSIONS

Emotions are ubiquitous throughout marketing. They influence information processing, mediate responses to persuasive appeals, measure the effects of marketing stimuli, initiate goal setting, enact goal-directed behaviors, and serve as ends and measures of consumer welfare. Yet, we are only beginning to understand the role of emotions in marketing.

The following areas constitute opportunities for future research:

Area No. 1. Exactly how are appraisals conducted and how do they lead to emotional reactions in consumers? In what sense are appraisals conscious and purposive versus automatic? What is the role of the amygdala, hippocampus, and other neural systems in appraisals? What are the essential elements of cognitive appraisals in emotional behavior and how can they be influenced by marketing stimuli?

Area No. 2. Related to No. 1, but also more generally throughout the processes involved in emotional responses, what role does arousal play? What is physiological arousal and how does it relate to appraisals, coping responses, action tendencies, and behavior? What do self-reports of arousal really indicate? Is arousal an essential component of emotions? If so, how can marketers develop theories of emotions, better incorporating arousal, and how should arousal be measured?

Area No. 3. How do emotions affect information processing in consumer decision making? In what ways do emotions influence the encoding, storage, and retrieval of information? What contribution do emotions make to consumer decision making and choice?

Area No. 4. Are emotional reactions universal? In what ways do emotions differ across cultures? What role do socialization, ethnicity, and culture play in the representation, experience, and effects of emotions?

Area No. 5. Under what conditions do emotions function in discrete categories and what are the implications of

discrete emotions for consumer behavior? When do emotions function in clusters or as homogeneous groups, such as positive and negative categories?

Area No. 6. How do emotions function to influence the behavior of salespeople and managers? When are they functional or dysfunctional?

Area No. 7. How do consumers and managers control their emotions to advantage? What role do emotions play in self-regulation?

Area No. 8. How should emotions be measured in marketing? When are self-reports appropriate and inappropriate? How can physiological measures be incorporated? What are the consequences of treating emotions as unipolar versus bipolar responses?

Area No. 9. What are the distinctions between and relationships among emotions, affect, feelings, evaluations, moods, and attitudes?

Area No. 10. How are distinct emotions related to each other? Under what conditions, for example, does frustration lead to dissatisfaction? Shame lead to anger? Or love lead to happiness?

Area No. 11. An area neglected by marketers, but at the heart of the discipline, is the role of emotions in marketing exchanges and relationships. How do emotions initiate, maintain, or sever marketing relationships? Can emotions and marketing relationships be studied more dynamically as they evolve in real time and in context? What are the implications of treating emotions in marketing as social phenomena as opposed to strictly intrapsychic phenomena?

Area No. 12. Finally, is customer satisfaction a unique phenomenon or is it a subcategory of positive emotions? Likewise, is dissatisfaction a unique phenomenon, the polar opposite of satisfaction, or a subcategory of negative emotions? How do satisfaction/dissatisfaction and other emotions relate to customer loyalty, complaint behavior, and word-of-mouth behavior? What role do emotions play in the diffusion of innovations?

ACKNOWLEDGMENTS

The authors would like to thank Professor Julie Ruth for her comments on this article.

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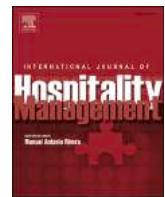
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Enhancing value co-creation behaviour in digital peer-to-peer platforms: An integrated approach

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ARTICLE INFO

Keywords:

Peer value co-creation behaviour
Peer perceived quality
Peer identification
Peer experience
Peer satisfaction
Peer motivation
Peer loyalty
Peer active participation

ABSTRACT

The rising number of digital peer-to-peer (P2P) platforms, e.g. Airbnb and HomeAway, has shaken up the hospitality industry by creating a specific context that leverages peer value co-creation behaviour (VCCB), but which, despite growing interest, remains under-explored. The purpose of this study is to further the understanding of peer VCCB in P2P digital platforms by investigating their antecedents and outcomes. Data are drawn from 24 interviews with managers, four focus groups with users of P2P platforms, and a survey using a sample of 712 peers. The main findings show that peers' identification, resource-sharing and experience are predictors of their VCCB, which, in turn, influences their motivation, relationships, loyalty and active participation in the platform. The study's implications propose guidelines to managers of P2P platforms on how to enhance peers' perceived quality, identification, resource-sharing and experience to increase their VCCB and active participation.

1. Introduction

P2P platforms, such as eBay, Peerby, AirBnB, BlaBlaCar etc. represent a new business model engendered by the digital transformation (Lund, 2021) whereby peers exchange services or goods through the buying and selling of goods, sharing and renting accommodation, and sharing or hiring rides, etc., and through enhancing "the shared creation, production, distribution, trade and consumption of goods and services" (Matofska, 2016, p.1). P2P platforms have opened up new markets and opportunities, providing new forms of income, peer-to-peer interaction, and facilitating relationships (Casais, Fernandes and Sarmiento, 2020; Stofberg and Bridoux, 2019). The P2P platform markets include "a wide range of new and emerging production and consumption models that involve the commercial exchange of goods and services between peers through digital platforms" (OECD), and contribute to the sharing economy, in which peer participation and involvement are critical (European Commission Report, 2017).

In the hospitality industry, P2P platforms offer many advantages to guests and property owners (Farmaki et al., 2010). To take advantage of this sharing economy trend, firms are integrating such platforms or creating their own to offer new experiences (Dolnicar, 2018; Lei et al.,

2020) to benefit from a novel peer-to-peer, or actor-to-actor orientation leading to value co-creation (Vargo and Lusch, 2011). Value co-creation has become an extensively investigated concept, predominantly since Prahalad and Ramaswamy (2000; 2004a; 2004b) and Vargo and Lusch (2004) observed it as developing into a novel service-dominant logic, suggesting that customers/actors are all co-creators of value (Vargo and Lusch, 2008; 2011; 2017). The service-dominant logic "is firm-centric and managerially oriented" (Vargo and Lusch, 2008, p.2) and has its origin in the foundational propositions that create value among organizations and stakeholders "in every aspect of the value chain and that it is the beneficiary who always uniquely and phenomenologically determines this value through value-in-use perceptions" (Merz et al., 2018, p.79).

The extant literature addressing value co-creation and service dominant logic (Payne et al., 2004; Gronroos, 2008; Vargo and Lush, 2008, (Ramaswamy and Ozcan, 2016; Vargo and Lusch, 2016) has attempted to understand how brand value may be co-created (Harmeling et al., 2017; Merz et al., 2018). There is a growing interest regarding value-co-creation in business-to-consumer literature. According to Foroudi et al. (2019b), value-co-creation is a concept related to the innovation, marketing and business paradigm, where customers'

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participation involves personalized experiences, goods and services, by being involved in the design procedure through their participation in the brand community. Value-co-creation is considered as the practice of emerging systems and products via an association with stakeholders, for instance customers, employees, suppliers, and managers (Ramaswamy and Gouillart, 2010), and as a collective, highly dynamic, continuous process amongst all the actors participating in networks of relationships (Iansiti and Levien, 2004), "all parties uniquely integrating multiple resources for their own benefit and for the benefit of others" (Vargo, 2008, p.211). The concept of value co-creation has been addressed from different perspectives, e.g. the customer/firm (Sashi, 2021), or guests and hosts (Yen et al., 2020). Merz et al. (2018) argued that value co-creation in digital platforms is expected to continue, triggering academic study, as very little is known about P2P VCCB and its influence on peers' participation in platforms. While there have been an increasing number of studies on the co-creation of value (e.g., Payne et al., 2009; Ramaswamy and Ozcan, 2016), studies addressing P2P value co-creation behaviour and the aspects leading to it are very scarce.

The purpose of this study is to uncover peers' value co-creation behaviour in a specific P2P digital platform in the hospitality sector. This context is different from the customer-to-customer context focused on by previous literature (Azer and Alexander, 2020) due to the P2P multi-layered relationships and characteristics, i.e. peer role fluidity, peer focus, dispersed beneficiaries, and reciprocity (Lin et al., 2019). To the best of our knowledge, P2P VCCB, with its antecedents and its outcomes has not been studied comprehensively. This study tries to understand how (i) peer perceived quality, (ii) peer affective and intellectual experience, (iii) peer-owned resources, and (iv) peer identification all interrelate in order to impact P2P value co-creation behaviour in digital platforms, and, in turn, how (i) peer VCCB, (ii) peer satisfaction, (iii) peer motivation, (iv) relationship with peers in the platform, and (v) peer loyalty all intertwine to impact active peer participation. Additionally, concept measures have been produced in relation to the customer-firm perspective. Adapting these to P2P VCCB and its related antecedents and outcomes is not appropriate.

To fill these gaps, this study builds on theories of service-dominant logic (Vargo and Lusch, 2004, 2006 Vargo et al., 2008), social identity (Bhattacharya and Sen, 2003), integrated service quality, and system and information quality (Xu et al., 2013) and the voluntary usage of resources (Harmeling et al., 2017) to develop an integrated approach to further the understanding of the intertwining between the antecedents of P2P value co-creation behaviour and its outcomes in terms of peer participation in the platform.

The rest of the paper is structured as follows. A literature review is carried out to discuss and build on existing knowledge of customers/company value-co-creation behaviour, and to suggest a research framework focusing on P2P value co-creation behaviour, its antecedents and outcomes. The method section is then covered, followed by the findings and discussion section. The paper concludes with implications for theories and practice, before proposing some future research areas.

2. Literature review and conceptual framework and hypotheses

The hospitality industry has been deeply disrupted by P2P platforms, allowing individuals to interact and transact directly with each other via the platforms without the intermediation of a company. In order to take advantage of this opportunity and contribute to the sharing economy, hospitality firms must encourage peers' active participation in those P2P platforms. P2P interaction in digital platforms is very important because it contributes to creating four types of experience: (i) pragmatic experience related to information acquisition about the supplier peer services, (ii) usability experience related to the computer-human interactions, (iii) sociability experience related to the social identity of peers within the peer platform, and (iv) hedonic experience related to entertaining the participants in the peer platform.

Extant knowledge on value co-creation behaviour has been

developed in an online brand community context. This study builds on existing knowledge to design a model that depicts the key antecedents of value co-creation behaviour (perceived quality, online community identification, corporate brand identification, user's resources, and experience) and outcomes (satisfaction, motivation, relationship strength, loyalty, and active involvement). The research model is demonstrated in Fig. 1.

2.1. Antecedents of VCCB

Perceived quality is a cognitive evaluation of the advantage or inferiority of a firm offering what is considered to be one of the main drivers of the purchase intention (Dodds et al., 1991; Jacoby and Olson, 1985; Kumar et al., 2009; So et al., 2021; Zhang et al., 2021). It can be measured through three components: (i) perceived information quality (Bailey and Pearson, 1983), (ii) perceived system quality (Gorla et al., 2010); and (iii) perceived service quality (Lien et al., 2017; Parasuraman et al., 1991; Zeithaml, 1988). Perceived system quality is the cognitive belief seen in user reactions (Bailey and Pearson, 1983), and concerns the favourable/unfavourable characteristics of the exchange information that "meet user needs according to external, subjective user perceptions ... conform to specifications and meet or exceed consumer expectations" (Kahn et al., 2002, p.185). It shows the extent to which a system is easy to learn, is error free, flexible, well-documented, and technologically sound (Gorla et al., 2010; Fang et al., 2008), and can be measured via the criteria of relevance, validity (accessibility), and interpretability, composed of completeness and accuracy. Perceived service quality pertains to overall assessment of the excellence and quality of services (Santos, 2003) and performance (Lien et al., 2017; Parasuraman et al., 1991; Zeithaml, 1988), and consists of three components: interaction, environmental, and outcome quality (Brady and Cronin, 2001, p.37).

The functional and technical aspects of service quality have a significant influence on the customer's assessment of a firm (Bloemer et al., 1999; Zeithaml, Berry, and Parasuraman, 1996; Xu and Du, 2018; Nyadzayo and Khajehzadeh, 2016; Orel and Kara, 2014), generating trust (Martínez and del Bosque, 2013; Singh et al., 2012; Veloutsou, 2015), and encouraging them to share their resources (e.g., knowledge, time, feedback) with other customers (Fang and Chiu, 2010; Gummeson and Mele, 2010; Hibbert et al., 2012). Understanding perceived quality is critical for firms as it helps to develop long-term interactions with customers (Malar et al., 2011). Customer perceived quality - referred to as one of the key psychological variables having an influence on consumer judgment regarding the quality of products/services - can also shape customer identification (Ahearne et al., 2005; Foroudiet al., 2021a, 2021b, 2021c). Customers identify favourably with firms which are perceived to offer products and services of high quality (Lichtenstein et al., 2004; Luo and Bhattacharya, 2006), and are more interested in engaging in positive actions towards those firms (Donavan et al., 2006). They also identify themselves with high-quality firms to enhance their self-esteem and accommodate their need for self-enhancement and self-consistency (Ahearne et al., 2005; Martínez and del Bosque, 2013; Moliner et al., 2018; So et al., 2017; Wolter and Cronin, 2016). In similar vein, Lam et al. (2012) (p.309) proposed a symbolic instrumental interactive framework of customer-brand identification, explored across 15 countries, and suggested that customers are more interested in identifying with high-quality brands and that perceived quality is "an instrumental driver of customer-brand identification". Additionally, perceived information quality and system quality are important when designing an online system (Islam and Rahman, 2017) as they shape customers' identification within online communities (Moliner et al., 2018; So et al., 2017; Wolter and Cronin, 2016). They also shape customers' experience (Sautter et al., 2004; Pullman and Gross, 2004).

Customer experience is based upon the customer's internal response to their customer journey with a firm that can be subjective in nature, thereby provoking a reaction in customers. Word-of-mouth (Kwortnik

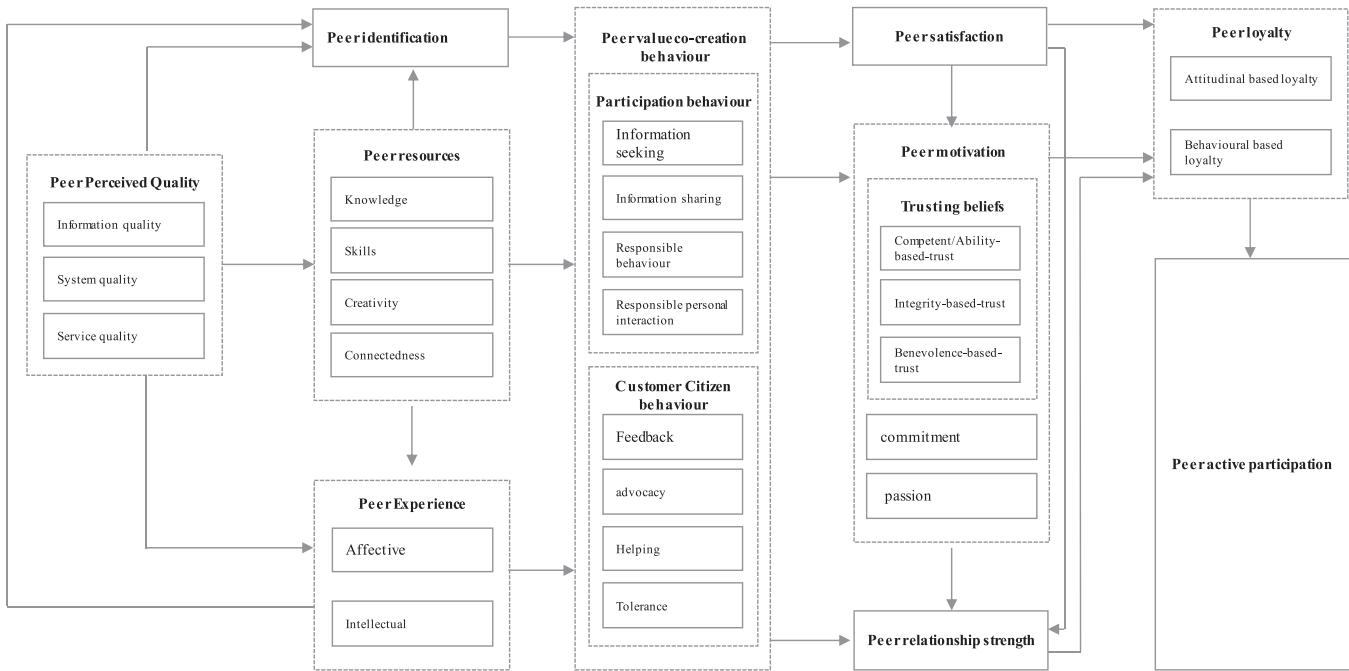


Fig. 1. Conceptual Model.

and Ross, 2007) and marketing communication (Brakus et al., 2009), and the customer's navigation experience on the firm's website (Sautter et al., 2004) form part of the customer journey, which can expand the dimension of service quality (Pullman and Gross, 2004). It is widely accepted that the functional and technical aspect of service quality has an enormous influence on the customer assessment of a firm (Bloemer et al., 1999; Zeithaml et al., 1996; Xu and Du, 2018). Positive evaluation can make customers trust the firm (e.g., Veloutsou, 2015), which can result in them sharing their resources (e.g., knowledge, time, feedback) with other customers (Fang and Chiu, 2010; Hibbert et al., 2012).

Customers' indirect interactions with the service encounter include overall experience and the level to which an offering could accommodate their requirements (Woodruff, 1997). During this interaction, customers also share their own resources - e.g. their knowledge and skills, their creativity and connectedness and their persuasion capital (Harmeling et al., 2017) in order to co-create value (Merz et al., 2018). Such resources are relevant to firms as they can be used to develop and implement strategies (Barney and Arikans, 2001) and achieve goals, integrating them by offering a development which enhances an offering that fits the focal customer's value process, and that helps and encourages potential resource contributions from other stakeholders toward the focal firm (Jaakkola and Alexander, 2014). This in turn results in an enhanced role for customers through the contribution of knowledge, experience and time which shapes other actors' expectations, perceptions and knowledge about the service providers (Jaakkola and Alexander, 2014, 2016; Azer and Alexander, 2018), and which leads to positive outcomes for the focal organization (Harmeling et al., 2017; Van Doorn et al., 2010).

Against this background, the current study addresses a specific context of value co-creation, as peers represent the main source of value for other peers in the P2P platforms. This context is different from the firm/customer value co-creation, where both firms and customers constitute a source of value (Lin et al., 2019). Hence, we draw on existing firm and customer value co-creation for the hospitality industry, specifically peers' VCCB on P2P platforms, its determinants and outcomes. By understanding peer value co-creation behaviour as the main source of value for both peers and peer platforms (Lin et al., 2019), we propose the following hypotheses, that in a peer platform:

H1: Peer perceived quality, including information, system, and service quality, influence peer resources (H1a), peer identification (H1b), and peer experience (H1c).

2.2. Peer experience -> peer identification and value co-creation behaviour

Consumer experience is a complex, multi-dimensional term that represents a significant driver of a firm's success and competitive advantage (Lemon and Verhoef, 2016; Schmitt, 2003; Verhoef et al., 2009). Customer experience could be measured through affective and intellectual experience, as it involves both affective and intellectual responses to any possible touchpoint with a firm (McColl-Kennedy et al., 2015). Affective experience, such as moods and emotions, refers to the individual's emotional state after the introduction of stimuli, which impacts individual behaviour (Brakus et al., 2009; Goulding, 2000; Holbrook and Hirschman, 1982; Verhoef et al., 2009; Wang et al., 2012; Williams, 2006; Chen et al., 2009), whereas intellectual experience, comprising cognitive, functional, educational, and stimulating elements refers to one's knowledge about the product and services (Berry et al., 2006; Brakus et al., 2009; Ferguson et al., 2010; Goulding, 2000; Holbrook and Hirschman, 1982; Verhoef et al., 2009; Williams, 2006).

Identification of the customer to the brand/company relates to active and selective continuous association in order to accommodate their needs (Foroudi et al., 2019). Experience leads to success or market failure, so managers should emphasize success which has a specific symbolic meaning and value. The experience and value of a brand are a foundation for identification with that brand (Carlson et al., 2008; Foroudi et al., 2019, 2020) as well as with other peers in the peer platform. In addition, by sharing their experiences through reviews or comments, customers can interact with each other, creating joint innovation via the interaction of consumers and other parties (Foroudi et al., 2019).

The process by which customers evaluate customer attributes, such as identification, is primarily based on their experience with the brands/firms (So et al., 2013). Indeed, customer evaluation on the possibility of identification with a brand is based on customer service consumption (So and King, 2010). Customers value favourably those firms and brands with which they have enjoyed a pleasant experience (Nam et al., 2011)

and are highly likely to take part in positive actions e.g., sharing their experiences with peers (Donavan et al., 2006). In preceding years, practitioners and academics acknowledged the significance of customer experience as a new method of creating sustainable value, both for the consumer, and the organization (Carlu and Cova, 2003; Prahalad and Ramaswamy, 2004; Schmitt, 2003; Shaw and Ivens, 2005). In this respect, creating value is not simply a matter of providing memorable experiences of products/services, but it lies in exceeding the customer's expectations. Prahalad and Ramaswamy (2004) stressed the importance of creating distinctive customer experiences of firms/brands, and in this vein, Carlu and Cova (2007) proposed that companies should employ different techniques and strategies to ensure that customers have a unique, co-created experience. Prahalad and Ramaswamy (2004) suggested that value co-creation is achieved through personalised consumer experiences. The early research by Holbrook and Hirschman (1982) suggested that the symbolic and emotional features of consumer experience also have an influence on the co-creating of value. Consequently:

H2: Peer experience influences peer identification (H2a) and value co-creation behaviour (H2b).

2.2.1. Peer resources include four components

(i) knowledge, (ii) skills, (iii) creativity, and (iv) connectedness. Knowledge can be defined as "the extent to which the stakeholder is informed and experienced with a brand" (Merz et al., 2018, p.82). Skills are regarded as the "extent to which the customers are stimulated by the firm in terms of their capabilities" (Merz et al., 2018, p.82). Creativity is "the extent to which the stakeholder is stimulated by the brand in terms of his/her use of imagination and development of original ideas" (Merz et al., 2018, p.82). Connectedness is "the extent to which the stakeholder is associated, bonded, or linked with others because of the brand" (Merz et al., 2018, p.82).

The organizational literature suggests that employee resource integration (e.g., sharing knowledge with other employees) can result in the individual attitude of the employee as employee identification (Michailova and Hutchings, 2006). As a matter of fact, resource integration can be helpful in the creation of a community climate that gives the opportunity to continuously learn, and, ultimately, results in peer-to-peer identification (Avolio et al., 2004). Previous studies have highlighted the influence of identification on resource integration, for instance by sharing knowledge (Cabrera and Cabrera, 2005; Carmeli et al., 2011; Wang and Noe, 2010). However, to the best of our knowledge, none of the existing studies have addressed the influence of resource integration on peer identification.

The literature has emphasised the role of customers' resources and business/customer interaction in value co-creation (Etgar, 2008; Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2004). Customer interaction has been defined as "mutual or reciprocal action where two or more parties have an effect upon one another" (Grönroos, 2011, p.289). Nambisan and Baron (2009) claimed that customer interaction in a virtual environment is a determinant of value co-creation. The resources shared in the community influence value co-creation behaviour among the members and the firm. Based on the social identity theory (Elbedweihy et al., 2016; Lam et al., 2012), firms with "meaningful and attractive social identities could help consumers' self-definitional needs, and, thus, are valid targets for identification" (Elbedweihy et al., 2016, p.2). However, previous studies confirmed that formal membership is not a requirement for identification (Elbedweihy et al., 2016; Scott and Lane, 2000).

With this in mind, peer experience is the key to developing relationships between peers. Value co-creation allows an organization to be more creative and attractive, and to develop valuable ideas from the stakeholders in the value chain, not only about the products but also for the raw materials, product packaging, and distribution channels (Payne et al., 2008). Value can be co-created through resource integration activities e.g., communication and knowledge-sharing (Ramaswamy and

Ozcan, 2016). For instance, when a customer surfs through a peer provider profile, exploring comments, shared photos of other customers, and shared experiences, the customer peer is actively taking part in the process of contributing to information. Through such interactions, the information passes along the social media platform and is organized into the functional container, which can transform this technological information into resources (Singaraju et al., 2016). So:

H3: Peer resources, including knowledge, skills, creativity, and connectedness, influence peer identification (H3a), peer experience (H3b), and peer value co-creation behaviour (H3c).

2.3. Peer identification -> peer value co-creation behaviour

Peer identification shows the degree to which peers describe themselves by identical attributes, which can be defined as the peer platform (Dutton et al., 1994) of providing peers. Identification helps customers to engage more with other customers, and the degree of their identification helps them to be involved in value co-creation behaviour. Besides, the subjective norm for value co-creation is the degree of identification held by peer value towards co-creation (Foroudi et al., 2019).

Peer platforms are also a place for peers to communicate with each other. Sharma and Patterson (1999) define the concept of communication as an informal and formal source of sharing information between individuals, which can result in establishing a strong relationship between customers (Parvatiyar and Sheth, 2001). More specifically, when customers identify with a brand, they perceive a greater value of the relationship and bonds made with other customers and other members of the online community (Nambisan and Baron, 2007). Additionally, peer platforms also aid customers in socialising with regard to the norms and procedures of firms, and to identify with a specific role in a brand/firm (Tuskej et al., 2013). Consequently, the extent to which customers are willing to identify themselves as value co-creators in a firm will have an effect on their willingness to show value co-creation behaviour, i.e., citizenship behaviour and participation behaviour. Therefore, we propose the following hypothesis on peer-platforms:

H4: Peer identification influences peer value co-creation behaviour.

2.3.1. Outcomes of peers' VCCB

Co-creation is a "desirable goal as it can assist firms in highlighting the customer's or consumer's point of view and in improving the front-end process of identifying customers' needs and wants" (Payne et al., 2008, p.84). It occurs when a customer uses the services of another customer provider, and can be measured through sub-constructs, participation behaviour, and citizen behaviour (Yi and Gong, 2013).

Participation behaviour refers to role clarity, ability, and motivation to participate (Foroudi et al., 2019; Yi and Gong, 2013) in the peer-to-peer platform, which is created through the following: (i) *Information seeking*, when customers try to find the necessary information to satisfy other cognitive needs, on how to perform their tasks as value co-creators, as well as what they are expected to do and "how they are expected to perform during a service encounter" (Yi and Gong, 2013, p.1280). (ii) *Information sharing* is key to the success of value co-creation. For successful value co-creation, "customers should provide resources such as information for use in value co-creation processes" (Yi and Gong, 2013, p.1280). (iii) *Responsible behaviour* "occurs when customers recognise their duties and responsibilities as partial employees. For successful value co-creation between themselves and employees, customers need to be cooperative, observe the rules and policies and accept the directions from the employees" (Yi and Gong, 2013, p.1280). (iv) *Responsible personal interaction* refers to the "interpersonal relations between the customers and employees, which are necessary for successful value co-creation" (Yi and Gong, 2013, p.1280).

Customer citizen behaviour has an astonishing value to an

organisation, and refers to peers' interactional, procedural, and distributive justice (Yi and Gong, 2013). It can be measured via the following: (i) *Feedback*, which includes "solicited and unsolicited information that customers provide to the employee, which helps employees and the firm to improve the service creation process in the long run" (Foroudi et al., 2019; Yi and Gong, 2013, p.1280). (ii) *Advocacy* refers to "recommending the business – whether the firm or the employee – to others such as friends or family. In the context of value co-creation, advocacy indicates allegiance to the firm and promotion of the firm's interests beyond the individual customer's interests" (Foroudi et al., 2019; Yi and Gong, 2013, p.1280). (iii) *Tolerance* is related to "customer willingness to be patient when the service delivery does not meet the customer's expectations of adequate service, as in the case of delays or equipment shortages" (Yi and Gong, 2013, p.1281). (iv) *Helping* refers to customer behaviour in which customers are frequently helping other consumers with their expectations in a consistent way (Foroudi et al., 2019).

In essence, outstanding peer value co-creation behaviour will certainly lead to peer satisfaction, peer motivation, and relationships in the peer community. The next section will identify to what extent (a) peer co-created value, (b) peer satisfaction, (c) peer motivation, (d) relationships in the peer community, and (e) peer loyalty interconnect with each other to impact active participation in the development of peer value co-creation in peer platforms (RQ2).

2.4. Peer value co-creation behaviour -> peer satisfaction, peer motivation and relationships in the peer community

Online environments provide services and help different firms to engage their customers in designing and supporting actions, which are significant in co-opting customer ability for joint value creation (Nambisan, 2002; Vargo and Lusch, 2004) through virtual design, conversational environments, and prototyping centres to appeal to possible contributors (Muniz and O'Guinn, 2001; Nambisan and Baron, 2009). Value co-creation is a psychological, multi-dimensional, context-dependent state, consisting of emotional, cognitive, and behavioural dimensions. This state occurs within iterative, dynamic engagement processes characterised by changing strength levels inside the brand community (Brodie et al., 2011, 2013; Foroudi et al., 2019).

Co-creation behaviour can influence customers' motivation to interact more in the community, which underpins customer involvement in certain types of firm activity and product and firm support. Also, the motivational driver of mutual benefits could derive from their interaction in the community by extending help to peers. Scholars (Hertel et al., 2003; Nambisan and Baron, 2009) stated that citizen behaviour and a norm-oriented perspective are related to pro-social behaviour (helping the cause).

While customer satisfaction is mainly understood as the individual's assessment of a brand based on their expectations (Hammerschmidt et al., 2016; Xin Ding et al., 2010), a growing amount of research (Fang et al., 2013; Hekman et al., 2010) has suggested that consumer satisfaction is based on the customer's social judgment. Notably, as Vargo and Lusch (2004) state, consumers represent a transformation of perspective, shifting from tangible to intangible resources. Thus, when a customer takes part in value co-creation behaviour with a company, this behaviour can reflect their level of satisfaction with the service company. In the main, this is because value co-creation behaviour offers customers an opportunity to co-create their own products/services, to fulfil their own personal needs (Franke and Piller, 2004).

Additionally, customers can improve their social status by taking part in value co-creation activities. For example, when a customer actively joins in the procedure of value co-creation behaviour, peer consumers or stakeholders can recognize them as an invaluable source of information. Consequently, being considered a useful source of information can enhance peer customers' communication skills, resulting in higher social enjoyment, which can boost peer satisfaction with the

service provided by peer providers. Thus;

H5: Peer value co-creation behaviour influences peer satisfaction in the peer platform (H5a), peer motivation in the community (H5b), and relationships in the peer community (H5c).

2.5. Peer satisfaction -> peer motivation, relationships in the peer community and peer loyalty

Peer satisfaction can be defined as post-decision consumer experience (Caruana, 2002, p.815; Cronin and Taylor, 1994), which, in previous interactions within a peer platform, can have a positive impact on peer loyalty, motivation, and relationships, and could impact on their participation in relationship to the peer platform. Foroudi et al. (2019b) claimed that members of a platform, i.e., Twitter, satisfy their need for communal brand connection and their need for uniqueness, leading to a stronger loyalty to both the platform and to each other. Moreover, satisfaction influences the relationship between the company and its customers, which is often a "synonym for interpersonal loyalty" (Barry et al., 2008, p.155), an important concept in P2P services due to the personal contact between peer providers and peer customers (Barry et al., 2008; Liljander and Roos, 2002). Peer involvement in P2P platforms has an influence on P2P attitudes and behaviour, and customer satisfaction, and may strengthen the relationship (Alqayed et al., 2020). Hence:

H6: Peer satisfaction in a peer platform influences (H6a) peer motivation in the peer platform (H6b), relationships in the peer community, and (H6c) peer loyalty.

2.6. Peer motivation -> relationship in the peer community and peer loyalty, relationship in the peer community -> peer loyalty

Peer motivation is a mental state associated with circumstances that are useful and practical for individual wellbeing or purposes (Johnson and Stewart, 2005), and which influence the future of business relationships. People in "business-to-business relationships appraise the situations they perform in, and the happenings that occur to them, and the resulting emotions and coping responses influence the course and outcomes of the relationship" (Bagozzi and Dholakia, 2006, p.456). Motivation can be measured through (i) *trusting beliefs*, (ii) *corporate brand commitment*, and (iii) *corporate brand passion*.

Trusting beliefs is a psychological state "comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviors of another" (Rousseau et al., 1998, p.395) where the stakeholder is confident regarding the brand (Merz et al., 2018, p.82). It is measured via three components: (i) *competence/ability-based-trust* refers to individuals' beliefs and confidence in fulfilling their needs (Gharib et al., 2017, p.518; Mayer et al., 1995; Schlosser et al., 2006). (ii) *Integrity-based-trust* concentrates on one's belief in others' trustworthiness, honesty, and commitment to fulfil their promises (Gharib et al., 2017, p.518; Mayer et al., 1995; Schlosser et al., 2006; Schlosser et al., 2006). (iii) *Benevolence-based-trust* reflects confidence and responsiveness to the customer/partner's interests, and not just one's own beliefs (Gharib et al., 2017; Mayer et al., 1995; Schlosser et al., 2006) by voluntarily accommodating them (Gharib et al., 2017).

Corporate brand commitment arises from social exchanges (Gharib et al., 2017; Ryssel et al., 2004) and refers to an individual's intention to maintain a relationship (Chen, 2013; Gharib et al., 2017) with the brand and its success (Merz et al., 2018, p.82). The concept of *passion* is the extent to which "the stakeholder has extremely positive feelings toward the brand" (Merz et al., 2018, p.82). Value co-creation in terms of customer participation and motivation in product design helps organizations to establish deep relationships and strong bonds with the peer platform community (Payne et al., 2008).

It has been demonstrated that trust is a crucial factor for an organization's success or failure. Online shopping involves more risk and

uncertainty. That is why trust is an essential factor that influences customer peers' interactions with peer providers. Moreover, customers share very sensitive information during online transactions, such as their personal address and data, which makes trust an important factor when interacting with the website. In the B2C context, transactions do not happen as often as in the P2P context: exchange of money and products does not happen simultaneously when the customer may be in a different country, legal system, time zone, or using a different currency. When customers believe in a brand, trust occurs when the brand keeps its promises regarding product performance (Foroudi, 2019, 2020; Füller et al., 2008). Brand trust evokes a positive, deliberate, spontaneous and immediate emotional response from the customer towards the brand because, at the cognitive level of customer loyalty, trust strengthens associations among customers and the brand, as well as reducing uncertainty (Chaudhuri and Holbrook, 2001). Hence, based on the aforementioned discussion, we propose the hypotheses:

H7: Peer motivation in peer platforms influences (H7a) relationships in the peer community and (H7b) peer loyalty.

H8: Relationships in the peer community influence peer loyalty.

2.7. Peer loyalty -> peer active involvement

Peer loyalty is the combination of behaviour and attitude that benefits one particular firm over its competitors in the market (Watson et al., 2015; Han et al., 2008), and can be measured by attitudinal and behavioural loyalty. *Attitudinal-based loyalty* (cognitive-based loyalty or phantom loyalty), or pleasurable accomplishment that favours a specific firm mainly results from a firm offering, such as quality or price (Chaudhuri, 1999), and by showing customers that the chosen product/service is the most appropriate choice compared with others in the market (Ahluwalia, 2000; Watson et al., 2015). Attitudinal loyalty can be described as an individual's motivation to repurchase a certain service/product from a brand, resulting in customers having a stronger bond with the company (Brunner et al., 2008). *Action-based loyalty* is the individual behaviour in which the customer *actually* repurchases a firm offering (Bolton, 1998). Meanwhile, *behavioural-based loyalty* entails repeated purchases that stem from an action orientation that involves a readiness to act to the advantage of a particular entity (Chaudhuri and Holbrook, 2001; Wulf et al., 2003), and which improves customers' *active participation*. It is an important achievement factor for different peer platforms, and can include activities such as updating their profiles and replying to posted questions (Gharib et al., 2017; Nonnecke et al., 2006; Preece et al., 2004) on a regular basis (Ray et al., 2014). Therefore:

H9: Peer loyalty influences active peer participation.

3. Method

3.1. Data collection

In order to fulfil the research aims, we adopted a mainly quantitative study approach using the survey method, preceded by an exploration stage using focus groups and interviews (Chisnall, 1991; Creswell, 2009; Creswell and Plano-clark, 2011; Foroudi et al., 2014). This study explores new fields and investigates topics where knowledge is not sufficiently developed (Creswell et al., 2003). The researcher approached Airbnb peer platforms in the UK hospitality and tourism setting to validate the conceptual model. Airbnb is the accommodation market leader, and, based on UNWTO's forecast, "Airbnb's expansion will be to emerging markets and by 2030, Airbnb expects that over 400 million guests will have used the platform to arrive at listings in emerging markets since the company was founded" (Airbnb, 2021; Akarsu et al., 2020, p.5). According to Foroudi and Marvi (2021), Airbnb shares information with its hosting partners using high levels of honesty and

transparency. Airbnb has reached far beyond the traditional markets, due to the dematerialization and digitalization of society. It demonstrates strong societal concerns, such as hyperconsumerism, pollution, poverty, and the environment. Also, it helps people to support each other and to perform in a sustainable way (such as increasing the number of entrepreneurs). Tourists are mainly motivated to use the platform because of its household amenities, convenient locations, and low costs, strengthening users' engagement with Airbnb. Statistics show that 89% of users are satisfied with their most recent Airbnb stay (Hospitalityinsights, 2021) and likely to recommend the platform to others, hence shaping user loyalty.

To enhance the sample size, the non-probability (snowballing) technique was employed, asking the primary peers on Airbnb platform informants to propose and invite others who could add additional insights (Andriopoulos and Lewis, 2009). In total, 821 completed surveys were returned, but due to a large amount of missing data, only 712 were received and assessed. The results show that most of the participants were male (57.6%), aged between 30 and 39 years (38.2%), or 20–29 years (36.2%). Some held a postgraduate degree (63.3%), some were craftsman (19.4%), others were students (13.9%), lawyers, dentists, architects, etc. (13.6%), or workers (11.4%), top executives or managers (11.2%) (see Table 1).

3.2. Development of measures and refinement

Before carrying out the survey, item measurements for each construct were developed using Churchill's (1979) approach. Subsequently, there were 24 interviews with managers, website designers, customer service manager, brand assistant, communications manager and four focus groups with users of an online brand community, undergraduate, MBA, and doctoral researchers (4 groups consisting of 5–6 participants). An exploratory study was carried out for the following reasons: (i) to gain an in-depth understanding of the research area; (ii) to achieve insights into the corporate logo, corporate image and reputational context; (iii) to understand actual practice in the field in order to gauge whether the proposed research study was relevant; and (iv) to obtain insightful information and understand the proposed research questions, generate hypotheses and purify measures for a questionnaire (Churchill, 1979; Foroudi et al., 2014).

Through the related literature and qualitative studies, the content domain was attained (Churchill, 1979). The exploratory research revised the questionnaire to test the hypotheses. Data triangulation was employed as "a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study" (Creswell and Miller, 2000, p.126)

Table 1

Demographic profile of the peer platform users compared with the main population figures (N = 712).

Gender	N		%		Jobs	N	%
	Male	Female					
Age					Top executive or manager	80	11.2
					Owner of a company	48	6.7
					Lawyer, dentist or architect etc.	97	13.6
	19 years old or less	13	1.8		Office/clerical staff	75	1.5
	20–29 years	258	36.2		Worker	81	11.4
	30–39 years	272	38.2		Civil servant	73	1.3
	40–49 years	145	2.4		Craftsman	138	19.4
	50–59 years	24	3.4		Student	99	13.9
Education					Housewife	21	2.9
	High school	36	5.1				
	Undergraduate	225	31.6				
	Postgraduate and above	451	63.3				

and for richness of the research conclusion. The study developed a large pool of item measurements for the research constructs based on the literature review and qualitative results (Churchill, 1979).

The items were assessed by seven faculty members for clarity and appropriateness of the scales. Four academics checked the survey for face validity. The outcome of this process indicated the well-versed judgments of specialists in the content domain. According to their recommendations, the list of items was modified and some were eradicated (Appendix 1). The questionnaire was circulated amongst peers in the hospitality platform. 136 questionnaires were received, 16 being eliminated because of the low quality of respondents and missing data, leaving 120 as useable data. To recognise any patterns in the data, EFA (exploratory factor analysis) was employed (Hair et al., 2006). Some items were removed due to a correlation of less than .5 or multiple loadings on two factors.

We employed a non-response bias, as it "involves the assumption that people who are more interested in the subject of a questionnaire respond more readily and that non-response bias occurs on items in which the subject's answer is related to his interest in the questionnaire" (Armstrong and Overton, 1977, p.2). Non-response bias was assessed via Mann-Whitney U-examination on early and late participants, the non-respondents being compared with the whole sample and no difference found. The outcome illustrated that the significance values in the study variables were not less than a 0.5 probability value, which is insignificant. Thus, non-response bias was not a concern (Nazarian et al., 2021; Lambert and Harrington, 1990).

3.3. Data analysis and results

The research conceptual model was assessed using SPSS/AMOS 22.0. Normality, multi-collinearity, linearity, and outliers were inspected; the outcomes specified that the data was distributed normally. The study employed a two-stage approach in structural equation modelling (SEM) (Anderson and Gerbing, 1988). In the first stage, a confirmatory factor analysis (CFA) was performed to examine the measurement properties of the present scales' validity. CFA approved the underlying relationship of the latent factors, observed the variables and confirmed the validity of the model (Hair et al., 2006). Cronbach's α was used for measuring the unidimensionality of scales and the construct-related reliability (0.875 through .967 > 0.70). The results were shown to be satisfactory for the psychometric reliability examination (Hair et al., 2006) (see Appendix 1).

Goodness of fit indices are recommended as an acceptable fit: the root-mean-square-error of approximation (RMSEA).034 (<0.08 is acceptable) and the comparative fit index (CFI).942 (>0.90 is good fit), which is an index for evaluating the fit of the model. The normed fit index (NFI) calculates the way a model is developed in terms of fit and does not exert control on the degree of freedom, which can underestimate the fit in smaller data samples, (0.876 > 0.08 specifies an acceptable fit). The goodness-of-fit index (GFI) calculates the fitness of a model in comparison to another model: below (0.772 > 0.90) is not acceptable (Hair et al., 2006). Similarly, the adjusted goodness-of-fit index (AGFI) modifies the model's complexity with a similar cut-off level (0.760 > 0.90). However, according to Hair et al. (2006), researchers cannot determine a special value for separating different models into unacceptable/acceptable fits. The Tucker-Lewis index (TLI) and Incremental Fit Index (IFI) were reported as .940 and .943, respectively, showing that the measurement factor was nomologically more than the recommended threshold criteria (0.90) (Hair et al., 2006; Steenkamp and Trijp, 1991), and, consequently valid.

According to previous researchers (e.g., Hair et al., 2006; Steenkamp and Van Trijp, 1991), discriminant validity shows to what extent each construct is distinctive from another variable. To test discriminant validity, our research computed the average variance extracted (AVE) for all constructs and compared the value with the square correlation. A good rule of thumb ranged from .582 to .911 (0.5 or > specifies adequate

convergent validity). To assess the item level reliability, both the average variance and composite reliability (above .8) were employed, showing them to be satisfactory for the psychometric reliability assessment (Foroudi, 2019).

Following the recommendation by Anderson and Gerbing (1982), in the second step, the study assessed the covariance linear and assumed that there was a causal relationship between the dependent and independent variable. By using the SEM analysis of the moment structure (AMOS), the study examined the research hypotheses from the standardised evaluation and t-value (critical ratio), Chi-square of 1371.012 (degrees of freedom, $df = p < .001$); IFI = 0.931; TLI = 0.929; CFI = 0.931; RMSEA = 0.037. Nineteen hypotheses were examined based on standardised regression coefficients. The parameter results estimate the association with the hypothesised SEM paths and the causal paths (Table 5.28 shows the path coefficients (β), hypotheses results, and the standard error). The standardised regression path among the peer perceived-quality and peer resources was significantly different from 0 at the .001 significance level. Consequently, Hypothesis 1a was not accepted ($\gamma = -0.036$, t-value = -0.477, p.634). H1b and H1c were supported showing a significant relation between peer perceived quality with peer identification and peer experience ($\gamma = 0.644$, t-value = 4.491; $\gamma = 1.678$, t-value = 8.449 respectively). Referring to the relationship between peer experience and peer identification, the results suggest that these two constructs had no meaningful relationship with each other ($\gamma = -0.439$, t-value = 0.412, p.681); hence, Hypothesis 2a was rejected. However, the association between peer experience and peer value co-creation behaviour was significant (H2b: $\gamma = 0.562$, t-value = 8.894).

Surprisingly, the relationship between peer resources and peer identification (H3a), and peer experience (H3b) was not significant, and the regression path, interestingly, revealed a significant negative association ($\gamma = -0.054$, t-value = -0.182, p.856; $\gamma = 0.095$, t-value = 1.144, p.253, respectively). Thus, Hypothesis 3a and Hypothesis 3b were rejected. However, Hypotheses 3c was found to be fully supported, and there was a significant association between peer resources and peer value co-creation behaviour ($\gamma = 0.547$, t-value = 8.544). The relationship between peer identification and peer value co-creation behaviour was acceptable (H4: $\gamma = 0.072$, t-value = 0.072). The results demonstrate that value co-creation behaviour in an online peer platform influenced peer satisfaction in the platform (H5a: $\gamma = 0.632$, t-value = 6.018), peer motivation in the peer platform (H5b: $\gamma = 0.766$, t-value = 7.458), and peer relationship strength (H5c: $\gamma = 0.591$, t-value = 6.079); hence, Hypotheses 5a, b, and c were all fully accepted.

According to the results presented in Table 2, it was found that H6a (satisfaction \rightarrow motivation) and H6b (satisfaction \rightarrow corporate/brand loyalty) were significant ($\gamma = 0.071$, t-value = 2.579; $\gamma = 0.103$, t-value = 2.746, respectively). By contrast, the regression weight for peer relationship strength in forecasting satisfaction was significantly different from 0 at the .001 significance level ($\gamma = -0.224$, t-value = -1.465, p.143). Therefore, Hypothesis 6c was rejected. Surprisingly, for Hypothesis 7a, which signifies that the peer motivation in an online peer platform influences peer relationship strength, the association was not significant ($\gamma = 3.300$, t-value = 1.840, p.066); hence it was rejected. However, the relationship between customers' motivation in an online peer platform and peer loyalty (H7b) was statistically significant ($\gamma = 0.542$, t-value = 5.299). Based on the outcomes obtained from Table 2, it was found that H8 (peer relationship strength \rightarrow peer loyalty) and H9 (peer loyalty \rightarrow peer active-participation) ($\gamma = 0.128$, t-value = 2.975; $\gamma = 2.280$, t-value = 5.078) were to be accepted (Table 2).

4. Discussion

The primary aim of our study was to examine the role of peer value co-creation in building peer loyalty and peer active participation and to address the gaps in any previous study concerning the antecedents and outcomes of peer value co-creation (Agarwal et al., 2020; Cortez and Johnston, 2017; Zaborek and Mazur, 2019). The outcome of this

Table 2

Results of hypothesis testing.

Standardised regression paths			Estimate	S.E.	C.R.	p	Hypothesis	
H1a	Peer Perceived Quality	→	peer resources	-0.036	.076	-0.477	.634	Not Supported
H1b		→	peer identification	.644	.143	4.491	* **	Supported
H1c		→	Peer Experience	1.678	.199	8.449	* **	Supported
H2a	Peer experience	→	Peer identification	.439	1.067	.412	.681	Not Supported
H2b		→	Peer Value co-creation behaviour	.562	.063	8.894	* **	Supported
H3a	Peer resources	→	Peer identification	-0.054	.297	-0.182	.856	Not Supported
H3b		→	Peer Experience	.095	.083	1.144	.253	Not Supported
H3c		→	Peer Value co-creation behaviour	.547	.064	8.544	* **	Supported
H4	Peer identification	→	Peer Value co-creation behaviour	.072	.031	2.343	.019	Supported
H5a	Peer value co-creation behaviour	→	Peer Satisfaction	.632	.105	6.018	* **	Supported
H5b		→	Peer Motivation	.766	.103	7.458	* **	Supported
H5c		→	Peer relationship strength	.591	.097	6.079	* **	Supported
H6a	Peer Satisfaction	→	Peer Motivation	.071	.027	2.579	.010	Supported
H6b		→	Peer Loyalty	.103	.038	2.746	.006	Supported
H6c		→	Peer relationship strength	-0.224	.153	-1.465	.143	Not Supported
H7a	Peer Motivation	→	Peer relationship strength	3.300	1.794	1.840	.066	Not Supported
H7b		→	Peer Loyalty	.542	.102	5.299	* **	Supported
H8	Relationship in the community	→	Peer Loyalty	.128	.043	2.975	.003	Supported
H9	Peer Loyalty	→	Peer Active participation	2.280	.449	5.078	* **	Supported

* ** p < .001.

Notes: Path = Relationship between independent variable on dependent variable; β = Standardised regression coefficient; S.E. = Standard error; p = Level of significance.

research proposes an optimistic reply to both questions. Peer value co-creation is a “desirable goal as it can assist firms in highlighting the customer’s or consumer’s point of view and in improving the front-end process of identifying customers’ needs and wants” (Payne et al., 2008, p.84). It clarifies theoretical and managerial implications to reinforce the knowledge and management of a peer online platform.

The proposed model of the antecedents (peer perceived quality, identification, use resources, experience), and main outcomes (satisfaction, motivation, relationship in community, loyalty, and active participation) of value co-creation behaviour in P2P platforms have been tested by taking into account the particular peers’ interaction context of P2P platforms in the hospitality industry. The findings show that perceptions of the quality of the system, information and service positively influences peers’ identification and experience. However, it does not influence their resources sharing, which was found to have an impact on VCCB. In turn, peers’ identification and experience significantly contribute to their VCCB, which, in turn, influences their motivation and relationship strength. Both peers’ motivation and peers’ relationship strength were found to significantly contribute to their loyalty to the peer-to-peer platform, which, in turn, significantly contributes to their active participation in the platform.

Surprisingly, peers’ VCCB did not have a significant influence on their satisfaction with the P2P platform. This could be explained by the fact that transactions on the P2P platforms are peer-focused and not firm/platform provider-focused, with a fluid peer role which could be the provider of a service at times, and the user of a service at other times (Lin et al., 2019).

4.1. Implications for marketing theory

The most significant contribution of this study extends the understanding by investigating in P2P contexts the complex impact of value co-creation behaviour on peer evaluation (Lenka et al., 2017; Ramaswamy and Ozcan, 2016; Reypens et al., 2016). Previous researchers (Kahn et al., 2019; Foroudi et al., 2019) suggested that peer identification, peer resources, and peer experience are related to peer value co-creation behaviour. In this regard, the study revisits the previous literature in a context characterised by role fluidity, peer focus, dispersed beneficiaries, and reciprocity (Lin et al., 2019), and offers a validated framework that shows association between the constructs of peer value co-creation behaviour.

This research redefined and redeveloped the present investigation in

the era of value co-creation. The current study makes a contribution to the research on value co-creation by designing and investigating a scale which identifies peer value co-creation behaviour in terms of its antecedents and outcomes. While the notion of peer value co-creation behaviour has been extensively deliberated in tourism and marketing research, no systematic endeavour has been made to analyse the features, which might account for the difference in results through the existing research. Consequently, from an academic perspective, the findings of this research apply a more methodological and inclusive method than any hitherto.

4.2. Implications for managerial practice

Our study delivers a managerial contribution for decision-makers by delineating the relationship between value co-creation behaviour in P2P platforms and (1) its antecedents, e.g. peer identification, user resources, and (2) outcomes, e.g. peer motivation, and peer satisfaction. The study provides insights on how value co-creation behaviour in P2P platforms could be enhanced by developing appropriate strategies to help facilitate peers’ identification with the firm, developing a positive peer experience, and facilitating their resource-sharing, and, hence value co-creation behaviour in a P2P platform.

The study shows that peers’ perceived quality influences their identification and experience. In order to enhance perceived quality, managers could manage peer reviews and online recommendations by promoting attributes related to the specific needs of users, e.g. shopping and visiting tourist attractions (Ding et al., 2020). The findings also emphasize peers’ identification influence on VCCB in P2P platforms. This is not surprising, as it corroborates the distinctiveness between the P2P context and other business contexts. Lin et al. (2019) claimed that the essence of the P2P context is different from other business contexts due to role fluidity, peer focus, dispersed beneficiaries, and reciprocity. For instance, in a peer platform, peers are focusing on other peers’ benefits, while in a B2C context, customers are not, predominantly, focused on the benefits to other customers. Consequently, the incorporation between the P2P context and other business contexts can have great potential for peer platform managers for running and managing the peer platforms more efficiently. In this regard, the current research provides peer platform managers with an understanding of the value co-creation in peer platforms. Additionally, P2P platforms constitute a unique context that emphasises the role of service providers as facilitators of peers’ value co-creation. Therefore, they need to fully

understand what could potentially help peers co-create value together.

By understanding the peer requirements for co-creating value, peer managers can make the right decisions when providing the right tools for facilitating VCCB in peer platforms. In practice, managers can set out to establish a sense of shared vision through decreasing the dysfunctional and conflict sense of value in the platform. Furthermore, managers should take peer identification into account, and should create tools for peers so that they can safely share their identity in their profiles. For instance, as suggested by Underwood et al. (2001) some traits, such as having a high physical facility could assist customers in building a higher level of social identification; online traits/features might be included in the website which could potentially augment peers' identification with the peer-to-peer platform.

The concept of value co-creation behaviour can have benefits for different stakeholders involved in the P2P platform. Hence, it is important for P2P platform managers to note the significance of value co-creation behaviour as the main driving source in sustaining a P2P platform (Lin et al., 2019). By identifying the different influences of peers' VCCB (customer citizenship behaviour and participation behaviour), this study could assist peer managers to comprehend the role of peers as value co-creators, and the main source of benefit to P2P platforms.

By bridging the gap between professionals and academics, managing peers' VCCB could be regarded as an integrated approach to creating value for both internal and external stakeholders. Regarding developing the items and components of the VCCB in P2P platforms, this study confirms that the measurement scale supports peers' VCCB as an operative instrument for attaining the objectives of peer platforms, and suggests that it should have a more noteworthy role for peer platform administrators. The current study extends the understanding of the factors influencing peers' VCCB and its impact on peer loyalty and active participation. P2P platform managers could adapt the developed measurement scales and use them as an important guideline and checklist for examining the degree of VCCB among different peers.

4.3. Limitations and future research directions

This study has addressed peers' VCCB in P2P platforms, its antecedents and outcomes, which could provide a number of potentially fruitful further research avenues. In terms of validation and measurement, the current research applied a quantitative approach with a minor reliance on exploration, and developed appropriate measurement scales for peers' VCCB. Future studies could further test the developed scales in order to measure VCCB in other P2P platforms. Furthermore, this study's research applied multiple and different measurements and constructs within the hospitality setting in the UK. Hospitality researchers could examine the reliability and validity of the item measurements. The current study represents an initial effort on how to conceptualise peers' VCCB in a P2P digital setting by focusing on the hospitality industry; future studies could thus advance the concept of peers' VCCB in other business contexts and take into consideration the various stakeholders (e.g., peer managers). Moreover, it is also useful to deliberate on other types of service. Future research might discover whether or not the proposed associations in this study hold for other cultures or nations.

Further study could also reproduce the current study model in other P2P platforms, such as Amazon or Uber. Finally, while some relationships were found to be significant, others were not. In this regard, future researchers are encouraged to conduct investigations on these rejected relationships. This study is the first research to inspect VCCB in the P2P platform context, its antecedents, and outcomes. It employed a quantitative study with reliance on the exploration approach to test and validate a research framework by using structural equation modelling. As some of the hypotheses were not positive, future research could repeat this research in diverse sectors to increase the generalisability of the findings.

Data Availability

Data will be made available on request.

Appendix 1. Item measurement, reliability, AVE, and CR

Construct and item measurement	Factor loading	Mean	Std. Dev	AVE	CR	Cronbach @
Information quality				.841	.955	.954
The content of the information discussed between the peers is always accurate	.911	5.4303	1.61771			Gharib et al. (2017); Supported by Qualitative Study
The content of the information discussed between the peers in the peer platform is always up to date	.901	5.2478	1.63525			Gharib et al. (2017)
The content of the information discussed between the peers in the peer platform is well formatted	.876	5.2967	1.62934			Gharib et al. (2017)
The content of the information discussed between the peers in the peer platform is always useful	.935	5.3487	1.62679			Gharib et al. (2017)
System quality				.582	.874	.872
The peer providers inform the customer providers of new services	.738	5.0786	1.50128			Qualitative Study
The moderator of the peer providers would not allow peers to disrupt the discussion	.728	5.0401	1.54666			Gharib et al. (2017)
The moderator of the peer providers often encourages peer customers to take part in the discussions	.766	4.9792	1.54752			Gharib et al. (2017)
The peers are well moderated	.764	5.0148	1.61432			Gharib et al. (2017); Supported by Qualitative Study
The moderator of the peer providers protects his/her peer customers from disruptive peers	.814	5.1068	1.55642			Gharib et al. (2017); Supported by Qualitative Study
The moderator of the peer providers does not show a sincere interest in solving peer customer problems (R)				.764	.942	.942
The service quality						
It is easy to navigate through the peer profiles	.801	5.6098	1.61548			Gharib et al. (2017)
It is easy to use the peer profiles	.824	5.4228	1.66088			Gharib et al. (2017); Supported by Qualitative Study
The peer providers can be adapted to meet a variety of needs	.851 .827	5.5415 5.3991	1.56927 1.61973			Gharib et al. (2017) Gharib et al. (2017)

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Construct and item measurement	Factor loading	Mean	Std. Dev	AVE	CR	Cronbach @
It takes too long for the peer providers to respond to my request (R)						
The peers allow information to be readily accessible	.851	5.3472	1.56330			Gharib et al. (2017); Supported by Qualitative Study
The peers always operate reliably				.879	.956	Gharib et al. (2017) Removed
Identification						
This peer provider's successes are my successes	.861	5.4036	1.57064			Foroudi et al. (2019a)
My peer provider is very interested in what others think about him/her	.869	5.4258	1.65654			
If a story in the media criticised the peer provider, I would feel embarrassed	.850	5.3783	1.65731			Foroudi et al. (2019a) Removed
When someone praises the peer provider, it feels like a compliment for me						Foroudi et al. (2019a) Removed
When I talk about the peer provider, I usually say 'we' rather than 'him/her'						Foroudi et al. (2019a) Removed
When someone criticises the peer providers, it feels like a personal insult						Foroudi et al. (2019a) Removed
I am very interested in what others think about the peer provider				.783	.915	Foroudi et al. (2019a) Removed
Knowledge						
I am informed about what the peer provider has to offer	.907	5.3338	1.55335			Merz et al. (2018)
I am knowledgeable about the peer provider	.913	5.3056	1.55486			Merz et al. (2018)
I am an expert on the peer provider and his/her services	.832	5.4006	1.54374			Merz et al. (2018)
I consider myself as very knowledgeable to contribute to peer provider service developments				.802	.923	Merz et al. (2018) Removed
Skills						
I think critically when I deal with the peer provider	.897	5.2745	1.60062			Merz et al. (2018)
I think logically when I deal with the peer provider	.892	5.2626	1.62472			Merz et al. (2018)
I think analytically when I deal with the peer provider	.819	5.3101	1.56493			Merz et al. (2018)
Creativity				.758	.903	.895
I become curious when I interact with the peer provider	.805	5.4243	1.66631			Merz et al. (2018)
I become creative when I interact with the peer provider	.925	5.4050	1.66532			Merz et al. (2018)
I become imaginative when I interact with the peer provider	.926	5.2507	1.65557			Merz et al. (2018)
I become creative when there is an opportunity to solve an issue (give an answer to the peer provider)						Qualitative Study - Removed
Connectedness				.876	.966	.965
I socialize with other peer customers of the peer providers	.930	5.2389	1.76752			Merz et al. (2018)
I belong to one of peer provider communities related to the peer provider	.925	5.2997	1.80533			Merz et al. (2018)
I am connected to other peer customers of the peer provider	.933	5.2181	1.81661			Merz et al. (2018)
I am networked with other peer customers of the peer providers	.880	5.2685	1.82861			Merz et al. (2018)
Affective experience				.846	.965	.965
The peer provider and I result in bodily experiences	.887	5.3576	1.57847			Brakus et al. (2009)
I engage in physical actions and behaviours when I use the peer provider services	.924	5.3487	1.59357			Brakus et al. (2009)
My decision to visit the peer provider made me satisfied	.903	5.3398	1.61585			Dennis et al. (2014); Foroudi et al. (2016)
My decision to visit the peer provider was the right decision	.907	5.3620	1.62250			Dennis et al. (2014); Foroudi et al. (2016)
The peer provider is not action oriented	.905	5.3605	1.58906			Brakus et al. (2009)
Intellectual experience				.832	.961	.960
I engage in a lot of thinking when I encounter the peer provider	.771	5.2967	1.58965			Brakus et al. (2009)
I can decide better with the peer provider	.788	5.4436	1.59417			Brakus et al. (2009)
I find the peer provider helpful	.772	5.1039	1.64028			Dennis et al. (2014); Foroudi et al. (2016)
I can find what I am looking for in the peer provider profile	.824	5.5297	1.50872			Dennis et al. (2014); Foroudi et al. (2016)
The peer provider does not make me think	.833	5.4125	1.54830			Brakus et al. (2009)
The peer provider stimulates my curiosity and problem solving				.818	.957	.958
Information seeking						Brakus et al. (2009) Removed
I have searched for information about what I need in the peer provider profile	.875	5.4659	1.52040			Qualitative Study
I have paid attention to how others behave in order to use the peer provider service well	.861	5.4926	1.43428			Yi and Gong (2013); Supported by qualitative study
I have searched for information on where the peer providers' services are located	.850	5.4555	1.48752			Yi and Gong (2013); Supported by qualitative study
I have asked others for information on what the peer provider service offers	.854	5.4095	1.53463			Yi and Gong (2013); Supported by qualitative study
I have searched for up to date and new services in the peer provider profile	.854	5.5104	1.47713			Qualitative Study
Information seeking				.854	.946	.946
I provided necessary information so that the peer provider could perform his or her duties	.835	5.1869	1.71370			Yi and Gong (2013); Supported by qualitative study
I gave the peer provider proper information	.840	5.1751	1.74331			Yi and Gong (2013); Supported by qualitative study
I clearly explained what I wanted the peer provider to do	.848	5.2537	1.68006			Yi and Gong (2013); Supported by qualitative study

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Construct and item measurement	Factor loading	Mean	Std. Dev	AVE	CR	Cronbach @	
I answered all the peer provider service-related questions							Yi and Gong (2013); Supported by qualitative study Yi and Gong (2013); Supported by qualitative study; Removed
Responsible behaviour							
I followed the peer provider directives or orders	.905	5.3220	1.48851	.841	.955	.955	Yi and Gong (2013)
I fulfilled responsibilities to the peer provider	.915	5.3887	1.48302				Yi and Gong (2013); Supported by qualitative study
I adequately completed all the expected behaviours	.905	5.2967	1.52573				Yi and Gong (2013); Supported by qualitative study
I performed all the tasks that are required	.917	5.3234	1.51441				Yi and Gong (2013); Supported by qualitative study
Responsible personal interaction							
I did not act rudely to the peer provider	.871	5.3546	1.77997	.798	.965	.965	Yi and Gong (2013); Qualitative Study
I was courteous to the peer provider	.883	5.1706	1.80941				Yi and Gong (2013); Qualitative Study
I was kind to the peer provider	.921	5.2389	1.80660				Qualitative Study
I was friendly to the peer provider	.891	5.2374	1.81868				Yi and Gong (2013); Qualitative Study
I was sympathetic to the peer provider	.908	5.2077	1.79189				Yi and Gong (2013); Qualitative Study
Interaction with the peer provider made me happier	.861	5.3071	1.74250				Qualitative Study
My inability to understand other peers' comments about the peer provider made me unhappy	.849	5.2760	1.73191				Qualitative Study
Feedback							
When I receive good service from the peer provider, I comment about it	.821	5.0341	1.74794	.796	.921	.919	Yi and Gong (2013); Qualitative study
When I experience a problem, I let the peer provider know about it	.853	5.0341	1.68739				Yi and Gong (2013); Qualitative study
If I have a useful idea on how to improve the peer provider services, I let the peer provider know	.824	5.1187	1.74976				Yi and Gong (2013); Qualitative study
Advocacy							
I encouraged friends and relatives to use the peer providers' services	.814	5.3056	1.66202	.832	.937	.936	Yi and Gong (2013); Qualitative study
I say positive things about the peer providers to other peers	.862	5.3323	1.59660				Qualitative study
I recommended the peer provider to other peers	.847	5.3145	1.58809				Yi and Gong (2013); Qualitative study
Helping							
I help other peers if they seem to have problems	.878	5.3947	1.71308	.808	.967	.967	Yi and Gong (2013)
I teach other peers to use the service correctly	.838	5.4614	1.67292				Yi and Gong (2013); Qualitative study
I assist other peers if they need my help	.862	5.4451	1.70240				Qualitative study
I give advice to other peers	.883	5.4184	1.69696				Yi and Gong (2013)
I assist other peers if they need my help	.865	5.4614	1.66044				Qualitative study
I help other peers if they seem to have problems	.838	5.4214	1.71278				Qualitative study
I teach other peers to use the service correctly	.834	5.4585	1.70452				Qualitative study
I give advice to other peer customers							Qualitative study; Removed
Tolerance							
If the peer provider makes a mistake during service delivery, I would be willing to be patient	.962	5.3739	1.78144	.911	.969	.968	Yi and Gong (2013); Qualitative study
If I have to wait longer than I normally expect to receive the service, I would be willing to adapt	.966	5.4036	1.70753				Yi and Gong (2013); Qualitative study
If the peer provider service is not delivered as expected, I would be willing to put up with it	.967	5.3724	1.73742				Yi and Gong (2013); Qualitative study
Peer Satisfaction							
Overall, I am pleased with the service offerings of the peer provider	.852	5.3932	1.70429	.713	.881	.879	Ranaweera and Prabhu (2003)
I feel satisfied that I could provide some information to other peer platform members	.869	5.4510	1.69821				Qualitative study
The service offerings of the peer provider meet my expectations	.818	5.4080	1.68058				Ranaweera and Prabhu (2003)
I think I did the right thing when I chose the peer provider							Ranaweera and Prabhu (2003)
Competent/Ability-based-trust							
The other peers have much knowledge about the subjects we discuss	.858	5.4273	1.65929	.754	.938	.948	Gharib et al. (2017)
The other peers have specialized capabilities that can add to the conversation on the peer platform	.849	5.6157	1.53099				Gharib et al. (2017)
The other peers are well qualified in the topics we discuss	.874	5.6335	1.55746				Gharib et al. (2017)
The other peers are very capable of performing tasks on the topics we discuss	.895	5.4555	1.61216				Gharib et al. (2017)
I could not totally rely on the peer platform community	.863	5.5371	1.57505				Qualitative study
I feel very confident about the skills the other peers have in relation to the topics we discuss							Gharib et al. (2017) Removed
Integrity-based-trust							
The other peers are truthful in dealing with one another	.857	5.3442	1.70226	.770	.959	.940	Gharib et al. (2017)
The other peers are genuine and sincere in dealing with one another	.886	5.3516	1.70118				Gharib et al. (2017)
The other peers are fair in dealing with one another	.891	5.3487	1.71050				Gharib et al. (2017)
In our relationship, the peer provider has high integrity	.837	5.3487	1.70441				Morgan and Hunt (1994)Ranaweera and Prabhu (2003)
	.850	5.3412	1.66491				Morgan and Hunt (1994)

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Construct and item measurement	Factor loading	Mean	Std. Dev	AVE	CR	Cronbach @
In our relationship, the peer provider can be counted on to do what is right						
In our relationship, the peer provider can be trusted at all times	.836	5.3561	1.68135			Ranaweera and Prabhu (2003)
If I trust the peer provider, I will trust the peer platform	.822	5.3264	1.71878			Qualitative study
The other peers do not behave in a consistent manner (R)						Gharib et al. (2017) Removed
Benevolence-based-trust						
The other peers would not intentionally do anything to disrupt the conversations	.870	5.1172	1.73408			Gharib et al. (2017)
The other peers are concerned about what is important to peers	.870	5.2181	1.73288			Gharib et al. (2017)
The other peers are very concerned about the ability of peers to get along	.851	5.0163	1.81574			Gharib et al. (2017)
Judging from the company response, I am confident that when peer customers have problems, the peer providers will respond constructively and with care	.899	5.1424	1.75054			Foroudi (2018); Sirdeshmukh et al. (2002); Xie and Peng (2009); Zhao and Roper (2011)
Judging from the peer provider response, I believe the peer provider has a great deal of benevolence	.878	5.0252	1.81482			Foroudi (2018); Sirdeshmukh et al. (2002); Xie and Peng (2009); Zhao and Roper (2011)
The peer provider constantly tries to improve their services and to better satisfy their peer customers						Foroudi (2018); Lombart and Louis (2016); Spears and Singh (2004); Removed
The peer provider renews their services to meet the expectations of their peer customers						Foroudi (2018); Lombart and Louis (2016); Spears and Singh (2004); Removed
Judging from the peer provider, I rely on the peer platform to favour the peer customer's best interests						Foroudi (2018); Sirdeshmukh et al. (2002); Xie and Peng (2009); Removed
The peer provider is concerned about their peer customers						Foroudi (2018); Sirdeshmukh et al. (2002); Xie and Peng (2009); Removed
Commitment						
The peer provider has a great deal of personal meaning for me	.881	5.4021	1.38557			Gharib et al. (2017)
I feel a strong sense of belonging to the peer provider	.890	5.3947	1.34806			Gharib et al. (2017)
I feel a strong connection to the peer provider	.904	5.3027	1.40803			Gharib et al. (2017)
I have a real emotional attachment to the peer provider	.916	5.3739	1.40461			Gharib et al. (2017); Supported by Qualitative Study
My goal is to make the peer provider successful						Merz et al., (2018, p. 82); Removed
I am driven to make the peer provider successful						Merz et al., (2018, p. 82); Removed
I am committed to making the peer provider successful						Merz et al., (2018, p. 82); Removed
I am enthusiastic about making the peer provider successful						Merz et al., (2018, p. 82); Removed
I feel like a part of the group at the peer provider profile						Merz et al., (2018, p. 82); Removed
Passion						
I am addicted to the peer provider	.907	5.4629	1.38533			Merz et al., (2018, p. 82)
I love the peer provider	.911	5.4674	1.44013			Merz et al., (2018, p. 82)
I admire the peer provider	.862	5.4599	1.43788			Merz et al., (2018, p. 82)
I am a fan of the peer provider	.899	5.5208	1.35531			Merz et al., (2018, p. 82)
Peer Relationship Strength						
The peer provider has good pricing for their service offerings	.763	5.5045	1.48818			Qualitative Study
The peer provider is flexible and adaptable in its marketing approach to the peer customers	.845	5.6484	1.40983			Qualitative Study
The peer provider makes a strong effort to get to know me	.857	5.4570	1.49355			Qualitative Study
My relationship to the peer provider is strong	.857	5.5638	1.38542			Qualitative Study
My relationship to the peer provider is important to me	.711	5.5104	1.49910			Qualitative Study; Removed
I got a good price deal from the peer provider						Qualitative Study; Removed
I am willing to share information and knowledge with the peer customers						Qualitative Study; Removed
I like the interactions I have with the peer providers						Qualitative Study; Removed
Attitudinal based loyalty						
I enjoy doing business with the peer provider	.898	5.2596	1.40661			Breivik and Thorbjørnsen (2008); Watson et al. (2015); Yim et al. (2008)
I use the peer provider services because it is the best choice for me	.889	5.2834	1.44069			Pritchard et al. (1999)
I really like the peer provider	.899	5.3190	1.43736			Breivik and Thorbjørnsen (2008); Watson et al. (2015); Yim et al. (2008)
I have a positive attitude towards the peer provider	.869	5.2641	1.47339			Breivik and Thorbjørnsen (2008); Watson et al. (2015); Yim et al. (2008)
I consider the peer provider my first preference	.912	5.2745	1.42688			Pritchard et al. (1999) - Removed
If I had to do it all over again, I would do business with the peer provider						Pritchard et al. (1999) - Removed
The peer provider is distinct from other peer providers in the peer platform						Pritchard et al. (1999) - Removed
To me the peer provider is the same as other peer providers (R)						Pritchard et al. (1999) - Removed
Behavioural based loyalty						
I frequently rent services from the peer provider	.826	5.6736	1.38673			Brady et al. (2012); Watson et al. (2015)
The last time I rented a service, I rented from the peer provider	.916	5.4777	1.36185			Brady et al. (2012); Watson et al. (2015)
I only rent services from the peer provider	.909	5.4154	1.37353			Brady et al. (2012); Watson et al. (2015)
I often rent services from the peer provider	.912	5.5282	1.28771			Brady et al. (2012); Watson et al. (2015)
I rent services mostly from the peer provider						Swanson and Kelley (2001) - Removed

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Construct and item measurement	Factor loading	Mean	Std. Dev	AVE	CR	Cronbach @
I am likely to go back to the peer provider the next time I need the related services						Swanson and Kelley (2001) - Removed
I am likely to rent the peer provider services again in the future						Swanson and Kelley (2001) - Removed
I am not likely to switch to another peer provider						Swanson and Kelley (2001) - Removed
Active participation				.837	.963	.962
I regularly login to the peer platform	.885	5.4763	1.50784			Ghahrib et al. (2017)
I always keep my profile up to date on the peer platform	.881	5.4540	1.57104			Ghahrib et al. (2017)
I regularly post relevant and useful information to the peer platform that engenders discussions	.888	5.3591	1.59546			Ghahrib et al. (2017)
I regularly reply with relevant and useful information to posted questions on the peer platform	.853	5.4228	1.48118			Ghahrib et al. (2017)
I am an active member of the peer platform	.904	5.5000	1.52566			Ghahrib et al. (2017)

Web Appendix 1: Interview protocol.

Construct, Definition and Qualitative Questions

RQ1: How and to what extent do (a) perceived quality, (b) affective and intellectual experience (c) user's resources, (d) corporate brand identification interrelate with each other to influence value in the process of value co-creation online brand communities

Perceived quality -> Peer resources

Peer PERCEIVED QUALITYDefinition: ...is a cognitive response and judgment about the overall excellence or superiority of a product or service which is the primary driver of purchase intention (Dodds et al., 1991; Jacoby and Olson, 1985; Kumar et al., 2009), which could be measured through three components (i) perceived information quality (Bailey and Pearson, 1983; Ives et al., 1983; Nicolaou and McKnight, 2006), (ii) perceived system quality (Gorla et al., 2010, p. 219; Fang et al., 2008); and (iii) perceived service quality (Bitner and Hubbert, 1994; Lien et al., 2017; Lien, Wu, Chen, and Wang, 2014; Parasuraman, Zeithaml, and Berry, 1991; Zeithaml, 1988)

Perceived information qualityDefinition: ... is cognitive beliefs and user reactions (Bailey and Pearson, 1983; Ives et al., 1983; Nicolaou and McKnight, 2006) to the favourable/unfavourable characteristics of the exchange information (Nicolaou and McKnight, 2006, p. 335) which meets user needs according to external, subjective user perceptions ... conforms to specifications, and meets or exceeds consumer expectations (Kahn, Strong, and Wang, 2002, p. 185). It can be measured via the criteria of relevance (Nicolaou and McKnight, 2006), accessibility (validity), and interpretability composed of accuracy (Nicolaou and McKnight, 2006) and completeness (Nicolaou and McKnight, 2006)" (Nicolaou and McKnight, 2006, p. 335)

Does the information you find in the platform conform to specifications and expectations?

Do they meet or exceed your expectations? How do you feel about the accessibility, currency, accuracy, completeness, relevance, and reliability of the exchange information?

Perceived system qualityDefinition: ... to what extent is the quality of the system technically sound, user friendly, easy to learn, error-free, well documented, and flexible (Gorla et al., 2010, p. 219; Fang et al., 2008)?

...is Proxym online platform technically sound, error-free, bug-free, user friendly, easy to learn, error-free, well documented, and flexible?

Is the search for the information in the platform speedy and convenient?

Perceived service qualityDefinition: ... is a customer's overall evaluations and judgments of the excellence and quality of service delivery (Santos, 2003) and performance (Bitner and Hubbert, 1994; Lien et al., 2017; Lien, Wu, Chen, and Wang, 2014; Parasuraman, Zeithaml, and Berry, 1991; Zeithaml, 1988) which consists of three components: interaction quality, environment quality, and outcome quality (Brady and Cronin, 2001, p. 37). In addition, it refers to such a cognitive state, while satisfaction is the affective (or emotional) state resulting from an evaluation of interaction experiences (Carrillat et al., 2009; Crosby et al., 1990)

How do you evaluate the overall excellence and quality of the peer platform of the organization and its services? In terms of interaction quality, environment quality, and outcome quality?

Peer RESOURCES...could be measured through four components (i) knowledge; (ii) skills; (iii) creativity; and (iv) connectedness

KnowledgeDefinition: ... can be defined as "the extent to which the peer is informed and experienced with a brand" (Merz et al., 2018, p. 82)

Do you think that the peers (the other members of the platform) are knowledgeable about the peer platform and its offers?

SkillsDefinition: The extent to which the peer is stimulated by the brand in terms of his/her capabilities (Merz et al., 2018, p. 82)

Do you think that the peers are stimulated by Proxym in terms of its capabilities?

CreativityDefinition: The extent to which the peer is stimulated by the brand in terms of his/her use of imagination and development of original ideas (Merz et al., 2018, p. 82)

Do you think the peers are stimulated by Proxym in terms of its use of imagination and development of original ideas?

ConnectednessDefinition: The extent to which the peer is associated, bonded, or linked with others because of the brand (Merz et al., 2018, p. 82)

To what extent do you think the peers are associated, bonded or linked with others because of the peer platform?

General Question: Do you think the information, system, and service qualities in the peer platform can influence users' knowledge, skills, creativity, and connectedness?

Perceived quality -> Identification

Peer identificationDefinition: ...is the degree to which members and social groups define themselves by the same attributes that they believe define the platform, meaning they identify themselves with the norms, traditions, customs and goals of the platform (Dutton et al., 1994, p. 239; Knight and Haslam, 2010; Tajfel, 1981)

Based on facts to date, do you think that your connection with the peer platform would influence your bond with peers and the platform itself?

Based on facts to date, do you think peer perceived quality impacts on your connection with the peer platform?

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Perceived quality -> Affective and intellectual experience
Peer Experience Definition: Customer experience is multi-dimensional in nature and is a complex and dynamic term that is a significant driver of firm's success and competitive advantage (Schmitt, 2003, 2016) customers'/users' reactions to all the interactions they have with a firm (Homburg et al., 2015) other customers/users (Lemon and Verhoef, 2016), intermediaries (Payne and Frow, 2004) and wider network actors (Zolkiewski et al. 2017). Customer experience is "holistic in nature involving the customer's affective and intellectual responses to any indirect or direct contact with the brand, platform, and other users across multiple touchpoints throughout the customer journey (McColl-Kennedy et al., 2015)
Do you think the peers' perceived quality from the online platform is beneficial and will influence their experience and develop stronger relationships?
Affective experience (moods and emotions)
Definition: ... refers to the individual's emotional state after the introduction of stimuli (Parboteeah et al., 2009), which affects each layer of an individual's behaviour and their decision-making process (Brakus et al., 2009; Chen et al. 2009; Essoo and Dibb, 2004; Garg et al., 2012; Goulding, 2000; Holbrook and Hirschman, 1982; Hosany and Witham, 2010; Klaus and Maklan, 2011; Klaus and Maklan, 2012; Parboteeah et al., 2009; Schmitt, 1999; Su, 2011; Tsai, 2005; Verhoef et al., 2009; Wang et al., 2012; Williams, 2006; Zarantonello and Schmitt, 2010)
Do you think the peers' perceived quality from the online platform will influence their experience towards their decision about a particular service/product?
Intellectual experience (cognitive, functional, educational, stimulation)
Definition: ... refers to an individual's knowledge about the product and services (Berry et al., 2006; Brakus et al., 2009; Ek et al., 2008; Ferguson et al., 2010; Fulbright et al., 2001; Garg et al., 2012; Goulding, 2000; Holbrook and Hirschman, 1982; O'Sullivan and Spangler, 1998; Olsson, 2012; Schmitt, 1999; Sundbo, 2009; Tsai (2005); Verhoef et al., 2009; Williams, 2006; Yu and Fang, 2009; Zarantonello and Schmitt, 2010)
Do you think the peers perceived quality from the online platform is helpful and problem solving, and will influence their experience towards their decision about a particular service/product?
General question: Do you think the information, system, and service quality in an online platform can influence users' intellectual and affective experiences?
Affective experience -> Behavioural experience
Do you think your visit to the online platform makes you happy and satisfied, which influences your decision and problem solving?
Experience -> Identification
How would you describe your identification with the platform? (e.g., Are you proud to tell others that you are part of the platform? Does the platform's image in the platform represent you?)
How would you describe the identification that the platform has with its peers?
To what extent do you think the experiences from the online platform can influence your identification with the platform?
Experience -> Identification
How would you describe your identification with the platform and peers?
Experience -> VCCB
Peer VCCB
Definition: ... is a "desirable goal as it can assist firms in highlighting the customer's or consumer's point of view and in improving the front-end process of identifying customers' needs and wants" (Lusch and Vargo, 2006; Payne et al., 2008, p. 84). It occurs when a customer consumes, or uses, a product or service, rather than when the output is manufactured. It could be measured through sub constructs, participation behaviour, and citizen behaviour
Participation behavior Definition: ...refers to role clarity, ability, and motivation in participation in the platform (Foroudi et al., 2019)
Please explain the purpose of participating in the online platform?
Information seeking Definition: customers seek information about service status and service parameters to explain service requirements and satisfy other cognitive needs, how to perform their tasks as value co-creators as well as what they are expected to do and how they are expected to perform during a service encounter (Foroudi et al., 2019; Yi and Gong, 2013)
Are you searching for information in the online platform? What information do you usually search for? Please provide an example
Information sharing :Definition: ... is the key to the success of value co-creation. For successful value co-creation, "customers should provide resources such as information for use in value co-creation processes" (Foroudi et al., 2019; Yi and Gong, 2013, p. 1280)
Are you sharing information in the online platform? What information do you usually share? Please provide an example
Responsible behavior Definition: ...occurs when customers recognize their duties and responsibilities as partial employees. For successful value co-creation between themselves and employees, customers need to be cooperative, observing rules and policies and accepting directions from employees (Foroudi et al., 2019; Yi and Gong, 2013, p. 1280)
Are you responsible for performing any tasks in the online platform?
Responsible personal interaction :Definition: ...refers to interpersonal relations between customers and employees, which are necessary for successful value co-creation (Foroudi et al., 2019; Yi and Gong, 2013, p. 1280)
Please explain your personal interaction in the online platform? For example, friendliness, kindness, politeness, etc.
Customer Citizen behavior Definition:... is an extraordinary value to the firm and refers to customers'/users' procedural justice, distributive justice, and interactional justice
Feedback Definition: ... includes "solicited and unsolicited information that customers provide to the employee, which helps employees and the firm to improve the service creation process in the long run" (Groth et al., 2004; Foroudi et al., 2019; Yi and Gong, 2013, p. 1280)
Advocacy Definition: refers to "recommending the business—whether the firm or the employee—to others such as friends or family. In the context of value co-creation, advocacy indicates allegiance to the firm and promotion of the firm's interests beyond the individual customer's interests" (Bettencourt, 1997; Foroudi et al., 2019; Yi and Gong, 2013, p. 1280)
Tolerance Definition: ... refers to "customer willingness to be patient when the service delivery does not meet the customer's expectations of adequate service, as in the case of delays or equipment shortages (Foroudi et al., 2019; Lengnick-Hall et al., 2000; Yi and Gong, 2013, p. 1281)
Helping Definition:... refers to "customer behaviour aimed at assisting other customers. In a service co-creation process, customers usually direct helping behaviour at other customers rather than at employees because other customers in a

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- service encounter may need help behaving in ways consistent with their expected roles" (Foroudi et al., 2019; Groth et al., 2004; Yi and Gong, 2013, p. 1281)
- To what extent do you think the interactions, participation, collaboration and dialogue within the online platform can help you receive quality of feedback, advocacy, tolerance, and help from the peers?
- General question: To what extent do you think the interactions, participation, collaboration and dialogue within online platforms can develop a deeper understanding about the product/services?
- Peer resources -> Identification
- To what extent do you share your knowledge, skills, and creativity within the online platform?
- Do you think sharing your resources within the online platform can influence your identification with the platform? Please explain
- Peer resources -> Experience
- Do you think sharing your knowledge, skills, and creativity within the online platform can influence your experience? Please explain
- Peer resources -> VCCB
- Do you think sharing your resources within the online platform can influence VCCB? Please explain
- Identification -> VCCB
- To what extent do you think the identification with the platform/brand can influence VCCB?
- Identification -> VCCB
- To what extent do you think the identification with the online brand platform can influence VCCB?
- RQ2: To what extent do (a) co-created value, (b) satisfaction, (c) motivation, (d) relationship strength, (e) peer loyalty interrelate with each other to influence active participation in the process of value co-creation online brand communities?
- VCCB -> Satisfaction
- Peer Satisfaction:** Definition: ... is a post-decision customer experience (Caruana, 2002, p. 815; Cronin and Taylor, 1994)
- To what extent do you think the value co-created behaviour in an online platform has influenced your satisfaction?
- VCCB -> Motivation
- Peer Motivation:** Definition: ... as mental states experienced in relation to situations or targets that have implications for the individual's goals or well-being (Johnson and Stewart, 2005) which influence the future of business relationships (Tahtinen and Blois, 2011). People in business-to-business relationships appraise the situations they perform in, and the happenings that occur to them, and the resulting emotions and coping responses influence the course and outcomes of the relationship" (Baggozi, 2006, p. 456)
- Please explain what the key factors are that motivate you to participate in the online platform?
- Trusting beliefs:** Definition: ... is a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviours of another (Rousseau et al., 1998, p. 395) which means the peer is confident about the brand (Merz et al., 2018, p. 82)
- Please explain what the key factors are that can influence your trusting beliefs towards the online platform?
- Competent/Ability-based-trust:** Definition: ... is concerned with an individual's belief and confidence that others are able to help fulfil his/her needs (Chow and Chan, 2008; Gharib et al., 2017, p. 518; Hsu and Lin, 2008; Mayer, Davis, and Schoorman, 1995; McKnight et al., 1998; McKnight, Choudhury, and Kacmar, 2002; Nicolaou and McKnight, 2006; Schlosser, White, and Lloyd, 2006; Sitkin and Roth, 1993; Vatanasombut, Igbaria, Stylianou, and Rodgers, 2008).
- To what extent do you think your belief keeps commitments and will fulfil needs to the online platform?
- Integrity-based-trust:** Definition: ... focuses on an individual's belief that others are telling the truth and are honest as well and keep commitments and will fulfil promises they make (Chow and Chan, 2008; Gharib et al., 2017, p. 518; Hsu and Lin, 2008; Mayer, Davis, and Schoorman, 1995; McKnight et al., 1998; McKnight, Choudhury, and Kacmar, 2002; Nicolaou and McKnight, 2006; Schlosser, White, and Lloyd, 2006; Sitkin and Roth, 1993; Vatanasombut, Igbaria, Stylianou, and Rodgers, 2008).
- To what extent do you think your belief keeps commitments and will fulfil promises to the online platform?
- Benevolence-based-trust:** Definition: ... relates to an individual's belief and reflects confidence and responsiveness to the customer's/partner's interests, not just its own (Chow and Chan, 2008; Gharib et al., 2017, p. 518; Hsu and Lin, 2008; Mayer, Davis, and Schoorman, 1995; McKnight et al., 1998; McKnight, Choudhury, and Kacmar, 2002; Nicolaou and McKnight, 2006; Schlosser, White, and Lloyd, 2006; Sitkin and Roth, 1993; Vatanasombut, Igbaria, Stylianou, and Rodgers, 2008) and that others voluntarily care about his/her needs (Gharib et al., 2017)
- To what extent do you think your belief towards the online platform can influence your confidence?
- Commitment:** Definition: ... arises from social exchanges (Gharib et al., 2017; Ryssel et al., 2004) and has been described as one's intention to continue a relationship (Chen, 2013; Gharib et al., 2017) with the brand and its success (Merz et al., 2018, p. 82)
- To what extent do you think your social exchange in the platform can influence the success of the brand?
- Passion:** Definition: The extent to which the peer has extremely positive feelings towards the brand (Merz et al., 2018, p. 82)
- General question: Please explain what the key factors are that can influence your motivation to use an online platform
- VCCB -> Relationship strength**
- Peer Relationship strength:** Definition: ... is often a "synonym for interpersonal loyalty" (Barry et al., 2008, p. 155; Oliver, 1999) and is an important concept in B2B services because of the personal contact between buyers and suppliers (Barry et al., 2008, p. 115; Liljander and Roos, 2002; Moller and Torronen, 2003).
- To what extent do you think the online platform helps connection, attachment, ties, and glue existing among the users and platform?
- Do you think the VCCB can help connection, attachment, ties, and glue existing among the users and platform?
- Satisfaction -> Motivation
- Do you think your satisfaction can influence your motivation to use the online platform?
- Satisfaction -> Relationship strength
- Do you think your satisfaction with the online platform can strengthen your relationship with platform members and the platform?
- Motivation -> Relationship strength
- Do you think your motivation for being involved in the online platform can strengthen your relationship with platform members and the platform?
- Motivation -> Peer Loyalty
- Peer loyalty

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Definition: ... is a collection of attitudes aligned with a series of purchase behaviours that systematically favour one entity over competing entities (Brady et al., 2012; Breivik and Thorbjørnsen, 2008; Wulf et al., 2001; Watson et al., 2015; Han et al., 2008; Oliver, 1999;)
Attitudinal based loyalty
Definition: Attitudinal based loyalty (cognitive-based loyalty or phantom loyalty) or pleasurable fulfilment that favours a particular entity (Chaudhuri, 2009) derives from information about a platform's offering, such as quality and price, and is the weakest type of loyalty because it does not relate to the brand. This information indicates that the selected product or service is the best choice among its alternatives and thus preferable to others (Ahluwalia, 2000; Oliver, 1999, p. 37; Watson et al., 2015)
Do you think your involvement with the online platform is pleasurable fulfilment that favours a particular entity which derives from information about a platform's offering, such as quality and price?
Behavioural based loyalty
Definition: Behavioural based loyalty entails repeated purchases that stem from action orientation involving a readiness to act to the benefit of a particular entity (Chaudhuri and Holbrook, 2001; Wulf et al., 2003; Oliver, 1999, p. 35).
Cognitive-based loyalty describes an internal desire to repurchase a certain brand which binds the customer more strongly to the platform than affective loyalty (Brunner et al., 2008; Oliver, 1999) and is characterized by a deeper level of commitment (Harris and Goode, 2004). Action-based loyalty which describes the actual behaviour in which the preposition or readiness to repurchase a firm's offering developed in the previous loyalty stages is converted into action (Bolton, 1998; Perkins-Munn et al., 2005; Rust and Zahorik, 1993) and increased usage (Bolton and Lemon, 1999)
Do you think your repeated involvement with the online platform has increased your loyalty towards the platform and online platform?
General question: To what extent do you see yourself loyal to the platform and online platform?
How would you describe your platform's loyalty?
How would you describe the loyalty the platform has with its peers?
Do you think your motivation of being involved in the online platform can influence your loyalty towards the platform and online platform?
Relationship strength -> Peer loyalty
Do you think your strong relationships with the online platform can influence your loyalty?
Attitudinal based loyalty -> Behavioural based loyalty
To what extent do you think your attitudinal based loyalty can influence your behaviour?
Peer loyalty -> Active involvement
Peer Active participation
Definition: ...is the key success factor for online communities (Ardichvili et al., 2003). Active participation carrying out several activities on a regular basis (e.g., daily or weekly) (Ray et al., 2014). These activities include logging on to the platform website, keeping their profile up to date, complying with platform rules and regulations, posting quality messages that engender discussions, and replying to posted questions (Gharib et al., 2017, p. 517; Nonnecke et al., 2006; Preece et al., 2004).
Do you think you are an active member of the online platform? If so, why?

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