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Tourists' adoption of self-service technologies at resort hotels

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ABSTRACT

This study proposes and tests a model of travelers' self-service technology adoption to explain why travelers choose self-service technologies over service staff. Desire for interaction with service staff serves as a countervailing construct against technology-related perceptions and a subsequent technology adoption decision. Based on a resort hotel industry and data from a national sample, the proposed model provides cogent explanations for the two service transaction options' counteracting nature (self-service technologies vs. the service staff) toward the traveler's technology adoption in business transaction situations. The study shows the differently conceptualized role of the customer's desire for interaction. The proposed model allows service providers to examine the customer's willingness to adopt or avoid using self-service technologies and to determine a proper combination of technology and staff deployment.

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1. Introduction

As technological advances profoundly impact on business and marketing strategy, self-service technologies (SSTs) surface as an alternative or as a replacement of human-based service transactions (Rust & Espinoza, 2006). SST adoption benefits include labor cost reduction over time (Chang & Yang, 2008; Erdly & Chatterjee, 2003; Walker, Craig-Lees, Hecker, & Francis, 2002), creation of competitive niches and differentiation (Meuter & Bitner, 1998; Slifka, 2010), and improvement in consumer service and operational efficiency (Carline, 2007; Curran, Meuter, & Surprenant, 2003; Dabholkar, 1996; Meuter, Ostrom, Bitner, & Roundtree, 2003). Operators and managers remain hesitant to adopting SSTs due to their significant drain on resources if SSTs are not accepted by consumers (Curran & Meuter, 2005; Meuter et al., 2003). Service organizations fear losing customer–employee interactions may inhibit service recovery efforts, shatter social bonds between consumers and the organization, reduce up-selling opportunities, and cause service staff resentment of the technology (Beatson, Coote, & Drennan, 2006; Bitner, 2001; Curran et al., 2003; Meuter & Bitner, 1998).

In the hospitality and tourism industry, SST applications have increased substantially in recent years. Traveling consumers today encounter many SSTs such as airport self check-in kiosks, electronic tourist guides, tourism information kiosks, self-service systems in dining facilities, hotel self check-in, and automated hotel check-out (Kincaid & Baloglu, 2005; Riebeck, Stark, Modsching, & Kawalek, 2008; Stockdale, 2007). Stockdale (2007) uses the label "self-service tourist" to refer to travelers experiencing a wide variety of technology applications online and offline, before (information search), during (actual visit), and after visitation. Tourism operation managers need to know how the two competing choices–SSTs vs. the service staff–affect travelers. Under what conditions will travelers adopt or reject SSTs?

This study shows how the traveler's intrinsic desire for interaction-based service encounters counteracts perceptions and adoption of SSTs as a method of service transactions. In particular, this study enriches the Technology Adoption Model's (TAM) by introducing an intrinsic factor, the desire for human interaction and related constructs such as the traveler's desires for privacy, autonomy, and effectiveness. Extending the literature, this study models both perceived usefulness of SSTs and desire for interaction as key mediating variables. How do the traveler's perceived usefulness of SSTs and desire for human interaction mediate the effects of perceived ease of use and technology-related instrumental desires toward SST adoption?

1.1. Conceptual background

1.1.1. Extrinsic desires

Extrinsic motivation theory provides a conceptual framework for understanding TAM and many other related studies (Davis, Bagozzi,

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& Warshaw, 1992; Meuter, Bitner, Ostrom, & Brown, 2005). According to Deci (1971) and Deci and Ryan (2000, p. 60), extrinsic motivation pertains whenever a person performs an activity in order to attain some separable outcomes. The theory posits that people engage in performing activities because of the rewards they want to obtain or the punishments (or losses) they want to avoid. Webster and Martocchio (1992) define extrinsic motivation as the motivation to perform an activity because the activity produces the valued outcomes that are distinct from the activity itself. A visitor may shop at a farmers market to save money or get fresh products rather than enjoying the shopping activity. Shopping at a farmers market becomes a means to these purchase-related ends (saving money or getting fresh products), extrinsic (or instrumental) motivations or values.

In the context of the consumer's adoption and use of SSTs, completing a service transaction fast or avoiding service congestion serve as a general extrinsic motivator leading the consumer to choosing SSTs instead of a service staff (Dabholkar, 1996; Meuter et al., 2003). Consumers' beliefs in the ease of use and usefulness of the focal technology for enhancing the performance of an intended task facilitate or reinforce choice of SSTs over the service staff (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Lu, Chou, & Ling, 2009). Other SST-related extrinsic motivations include self-esteem (Standing, McManus, Standing, & Karjuluoto, 2008), a reliable transaction and satisfaction (Chang & Yang, 2008; Rangarajan, Falk, & Schillewaert, 2007), process control and autonomy (Chang & Yang, 2008; Ding, Hu, & Sheng, 2010; Oyedele & Simpson, 2007), and social acceptance (Curran et al., 2003). For tourism, a descriptive study assesses user acceptance of electronic tourist guides based on two dimensions: social habit and practical acceptability (Riebeck et al., 2008). The practical acceptability includes usability, utility, cost, support, reliability, and compatibility—all extrinsic motivators.

1.1.2. Intrinsic desires

Self-determination theory recognizes strong intrinsic motivation's operation in human action (Deci & Ryan, 1985; Ryan & Deci, 2000). Ryan and Deci (2000, p. 56) define intrinsic motivation as "the doing of an activity for its inherent satisfactions rather than for some separable consequence." When intrinsically motivated, a person performs an act for the fun or challenge rather than because of external prods, pressures, or rewards. Buying fresh products and saving money may be secondary motivations for people to shop at a farmers market. Some shoppers' motivations include the fun and enjoyment they get through the shopping activity or process at a farmers market.

Consumers may adopt new technologies for intrinsic reasons. For example, employees adopt new technologies when they expect to *enjoy* the new system (Curran et al., 2003; Dabholkar, 1996; Davis et al., 1992). The *playfulness* of the web-based technology is a significant intrinsic reason for people to utilize web-based technologies (e.g., Moon & Kim, 2001; Novak, Hoffman, & Yung, 2000). Similarly, *fun* is an intrinsic motivation relevant to technology adoption (Chang & Yang, 2008; Dabholkar & Bagozzi, 2002; Rangarajan et al., 2007). When people fulfill their intrinsic motivations during the performance of an activity, they tend to reach a state of *flow* (Csikszentimihalyi, 1975).

Facing two different options–SSTs vs. service staff–to achieve the same task goal, consumer preference likely hinges on the strength of extrinsic or intrinsic motivations each option promises to satisfy. For example, a hotel check-in service is a situation where a speedy check-in service typically is viewed as high quality (Oh & Parks, 1997). Traveler choices include checking in through either the traditional front desk or a newly deployed SST kiosk.

In this case, the SST kiosk does not allow an ideal opportunity for the traveler to satisfy technology-oriented intrinsic needs due to the expected presence of social and system pressures (e.g., other customers are waiting in line behind). Choosing the front desk offers an opportunity to interact with a service staff. Travelers choosing the kiosk may be motivated more by extrinsic desires such as speedy check-in, while those guests electing the service desk satisfy intrinsic desires for interaction with the staff. When travelers face these contrasting choices, one type of desires likely suppresses or countervails the other desire because the two options are countervailing.

1.1.3. The conceptual model and hypotheses

Fig. 1 presents the conceptual model guiding this study. The model reflects a situation where both staff and SST options are available and a transaction through SSTs requires the traveler's reaction to some degree. The model extends the TAM by incorporating other extrinsic and intrinsic desires relevant to choosing SSTs vs. staff-based service. Perceived usefulness mediates the effects of four motivations toward intention to use SSTs, while desire for interaction serves as a countervailing mediator of the four motivations toward both perceived usefulness and intention to use SSTs.

In addition to TAM, the proposed model includes desire for privacy, autonomy, and effectiveness as motivations commonly related to the choice of either SSTs or the service staff for a transaction. Fig. 1 summarizes the hypothesized relationships and their directions.

Based on attitude theory (Ajzen, 2002), intention to use SSTs is defined as an individual's readiness to engage in a behavior. SST intention is operationalized as the likelihood of choosing to use SSTs instead of the service staff for a service transaction. Meuter et al. (2005) conceptualizes that both extrinsic and intrinsic motivations are direct predictors of trying SSTs. TAM and related studies provide evidence for perceived usefulness as a direct antecedent of intention to use SSTs (Lanseng & Andreassen, 2007; Lu et al., 2009). In a sense, perceived usefulness is a required condition to form an intention to use SSTs in lieu of the service staff (Meuter et al., 2003). An ineffective SST triggers a search for an alternative method of transaction if available.

Perceived SST usefulness increases the likeliness of use, especially in the presence of an alternative service transaction method such as staffed counters.

H1. Intention to choose and use SSTs relates positively to perceived usefulness of SSTs.

Desire for interaction is defined as a need to retain personal contact with others (e.g., service staff) during a service encounter (Curran & Meuter, 2005; Dabholkar, 1996). Human interaction is a valued experience in service encounters (Bitner, Booms, & Mohr, 1994; Bolton & Drew, 1991) and thus travelers actively seek to maximize the experience whenever possible. Although researchers report mixed findings, desire for interaction plays either a direct or indirect predictor of intention to use SSTs (e.g., Dabholkar, 1996; Langeard, 1981; Meuter et al., 2005). In a retail setting, customers with a greater need for interpersonal contact tend to avoid machines (Forman & Sriram, 1991; Prendergast & Marr, 1994), while other people purposefully avoid interacting with personnel to demonstrate independence (Anselmsson, 2001; Meuter, Ostrom, Roundtree, & Bitner, 2000).

Therefore, greater desire for interpersonal interaction likely decreases customer willingness to use SSTs.

H2. Intention to choose to use SSTs relates negatively to desire for interaction with the service staff.

Following Davis (1989), perceived usefulness is the degree to which the traveler believes that using SSTs enhances his or her service transaction. In a situation where SSTs and service staff are available as competing check-in methods, elicited motivations likely affect the traveler's choice. When one option is chosen against another, the consumer exerts mental efforts to justify his or her choice and, furthermore, criticizes the rejected choice in order to avoid any potential inner conflict (Festinger, 1957; Festinger & Carlsmith, 1959).

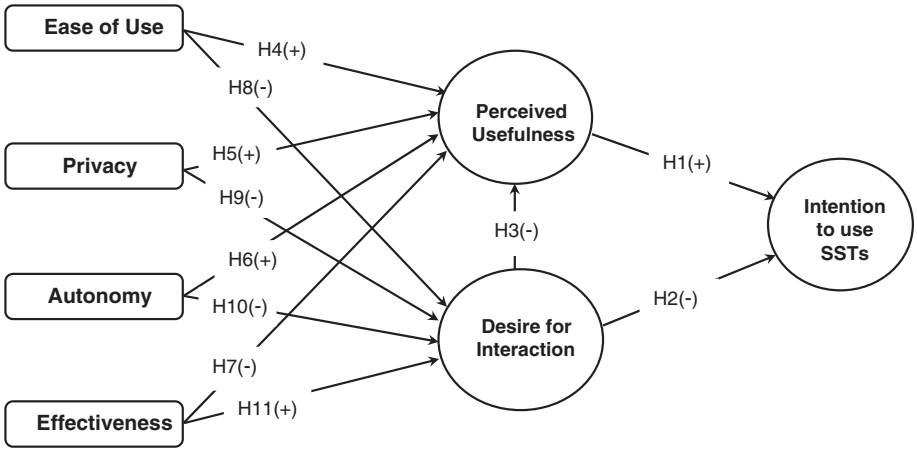

Fig. 1. The conceptual model.

Motivations associated with using SSTs or service staff likely counteract each other through such choice-justification efforts.

H3. Perceived usefulness of SSTs relates negatively to desire for interaction with the service staff.

A system must be easy to use to be useful. Davis (1989, p. 320) defines perceived ease of use as "the degree to which a person believes that using a particular system would be free from effort". TAM specifies ease of use as a pre-condition for usefulness perceptions (Davis, 1989; Davis et al., 1989; Porter & Donthu, 2006) and other studies support that ease of use predicts perceived usefulness (e.g., Lanseng & Andreassen, 2007; Lu et al., 2009). Tourists also will perceive the machine difficult to use for an intended task as not useful.

H4. Perceived usefulness of SSTs relates positively to perceived ease of use of SSTs.

In some service transactions (e.g., banking and hotel registration), data security and privacy of personal information are an important issue. Surveys show that 59–68% of consumers chose SST kiosks to protect their privacy when registering at hotels (Hospitality Technology, 2009; Smith & Rowinski, 2007). Consumer security and privacy are also an important concern in consumer research and public policy studies, especially when technology is involved in transactions (Horne & Horne, 1997; Milne, 2000; Phelps, D'Souza, & Nowak, 2001; Sheehan & Hoy, 2000). Phelps et al. (2001) show consumers' purchase behavior relates negatively to the degree of privacy concerns required in online transactions.

Pavlou (2003) extends the TAM by incorporating privacy-related variables such as trust and perceived risk as antecedents of perceived usefulness in internet transactions (also see Milne & Boza, 1999). Goodwin (1991, p. 152) defines consumer privacy as "the consumer's ability to control (a) presence of other people in the environment during a market transaction or consumption behavior and (b) dissemination of information related to or provided during such transactions or behaviors to those who were not present."

Desire for privacy motivates travelers to use SSTs more than to transact with service staff.

H5. Perceived usefulness of SSTs relates positively to the desire for privacy.

The tourist's desire for autonomy or independence in a service transaction process affects his or her choice of SSTs against service staffs. Ryan and Deci (2000) recognize autonomy as an innate psychological need to enhance self-motivation and well-being. Autonomy expresses desire for self-control or independence in a variety of situations (Oyedele & Simpson, 2007) and often translates as perceived control (Dabholkar, 1996). Generally, autonomy is one's investment in preserving and increasing independence, mobility, and personal rights (Bieling, Beck, & Brown, 2000). In the context of SST adoption, autonomy is the amount of control one expects to achieve over the process or outcome of a service transaction (Dabholkar, 1996).

Autonomous individuals are self-motivated to perform activities to achieve desired goals and they select SSTs over service providers to prevent undermining self-determination, and to avoid the social interaction required in service provider-controlled transactions (Oyedele & Simpson, 2007).

H6. Perceived usefulness of SSTs relates positively to desire for autonomy.

Regardless of the service transaction method, one common goal is to achieve consumer satisfaction by keeping the process error- and hassle-free. The consumer's service method choice focuses on the method's effectiveness in achieving the transaction goals to maximize satisfaction (Parasuraman, Zeithaml, & Malhortra, 2005). Previous research confirms the importance of anticipated satisfaction for consumer choice (e.g., Granzin & Schjelderup, 1982; Shiv & Huber, 2000; Simintiras, Diamantopoulos, & Ferriday, 1997). The present study conceptualizes the desire for effectiveness as the tourist's need to achieve high transaction-specific satisfaction in the process and as a result of a chosen service delivery method where different options exist. Service industry SSTs are relatively new, requiring a high level of self-efficacy not readily available to the majority of travelers (Oyedele & Simpson, 2007).

Therefore, even a useful SST may not be perceived as an effective transaction method, especially when they are compared to service staffs.

H7. Perceived usefulness of SSTs relates negatively to the desire for effectiveness.

As desire for interaction is hypothesized as a countervailing construct in this study, the construct will have the relationships that are opposite to those perceived usefulness has in general. For example, high perceived ease of use of SSTs should suppress the tourist's desire for interaction with service staffs, leading to the choice of SSTs. Likewise, a strong desire for privacy may discourage the tourist from choosing service staff for human interaction. Autonomous travelers may withdraw from social interactions and avoid service staffs

to preserve their sense of control when feasible, thereby choosing SSTs more often than service staffs. In contrast, service staffs are viewed as a way of more effectively satisfying transaction-specific goals and outcomes. The following hypotheses examine these contrasting rationales.

H8. Desire for interaction relates negatively to perceived ease of use of SSTs.

H9. Desire for interaction relates negatively to desire for privacy.

H10. Desire for interaction relates negatively to desire for autonomy.

H11. Desire for interaction relates positively to desire for effectiveness.

2. Methods

The resort hotel industry is an ideal study setting for several reasons. First, during guest registration, the traveler faces a choice of either SSTs or service staffs for a similar service transaction and goal. Second, annual consumer surveys consistently indicate that a top managerial concern is whether or not SSTs negatively affect traveler satisfaction and demand (Hospitality Technology, 2007, 2008, 2009). Finally, the resort industry is in an early stage of considering introduction of SSTs into the guest registration process (Hospitality Technology, 2009; Kasavana, 2005). The hotel industry is facing a critical management decision to adopt SSTs with uncertain returns on investment.

2.1. Preliminary studies

A series of qualitative studies preceded the main national survey. First, 26 representatives of SST companies exhibiting at the annual HITEC Show in Dallas, Texas were interviewed in June, 2008. These people identified key upcoming SSTs and related customer concerns for the resort hotel industry. A second set of interviews included eight conveniently selected General Managers (GMs) of resorts across the U.S. to verify the key SST systems and concerns that arose from the earlier interviews with the corporate representatives. Third, three frequent writers on SSTs to hotel industry magazines and four academic researchers on SSTs reconfirmed the upcoming SSTs and key concerns through email interviews. These study participants also provided evaluations of various study design ideas.

2.2. Measurement scales

Results from the preliminary qualitative studies and literature review helped determine a set of question items to measure each construct (see Table 2). The measures of perceived ease of use and perceived usefulness were consistent with those used in previous studies (Davis, 1989; Davis et al., 1989), while the measures of other constructs were developed to fit the study situations. Except for the measures of the intention to use SSTs construct, all the other construct measures were operationalized on the Likert scale with 1 = *strongly disagree* and 5 = *strongly agree*. One of the two measures for intention to use SSTs was operationalized on a 7-point likelihood scale (1 = *very unlikely*, 7 = *very likely*), while the other on an 11-point probability scale ranged from 0 to 100% in ten percent intervals. The questionnaire also included a few socio-demographic questions.

2.3. Research design

The main study was a national electronic survey in a 2×3×5 between-subject, experimental design of a resort hotel's check-in situation. The manipulation included two star ratings (3 star vs. 5 star), three lengths of waiting line at the staffed service center (short vs. medium vs. long), and five types of resort (beach vs. casino vs. golf vs. ski vs. theme park). In essence, these three manipulated variables were to control potential variables that could affect the guest's choice between SSTs and staff. These manipulations enhance generalizability of the results across various plausible check-in situations at resorts. The questionnaire with the embedded experimental conditions was hosted on separate websites and the links were then sent to the respondents for participation through the click-button responses. A marketing research company administered the quasi field experiment survey. The company randomly sampled 56,180 consumers (936 per each survey version on average) to invite participation in the study from a panel database containing more than 2 million US consumers. A total of 1690 customers participated in the study over a fixed two-week study period, resulting in a response rate of slightly above 3%.

3. Findings

3.1. Sample

Table 1 summarizes sample characteristics. Other than what Table 1 reveals, 72% of the respondents took at least one trip in the previous 12 months; 96% stayed eight nights or fewer at beach resorts, 96% seven nights or fewer at casino resorts, 97% three nights or fewer at golf resorts, 98% three nights or fewer at ski resorts, and 98% seven nights or fewer at theme park resorts. A zip code analysis revealed that the respondents' places of residence covered all 50 states, with relatively larger sample sizes derived from more populated states such as California (n = 181), Pennsylvania (100), Florida (105), Texas (90), and New York (89); in contrast, a much smaller number of responses originated from such states as Vermont (1), Wyoming (2), North Dakota (3), South Dakota (3), and Hawaii (3).

Table 1
Sample characteristics.

	Frequency[a]	Percent[a]
Gender		
Female	855	50.6
Male	810	47.9
Annual household income		
Less than $50,000	741	43.8
$50,000–$75,000	416	24.6
$75,001–$100,000	230	13.6
$100,001–$125,000	134	7.9
More than $125,000	140	8.3
Education		
High school or less	418	24.7
2 year college	519	30.7
4 year college	487	28.8
Post graduate	239	14.1
Experience with SST at hotels		
Never	1347	79.7
1–3 times	245	14.5
4–6 times	69	4.1
7–9 times	18	1.1
10 or more times	1	0.0
Technology used		
Email	1603	94.9
Internet	1557	92.1
Mobile phone	1236	73.1
ipod/MP3 player	402	23.8
Use of SST at grocery store/retail		
Never	289	17.1
Seldom	348	20.6
Occasionally	508	30.1
Often	417	24.7
Every time I go there	104	6.1

[a] The frequencies and percent may not sum to total due to missing values.

3.2. Manipulation checks

Because both star rating and type of resort were nominal categories following industry practices, manipulation checks were not necessary. The field survey included one question to collect the respondent's opinion about the length of the given waiting line on a 7-point scale (1 = very short–7 = very long). One-way analysis of variance indicated that the respondent perceived the three waiting lines significantly different in length (mean = 3.57 vs. 5.02 vs. 5.55; $F_{2;1678} = 212.45$, $p<0.001$); post-hoc tests for pairwise differences confirmed that each waiting line was indeed differently perceived for its length.

3.3. Main effects

Multivariate analysis of variance tested whether the hypothetical transaction conditions had any implications for consumer perceptions of the constructs. All sets of the construct measures are reliable, with Cronbach's alpha of .85 for intention to use SSTs, .89 for perceived ease of use, .91 for perceived usefulness, .90 for desire for interaction, .97 for privacy, .87 for autonomy, and .96 for desire for effectiveness (Nunnally, 1978). Results show that neither star rating nor type of resort make significant differences in the subject's responses to the model constructs (Wilks' λs>.99; $p>0.05$). Only desire for autonomy was significantly stronger for 3-star resort customers ($M = 3.50$) than for 5-star resort customers ($M = 3.47$; Wilks' $\lambda = .99$, $F = 2.77$, $p<0.05$).

In contrast, waiting line resulted in significant differences in some model constructs. As expected, line length is associated positively with intention to use SSTs (Wilks' $\lambda = .89$, $F = 31.3$, $p<0.001$); the mean strength of intention is 3.51 for a short, 4.61 for a medium, and 5.17 for a long waiting line. Both perceived ease of use and perceived usefulness are significantly different only between the short ($M = 3.36$ and 3.26) and the medium lines ($M = 3.55$ and 3.46) (Wilks' λs = .98 and .96, $F = 5.94$ and 7.29, $p<0.001$, respectively); the medium line length is about the same as a long line in the mean perceived ease of use ($M = 3.54$) and perceived usefulness ($M = 3.54$). The length of waiting line does not affect desire for privacy (*Ms* = 4.51 vs. 4.52 vs. 4.44; Wilks' $\lambda = .99$, $F = 1.25$, $p>0.05$), desire for autonomy (*Ms* = 3.43 vs. 3.55 vs. 3.47; Wilks' $\lambda = .99$, $F = .94$, $p>0.05$), and desire for effectiveness (*Ms* = 4.30 vs. 4.31 vs. 4.21; Wilks' $\lambda = .99$, $F = .95$, $p>0.05$). Finally, the waiting line is associated negatively with desire for interaction (*Ms* = 3.66 vs. 3.54 vs. 3.48; Wilks' $\lambda = .99$, $F = 2.02$, $p<0.05$), which contrasts the intention to use SSTs. These results collectively suggest that the proposed model needs validation at least among the groups experiencing different waiting lines at the staffed service center.

3.4. Measurement model

Using the raw data as input and analyzing the variance-covariance matrix, confirmatory factor analysis for the expected factor structure results in a good fit after dropping three of the 26 original measurement items: χ^2(d.f. = 209) = 907.5, CFI = .99, TLI = .99, and RMSEA = .047 (Hu & Bentler, 1999). Table 2 summarizes the results. The three items were dropped due to a sizable cross loading, a weak loading by the reverse-coded item, and a large modification index value suggesting two correlated errors. All factor loadings are large and significant, and most measurement errors are relatively small.

Cronbach's alpha of internal consistency is high for each construct, with a minimum of .85 (desire for autonomy), and such high construct reliability also is evident in the reliability index (ρ>.86, desire for autonomy) calculated by LISREL (8.80). The variance extracted for each construct is .67 (autonomy) or higher. Combined, these results lend a strong support for convergent validity of the model constructs (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). Discriminant validity of the constructs was assessed by constraining each inter-construct correlation to unity, based on the correlation matrix, and then conducting a chi-square difference test (Bagozzi & Yi, 1988). Since none of the constraints were acceptable ($p<0.05$) the constructs' discriminant validity was evident.

Table 2
The measurement model results.

Measures[a]	Mean	SD	Loading[b]	Error[b]
Intention to use SST (α = .95; ρ = .94; AVE = .88)[c]				
Likely to choose the self service kiosk[d]	4.85	2.00	0.94	.12
Probability to check in through the SST[e]	60.16	31.24	0.94	.12
Desire for interaction (α = .87; ρ = .87; AVE = .69)				
Like interacting with front desk staff	3.45	1.03	0.84	.30
Enjoy working with the staff to address my needs	3.66	0.95	0.88	.23
Guest service based on human interaction	3.56	1.00	0.77	.41
Desire as much human interaction as possible	3.37	1.07	–	–
Usefulness (α = .92; ρ = .92; AVE = .74)				
SST would be useful in completing my check in	3.60	0.99	0.88	.23
SST would improve my check-in transactions	3.25	1.02	0.81	.34
SST would be convenient	3.69	1.04	0.87	.24
SST would be useful in meeting my travel needs	3.43	1.04	0.87	.24
Ease of use (α = .88; ρ = .88; AVE = .72)				
SST requires little work	3.52	0.99	0.75	.44
Easy to get SST to do what I want it to do	3.42	0.99	0.88	.23
SST easy to accomplish what I want in check-in	3.51	0.99	0.91	.17
SST would be complicated to use (reverse coded)	3.40	1.01		
Privacy (α = .97; ρ = .97; AVE = .87)				
Want secure credit card transactions	4.44	0.91	0.90	.19
Want transaction records to remain confidential	4.50	0.88	0.95	.09
Want safe and secure transaction	4.51	0.88	0.96	.07
Am conscious about information security	4.45	0.88	0.92	.15
Autonomy (α = .85; ρ = .86; AVE = .67)				
Want to handle my needs on my own	3.14	1.07	0.86	.26
Want to be autonomous in taking care of my matters	3.30	0.97	0.87	.24
Want to avoid problems by doing on my own	3.46	0.99	0.71	.50
Want to make my own choices and decisions	3.87	0.87	–	–
Effectiveness (α = .95; ρ = .95; AVE = .82)				
Check-in to provide all info to my needs	4.18	0.87	0.86	.26
Expect completely satisfactory check-in experience	4.25	0.86	0.92	.15
Check-in organized in customer's best interest	4.32	0.85	0.94	.11
Check-in process free of errors	4.34	0.86	0.89	.21

χ^2 (df = 209) = 907.5; CFI = .99; TLI = .99; RMSEA = .047.

[a] The measures are abbreviated and Appendix A provides full details on the measurement items. Except for the two items measuring intention to adopt SST, all the other measures were operationalized on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

[b] Entries are standardized values, all statistically significant (p<.01).

[c] α = Cronbach's alpha of reliability; ρ = composite construct reliability; AVE = amount of variance extracted.

[d] Measured on a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree).

[e] For the calculation of α, the item was transformed using a formula, [the raw score/100] x 7, to avoid a scale effect on the α value. The scale used was 0%, 10%, 20%, …, 100%.

3.5. Structural model and validation

The proposed structural model in Fig. 1 results in a good fit, with χ^2(d.f. = 213) = 909.9, CFI = .99, TLI = .99, and RMSEA = .046. A chi-square difference test against the fully recursive model indicates that the fully recursive model should be rejected in favor of the more parsimonious structural model ($\Delta\chi^2$(d.f. = 4) = 2.4, $p>.10$). The model explains 60% of the variance in the intention to use SSTs, 87% in perceived usefulness, and 31% in desire for interaction.

Most proposed relationships appear tenable; see Table 3. The relationship between perceived usefulness and intention to use SSTs is

Table 3
Results of the structural models.

Hypothesized path	Indirect effect (mediation) model	Direct effect (fully recursive) model
Usefulness → intention to use SST (H1)	.75(.05)**	.81(.17)**
Desire for interaction → intention to use SST (H2)	−.15(.04)**	−.16(.05)**
Desire for interaction → usefulness (H3)	−.08(.03)**	−.07(.02)**
Ease of use → usefulness (H4)	.83(.03)**	.83(.04)**
Ease of use → desire for interaction (H8)	−.19(.04)**	−.19(.04)**
Privacy → usefulness (H5)	.06(.03)*	.06(.03)*
Privacy → desire for interaction (H9)	.06(.04)ns	.06(.04)ns
Autonomy → usefulness (H6)	.09(.02)**	.10(.02)**
Autonomy → desire for interaction (H10)	−.15(.03)**	−.15(.03)**
Effectiveness → usefulness (H7)	.04(.03)ns	.03(.03)ns
Effectiveness → desire for interaction (H11)	.57(.05)**	.57(.05)**
Direct effects tested		
Ease of use → intention to use SST	–	−.05(.19)ns
Privacy → intention to use SST	–	−.03(.07)ns
Autonomy → intention to use SST	–	−.03(.06)ns
Effectiveness → intention to use SST	–	.04(.09)ns

Entries are standardized estimates (standard errors).
* = $p<.05$; ** = $p<.01$; ns = $p>.05$.

significant and strong as expected in H1. Desire for interaction has a significant, negative effect on intention to use SSTs, lending support for H2. The relationship between desire for interaction and perceived usefulness also is significant and negative, supporting H3. H4 cannot be rejected as posited by the TAM because the relationship between perceived ease of use and perceived usefulness is significant, positive, and strong. Perceived ease of use exhibits a significant, negative effect on desire for interaction, providing evidence for H8. Desire for privacy's effect on perceived usefulness is significant and positive, but the effect on desire for interaction is not significant. Therefore, H5 cannot be rejected, whereas H9 is rejected. Both H6 and H10 cannot be rejected because the effect of desire for autonomy on both perceived usefulness and desire for interaction is significant, each in the expected direction. Finally, the data do not support for H7 as the effect of desire for effectiveness on perceived usefulness is not significant. Desire for effectiveness, however, shows a significant, positive effect on desire for interaction, lending support for H11.

The structural model was subjected to validation analyses using a multi-group analysis approach based mainly on the three research design variables (Thompson, 2000). First, a two-group analysis for the two star-rating samples result in a good model fit ($\chi^2_{426} = 1260.9$; CFI = .99; TLI = .99; RMSEA = .051). Only one of the 22 structural parameters (4.5%) shows a different value, albeit in the same direction, in the 3-star resort sample. Second, the structural model fits well across the three waiting line sample groups ($\chi^2_{639} = 1658.6$; CFI = .99; TLI = .98; RMSEA = .056), with four of the 33 parameters (12%) resulting in different values but all in the same direction as the previous analysis. A similar modeling across the five types of resort also results in a good model fit ($\chi^2_{1,065} = 2095$; CFI = .99; TLI = .98; RMSEA = .056); 12 of the 55 parameters (21%) show different values, again all in the expected, same direction. Finally, a random split-half analysis produced good model fits: $\chi^2_{213} = 630.9$, CFI = .99, TLI = .98, and RMSEA = .051 for the first group and $\chi^2_{213} = 625.1$, CFI = .99, TLI = .98, and RMSEA = .051 for the second group. Only one parameter from each group shows a value different from the one found in the all-sample analysis earlier. In sum, although a small proportion of the parameters shows some random instability in various subgroups, the overall model structure seems generalizable across the groups for theoretical purposes.

3.6. Perceived usefulness and desire for interaction as mediators

Additional analyses were conducted to assess the mediating roles played by perceived usefulness and desire for interaction. As no direct effect of the four exogenous constructs was significant, only the indirect effect of each exogenous construct on intention to use SSTs was decomposed by all possible indirect causal links. Summary results appear in Table 4. Of the total indirect effect of perceived ease of use on intention to use SSTs, 94% is mediated through perceived usefulness only, while only 4.4% is through desire for interaction only; perceived usefulness and desire for interaction in combination mediate an insignificant amount (1.7%) of the effect.

Similarly, much of desire for privacy (77.6%) and desire for autonomy (68%) on intention to use SSTs is mediated through perceived usefulness; perceived usefulness and desire for interaction mediate about one-third of the effect (32%). In contrast, 80% of the desire for effectiveness construct is mediated through the two key mediating variables. Desire for interaction only mediates about 57% on intention to use SSTs.

4. Discussion

4.1. Theoretical implications

The data provide clear evidence to support the proposed model of technology adoption in service settings where both SSTs and service providers are available for transactions. The model incorporates some salient concerns of customers in relevant service transaction situations. The model also newly conceptualizes desire for interaction and perceived usefulness as key mediating variables. Overall, the model seems tenable as evidenced in the measurement model's integrity, solid fit across validation samples, and converging results pointing to the roles of perceived usefulness and desire for interaction as key mediators.

The significant role of desire for interaction as a mediating construct in the proposed model is particularly notable. Most previous studies conceptualize desire for interaction as one of several independent variables to directly predict intention to use SSTs, SST trial, or SST-related attitudes (e.g., Curran & Meuter, 2005; Dabholkar, 1996; Meuter et al., 2005). This study, however, models desire for interaction as an intrinsic need or goal influenced by other innate or transaction-related desires, such as desires for privacy, autonomy, and effectiveness. These desires are satisfied by the customer's choice of a service provider as a transaction method.

4.2. Implications for industry

The proposed model suggests that the tourists may indeed desire interacting with the service staff and actively seek such opportunities during service encounters. This rather emotional need or motivation

Table 4
Decomposing indirect effects of SST use motivators on intention to use SST.

	Through usefulness only	Through desire for interaction		
		Desire for interaction + usefulness	Desire for interaction only	Desire for interaction total
Ease of use	.622(94.0)	.011(1.7)	.029(4.4)	.040(6.0)
Privacy	.045(77.6)	−.004(6.9)	−.009(15.5)	−.013(22.4)
Autonomy	.068(68.0)	.009(9.0)	.023(23.0)	.032(32.0)
Effectiveness	.030(20.0)	−.034(22.7)	−.086(57.3)	−.120(80.0)

Entries are indirect effects calculated based on the standardized estimates in Table 3 and the values in parentheses are percent of the effect mediated. The percentage values were calculated based on the absolute value of the estimates as they reflect the "amount" of the effect. The percentage may not sum to the exact total due to rounding.

is not well explained in TAM. TAM focuses mainly on the features of the target SST system such as perceived ease of use and perceived usefulness. Managers facing a SST deployment decision need to understand that some customers desire interaction with the service provider and that such desire may vary in strength dependent upon transaction situations. In addition, desire for human interaction often is a critical reason for loyalty to a company. Thus, the variable requires careful consideration.

This study also offers an important message to designers of SSTs. Considering the resort customer's non-technology related concerns and motivations (e.g., autonomy, privacy, and effectiveness) will help produce more useful SSTs and address the system buyer's concerns about service quality/image and customer relations. The model and data suggest that customers' non-technology desires may counteract deployment of SSTs in service operations. SST designers need to make conscious efforts to address both managers' and customers' concerns in their system design.

Technology enables companies to provide an autonomous, private, and effective service, but such operational innovations may not satisfy the traveler's emotional side of transaction goals. A hybrid service system design may be the best way to address business and customer needs. The service system design must coordinate both SSTs and staff as intricate players of service deliveries—achieving the traveler's transaction needs and goals. Of course, fully functioning SSTs likely requires fewer service staff, thereby satisfying the company's investment motives.

4.3. Toward future research

Future research may improve on the study limitations. First, the generalizability of the findings to other service settings, especially those where service delivery has been traditionally less labor intensive than hotel registration, is unknown. In particular, the strength of desires for privacy, autonomy, and interaction likely varies across different businesses requiring different levels of employee involvement during service transactions.

Second, studies modeling the dual processes of adopting and avoiding SSTs may be interesting. Although the proposed model provides a starting point for integrating key variables reflecting both adoption and avoidance of SSTs, the model did not incorporate generic transaction goals such as customer satisfaction. Inclusion of key transaction goals as criterion variables may produce rich information about how and why customers trade between SSTs and service staff for their service transactions.

Finally, the proposed model's predictive ability needs to be improved, especially for desire for interaction. Compared to similar models applied in other industries, the model predicts intention to use SSTs more powerfully ($R^2 = .60$ as compared to .42 for the ATM model, .32 for the bank by phone model, and .19 for the online banking model in Curran & Meuter, 2005). In contrast, this study's model accounts for only 31% of the variance in desire for interaction. Inclusion of other staff-oriented antecedents may strengthen the role of desire for interaction in the model.

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