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What makes online reviews helpful? A diagnosticity-adoption framework to explain informational and normative influences in e-WOM

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ABSTRACT

Consumers are increasingly using online consumer reviews (OCRs) to learn about product quality. It is thus paramount for marketers to understand what makes OCRs helpful to consumers and how this evaluation affects their decisions. Dual-process theory has been adopted in this study to investigate the informational and normative predictors of information diagnosticity and its links with consumers' information adoption.
The findings suggest that consumers are primarily influenced by the quality of information and subsequently influenced by customer ratings and overall rankings. These results imply that both of the aforementioned informational and normative cues are critical to consumers in evaluating the quality and performance of products through OCRs. The results show that information quantity and source credibility have a limited effect on information diagnosticity, which ultimately influences consumers' information adoption. This study extends the application of dual-process theory to online settings, the findings are valuable for marketing managers of online organisations.

1. Introduction

The advances of Web 2.0 are enabling consumers to share their experiences, opinions, and feedback regarding products, services, or brands in the form of online reviews for other consumers. Online consumer reviews (OCRs), which are the electronic version of word of mouth, are becoming increasingly popular among consumers worldwide, who read these reviews before making purchase decisions (Senecal & Nantel, 2004).

Consumers rely heavily on OCRs for their purchases, and OCRs have been found to be the most trusted sources of information after advice from friends (Nielsen, 2013). Research has shown that OCRs exert a strong influence on the purchase decisions of consumers (Filieri & McLeay, 2014; Senecal & Nantel, 2004; Smith, Menon, & Sivakumar, 2005) and on the sales of products in different categories (e.g., books, movies, and hotel rooms) (Cui, Lui, & Guo, 2012; Dellarocas, Zhang, & Awad, 2007; Godes & Mayzlin, 2004; Liu, 2006; Ye, Law, & Gu, 2009; Zhu & Zhang, 2010). The power of customer reviews in influencing consumer decisions is so prominent that many companies, such as Kia Motors, are now hosting reviews on their own websites to enable customers to discuss the quality of their products and are also using reviews in their TV advertisements (Kia Motors, 2014).

In addition to the popularity of consumer review platforms such as Tripadvisor and Yelp, little is known about how consumers assess the diagnosticity of the information that is available on those websites and their influence on consumers' decisions (Pan & Zhang, 2011). Information in online reviews is diagnostic if consumers perceive such information to be helpful for understanding and evaluating the quality and performance of products sold online (Jiang & Benbasat, 2004).

Many websites that publish consumer reviews provide normative evaluations, such as overall product rankings and product feature ratings, to help consumers assess product quality.

To date, little is known about whether the normative evaluations generated within these websites actually affect consumers' perceived diagnosticity of information from OCRs, in addition to the informational influences (e.g., information quality, quantity, source credibility).

The current research has attempted to fill this gap and has focused on the predictors of information diagnosticity and adoption in e-WOM using dual-process theory (Deutsch & Gerard, 1955). Dual-process theory has been adopted for its suitability to explain the influence of social and informational factors on individuals' psychological processes (Deutsch & Gerard, 1955). Informational influences are based on the receiver's judgement of the relevant content of a message and include elements such as information quality dimensions, whereas normative cues indicate the social pressure on individuals to conform to the opinions and expectations of others and include elements such as crowd opinions.

In e-WOM settings, informational influence may refer to the quality of information in OCRs, the perceived credibility of the source (which is assessed using information on the web profile of the reviewer), and the quantity of information (reviews) available for a product; by contrast, normative influences may refer to crowd opinion information, such as overall product rankings and customer ratings. The overall ranking is generally displayed by the number of stars or by

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the overall consumer evaluation of the products available in a category (e.g., accommodations in a destination), whereas the rating provides information about reviewers' evaluations of the specific features of a product (e.g., accommodation cleanliness, location, breakfast quality).

Therefore, this study investigates the importance of both informational and normative factors and their salience in influencing consumer evaluations of e-WOM communications. In summary, the proposed research model adopts dual-process theory and uses SEM to investigate the effect of informational and normative influences on consumers' perceived diagnosticity of information from OCRs and the influence of these perceptions on consumers' adoption of information.

2. Literature review and theoretical background

e-WOM refers to 'any positive or negative statement made by potential, actual or former consumers about a product or company, which is made available to a multitude of people and institutions via the Internet' (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004, p. 39). In this paper, the term 'OCR' is used to refer to any positive, neutral, or negative online review about a product or service created and published on a CRW by a potential, former, or actual customer. Previous studies have primarily focused on the power of OCRs to predict product sales in different product categories, such as books, movies, and hotels (Chevalier & Mayzlin, 2006; Cui et al., 2012; Dellarocas et al., 2007; Godes & Mayzlin, 2004; Liu, 2006; Ye et al., 2009; Zhu & Zhang, 2010). Other scholars have studied how OCRs affect different types of consumer behaviours, such as information adoption decisions (Cheung, Lee, & Rabjhon, 2008; Filieri & McLeay, 2014), purchase intentions (Lee & Lee, 2009; Park & Lee, 2008; Park, Lee, & Han, 2007), product considerations and choice (Gupta & Harris, 2010; Huang & Chen, 2006; Vermeulen & Seegers, 2009), and attitudes towards products (Lee, Park, & Han, 2007).

The Elaboration Likelihood Model has been widely used to investigate whether high- and low-involvement consumers primarily adopt central or peripheral cues in information processing (Chan & Ngai, 2011; Gupta & Harris, 2010; Lee & Lee, 2009; Lee et al., 2007; Pan & Chiou, 2011; Park & Lee, 2008; Park et al., 2007). The aforementioned studies are primarily based on factorial experiments in which respondents (typically college students) are divided into high- and low-involvement groups to test certain hypotheses, and the researchers often analyse the influence that is exerted by each positively or negatively valenced review. Herr, Kardes, and Kim (1991) formulated a diagnosticity-accessibility perspective to explain the persuasiveness of WOM. These authors found that WOM is accessible to consumers and is more diagnostic in the context of negative information, and e-WOM has a greater influence on product evaluations than print information because of its vividness.

Jiang and Benbasat (2004) defined information diagnosticity as consumers' perceptions of the ability of a website to convey relevant product information that can assist them in understanding and evaluating the quality and performance of products sold online. The more online retailers provide signals that help consumers overcome the barrier arising from the lack of physical inspection of products on the Internet (Kirmani & Rao, 2000), the more that the information provided will be perceived as diagnostic because of its ability to enable an adequate evaluation of the true quality of the products sold (Jiang & Benbasat, 2004). Information diagnosticity refers to a consumer's improved understanding or knowledge about a product and how it works as a consequence of adopting information from a specific website. Diagnosticity is determined by the perceived correlation between the information available to a consumer and the decision-making process and is often conceptualised as the degree of helpfulness of information (Dick, Chakravarti, & Biehal, 1990; Qiu, Pang, & Lim, 2012; Skowronski & Carlston, 1987). Research in online settings primarily focuses on the diagnosticity of both products and retailer websites, which is assumed to mitigate the negative effect of uncertainty on e-commerce adoption (Pavlou, Liang, & Xue, 2007). Despite the importance of the construct to explaining persuasion in WOM, there is a paucity of studies on the determinants of information diagnosticity and adoption in e-WOM research (Pan & Zhang, 2011) (see Table 1). Because consumers use OCRs to better understand the quality and performance of products that they plan to purchase (Chatterjee, 2001; Goldsmith & Horowitz, 2006), the determinants of information diagnosticity would be an interesting topic to investigate in e-WOM settings.

The focus of the current study is on the perceived diagnosticity of online reviews hosted on CRWs. A consumer review is a type of e-WOM communication and is determined to be diagnostic if it provides information that is perceived by consumers to be helpful to familiarise, understand, and evaluate the quality and performance of a product (Jiang & Benbasat, 2007).

Existing e-WOM research has primarily considered the Elaboration Likelihood Model when seeking to explain whether high- and low-involvement consumers adopt primarily central or peripheral cues to information processing (Chan & Ngai, 2011; Filieri & McLeay, 2014; Gupta & Harris, 2010; Lee & Lee, 2009; Lee et al., 2007; Park & Lee, 2008; Park et al., 2007). By contrast, dual-process theory has received less attention and has been adopted in this study because of its suitability for explaining the influence of informational and normative cues on consumer perceptions of information diagnosticity and on the adoption of information from OCRs. Dual-process theory was developed in psychology settings by Deutsch and Gerard (1955) to explain the influence of social factors on individuals' psychological processes. The theory considers two types of influences on individual judgements: *informational* and *normative* influences. *Informational influence* is based on the receiver's judgement of the relevant content of a message. Informational influence includes elements referring to the quality of information in a message, such as information relevancy, source credibility, and information quantity. By contrast, *normative influence* refers to the pressure on individuals to conform to the norms/expectations of others that are implicit or explicit in the choices of a reference group (Deutsch & Gerard, 1955). Dual-process theory posits that the perceptions and judgements of others are frequently reliable sources of evidence of reality to consumers. Hence, it is expected that if two or more consumers share the same perception of a product (e.g., hotel), then other people will be subsequently influenced by their perceptions. In e-WOM environments, users can use certain cues to understand how different customers have evaluated a specific product or service. Accordingly, many websites that publish OCRs display the ranking (or number of stars) of products, which refers to the average evaluation provided by all consumers who have reviewed a product within a specific category (e.g., hotels in a specific destination). The ranking is a type of statistic that summarises the proportion of positive, negative, and neutral reviews for a product/service posted by all customers who have reviewed the product/service. Additionally, consumers may also view the ratings provided for a specific service, namely, the average evaluations given by all consumers with respect to the specific features of a product/service, to better understand the quality of a product. We therefore consider overall product rankings and consumer ratings as normative influence factors. In summary, our research model includes both informational (i.e., info quality, source credibility, and info quantity) and normative influences (i.e., product ranking, ratings) and aims to understand their effects on information diagnosticity. Below, we illustrate the constructs of this study and the hypothesised relationships.

2.1. Informational influences

2.1.1. Information quality and perceived information diagnosticity

Information quality is defined as 'the quality of the content of a consumer review from the perspective of information characteristics' (Park et al., 2007, p. 128). The importance of the quality of information contained in OCRs and its influence on consumer decision making have been the focus of interest of several studies (Cheung et al., 2008; Lee et al., 2007; Park et al., 2007). However, information quality in e-WOM has been conceptualised differently in various studies; for

Table 1
Literature review.

Author	Study and data	Key findings
Chen, Dhanasobhon, and Smith (2008)	They use a sample of reviews from Amazon.	Helpful reviews have a positive influence on book sales, especially for less popular books.
Mudambi and Schuff (2010)	They adopt a large sample of reviews from Amazon to investigate perceived helpfulness of reviews.	Extreme reviews, review depth, and product type affect the perceived helpfulness of reviews. Product type moderates the influence of review extremity for experience goods, while review depth has a greater positive effect on the helpfulness of the review for search goods.
Pan and Zhang (2011)	Use a large sample of reviews from Amazon in order to investigate the determinants of information helpfulness.	Review length and positive reviews positively affect information usefulness, while a high number of reviews dilute their helpfulness.
Korfiatis, García-Bariocanal, and Sánchez-Alonso (2012)	Use 37,221 reviews collected from Amazon to assess the relationship between the percentage of helpful votes awarded to a review and the review text's stylistic elements.	Review readability and positive ratings affect the number of helpful votes that will be given to a review. Reviews are longer when they are extremely positive or positive and shorter when they are extremely negative or negative.
Racherla and Friske (2012)	Use a dataset of 3000 reviews from Yelp.com.	Reviewer reputation contributes to the perception of usefulness, while reviewer expertise is negatively correlated with review usefulness. Negative reviews are perceived to be more useful than either extremely positive or moderate reviews.
Qiu et al. (2012)	Use a 2 (conflicting aggregated rating: without *vs.* with) × 2 (positive vs. negative valence) × 2 (low vs. high extremity) factorial design to investigate the influence of a conflicting aggregated rating on review credibility and diagnosticity, taking into account the moderating role of review valence.	A conflicting aggregated rating decreases review credibility and diagnosticity for the positive review but not for negative reviews via the mediating effect of review attribution.

instance, Cheung et al. (2008) measured review quality in terms of review completeness, timeliness, accuracy, and relevance, whereas Park et al. (2007) considered credibility, objectivity, clarity, and logic. These scholars have primarily drawn from information systems research to select the information quality dimensions (Bailey & Pearson, 1983); however, consumers may assess the quality of information contained in OCRs differently than the employees of an organisation would assess the quality of the information contained in information management systems. Therefore, following Churchill (1979), a set of measures was designed specifically to measure information quality in e-WOM: *information depth, breadth*, *factuality*, *relevance*, and *credibility*. We define each of these dimensions below.

Information depth and breadth refer to the extent to which information is sufficiently complete and exhaustive for a particular task (Wang & Strong, 1996). For example, information is considered to have sufficient depth and breadth if an online review discusses in detail a wide range of aspects related to a product/service. For an accommodation, for example, such a review can encompass the cleanliness of rooms, the type and quality of breakfast, and provide detailed information. *Information factuality* refers to the degree to which a comment in a review is logical; is based on specific facts about a product/service; and is free from emotional, subjective, and vacuous comments. *Information relevance* refers to the extent to which a review is applicable to and helpful for the task at hand and depends on different customer needs in specific situations (Wang & Strong, 1996). Finally, *information credibility* or accuracy is defined as the extent to which a user perceives a recommendation/review as believable or true (Cheung, Luo, Sia, & Chen, 2009; Tseng & Fogg, 1999).

Researchers in e-WOM have demonstrated that the quality of arguments contained in OCRs influence consumer purchase intentions in high-involvement conditions (Lee et al., 2007; Park et al., 2007). In this study, we argue that consumers will perceive information to be more diagnostic in their decision-making process if the information found in OCRs is determined to be of high quality. In fact, the more an online review appears to be detailed and complete, accurate, based on facts, and relevant to consumer needs, the more consumers will find such information to be helpful in assessing the quality and performance of the product/service that they are planning to purchase. Thus, we hypothesise as follows:

H1a. Information quality significantly and positively influences perceived information diagnosticity.

2.1.2. Information quality and source credibility

Additionally, we can argue that the quality of information contained in a consumer review may affect consumers' perception of the credibility of a source. In fact, the quality of information may signal the expertise and/or trustworthiness of the source of information in OCRs. An information source (i.e., reviewer) who provides accurate, factual, and detailed information regarding the relevant features of a product/service may be perceived as more credible than a source who provides a brief, superficial, and subjective description of a product/service. For this reason, we hypothesise as follows:

H1b. Information quality significantly and positively influences perceived source credibility.

2.1.3. Source credibility and perceived information diagnosticity

Source credibility and trustworthiness are considered to be fundamental predictors of consumers' acceptance of a message in traditional WOM (Eagly & Chaiken, 1993; Hovland, Janis, & Kelley, 1953; McGinnies & Ward, 1980). However, in the online environment, the receivers of e-WOM cannot use non-verbal communication cues (i.e., verbal or paraverbal cues) to infer the credibility of a source (Tidwell & Walther, 2002) as they generally do in face-to-face conversations with referrals, family members, and friends. In fact, OCRs are written by anonymous sources who have no prior relationship with the receiver (Dellarocas, 2003; Sen & Lerman, 2007). In such a context, evaluating the credibility of a source is difficult (Chatterjee, 2001; Park & Lee, 2008); however, consumers can assess the credibility of a reviewer by analysing the information contained in his/her web profile. Additionally, many CRWs have begun to provide meta-information to enable consumers to make inferences about the reliability of reviewers. For instance, most of these websites utilise reviewer reputation systems to convey information about reviewers (Cheung et al., 2009). For example, Tripadvisor has introduced a badge system to denote the different levels of expertise of reviewers, ranging from 'reviewer' to 'top contributor' depending on the number of reviews and posts published by each reviewer. In the Amazon Vine Programme, reviewers are ranked based on the number of helpful votes on their reviews from other users, which increase their likelihood of becoming Vine Voices (Amazon, 2014).

Current research on the influence of source credibility on information usefulness and adoption has produced contrasting results in e-WOM studies. For instance, in a study of an online food community

in Hong Kong, Cheung et al. (2008) found that source expertise and trustworthiness do not influence perceived information usefulness. By contrast, the findings of Zhang and Watts (2008) revealed that source credibility has a positive and significant influence on information adoption in online travel websites, but its influence is lower and less significant in a community of computational fluid dynamics professionals in China. Willemsen, Neijens, Bronner, and De Ridder (2011) found that claims of expertise are weakly related to the perceived usefulness of information for search and experience products in Amazon, while Ayeh, Au, and Law (2013) revealed a weak or non-significant relationship between source trustworthiness/expertise and intention to use user-generated content for travel planning, suggesting that attitude plays a mediating role.

Drawing from dual-process theory, we hypothesise that perceived source credibility influences consumer perceptions of information diagnosticity. In fact, a source that is considered credible will be more likely to be perceived by the receiver of e-WOM as a source that is likely to provide helpful information. Therefore, we hypothesise as follows:

H2. Source credibility significantly and positively influences information diagnosticity.

2.1.4. Information quantity and information diagnosticity

Information quantity (or volume) is conceptualised as the number of OCRs published by consumers about a product or service. In WOM, information volume is considered to be a strong predictor of consumer behaviour (Anderson & Salisbury, 2003; Bowman & Narayandas, 2001) because more discussion surrounding a product leads to greater awareness of the product and thus generates greater sales (Liu, 2006). In e-WOM research, scholars have revealed that information quantity influences the purchase intentions of consumers in low- and high-involvement conditions (Park et al., 2007), enables the effect of valence and consensus information (Khare, Labrecque, & Asare, 2011), and predicts the sales of books and movies (Dellarocas et al., 2007; Liu, 2006). To the best of our knowledge, previous e-WOM research has not investigated the links between information quantity and review diagnosticity.

A higher volume of reviews indicates a higher probability of locating helpful information for users. In fact, a larger volume of information available in a CRW is associated with a greater likelihood that consumers will find the type of information they are seeking. Thus, consumers may find a large number of reviews to be more helpful for familiarising with a product and better understanding its performance and quality than a small number of reviews. Accordingly, we hypothesise as follows:

H3. Information quantity significantly and positively influences perceived information diagnosticity.

2.2. Normative influences

2.2.1. Overall product ranking and perceived information diagnosticity

As a common feature of e-WOM, the overall product ranking refers to the overall evaluation of the reviewers of a product in a specific category and is generally displayed as the average/mean star ratings beside the product picture. The overall product ranking does not refer to the quality of arguments; rather, it refers to an information cue (or shortcut) with respect to how all reviewers have evaluated one product and the other products in a specific category (e.g., accommodations in a destination). Such an information shortcut is a type of categorical crowd opinion because it classifies products according to the overall evaluation of reviewers.

For example, on Tripadvisor.com, every reviewer can rate the overall quality of an accommodation using a scale from one (terrible) to five (excellent) stars.

Existing studies have focused on the ranking behaviour of reviewers (Godes & Silva, 2012; Moe & Schweidel, 2012; Schlosser, 2005) or on how ratings change over time and sequence (Godes & Silva, 2012), while others have investigated the importance of ratings on the perceived trustworthiness of retailers (Aiken & Boush, 2006; Benedicktus, 2011) or the influence of the ratings given to a review (e.g., helpful votes) on the credibility of information (Cheung et al., 2009). The only exception is the study of Qiu et al. (2012), who found that conflicting aggregated ratings decrease review credibility and diagnosticity for positive reviews although its effect is not significant for negative reviews.

By contrast, the current study investigates the influence of overall product rankings on perceived information diagnosticity in OCRs, which has received less attention in literature. We argue that consumers benefit from the aggregation of individual review ratings into summary statistics (rankings), which are judged as helpful information. According to social cognition theorists, consumers tend to underuse base-rate information such as summary statistics in favour of more individuating information when they make judgements (Bar-Hillel, 1980; Borgida & Nisbett, 1977; Nisbett & Ross, 1980). By classifying the products in a category from best to worst, the crowd of reviewers makes an implicit statement regarding the level of quality of all products in a category. The ranking can then reduce the number of alternatives that a consumer will consider buying and can therefore increase the ease of consumer evaluation and choice. Moreover, summary information such as star rankings that represent average evaluations from a number of consumers may be considered more reliable and helpful by consumers than single reviews, which can sometimes be highly subjective and unhelpful when evaluating a product's performance in an objective manner. Accordingly:

H4. Overall product rankings significantly and positively influence information diagnosticity.

2.2.2. Customer ratings

A customer rating is another type of crowd opinion and indicates reviewers' average evaluation of the different features of a product or service. Like product rankings, customer ratings are a unique feature of e-WOM communications. By contrast, in face-to-face WOM communications, it is impossible to sort through all customer evaluations and obtain a summarised evaluation of the product's features. For example, on Tripadvisor, reviewers can attribute a rating from one to five to each of the following features of a hotel: location, sleep quality, rooms, service, value, and cleanliness. Research on the influence of customer ratings on consumer behaviour is scant in the literature. However, customer ratings may help consumers to learn about the quality of a product as they summarise reviewers' evaluations of the main features of a product. In this manner, consumers can determine the likely performance of a product, including its strengths and weaknesses. Accordingly, we propose the following hypothesis:

H5. Consumer ratings significantly and positively influence perceived information diagnosticity.

2.3. Perceived information diagnosticity and information adoption

Information helpfulness is a key construct in adoption behaviour (Sussman & Siegal, 2003) that displays significant correlations with both current and future self-reported system (or technology) usage (Davis, 1989). Information adoption is the process by which people purposefully engage in using information (Cheung et al., 2008; Sussman & Siegal, 2003). In this study, information adoption reflects the informational influence of e-WOM, which implies that consumers who adopt information from OCRs would accept the recommendations contained

in OCRs and subsequently take action by following these recommendations. There is a paucity of studies on the antecedents of information adoption in e-WOM. For instance, the only available studies are found in the information systems literature and include the works of Cheung et al. (2008, 2009), who found that information usefulness and e-WOM credibility predict information adoption in Chinese online discussion forums.

Drawing on technology acceptance theories, we hypothesise that perceived information diagnosticity will affect a consumer's decision to adopt information from OCRs. For instance, the users of CRWs would consider whether the information contained in OCRs is helpful to them to become familiarised with a product and to evaluate its quality and performance. Therefore, if consumers believe that OCRs are helpful, then users will be more likely to consider the recommendations from these reviews in their decision making. Thus, we hypothesise as follows:

H6. Information diagnosticity significantly and positively influences information adoption.

3. Methodology

3.1. Data collection

An online questionnaire was created using professional survey design software and was primarily composed of closed-ended questions that were measured using a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7). The questionnaire was available in English and was pilot-tested with a total number of 49 users of OCRs who were also familiar with questionnaire design. The questionnaire was improved considerably by paraphrasing or deleting ambiguous or similar items. An email with a link to the questionnaire was sent to a convenience sample of academic staff members and students from two universities: one located in the Republic of Ireland and one located in England. The email explained the general purpose of the research, the data collection, and the archival process. No incentive was given for completing the survey. To ensure the suitability of the participants, we selected the sample by attempting to concentrate only on individuals who had recently used OCRs of accommodations and restaurants. The email sent to potential respondents clearly stated that only people with experience with online consumer reviews could participate in the study. Additionally, in the questionnaire, the respondents had to write the name of the website where they read reviews and indicate how frequently they use reviews before purchasing a product/service. During a period of one month, a total of 398 responses were received; however, 44 questionnaires were excluded because they were incomplete or were not completed properly, which yielded a total of 354 usable questionnaires.

3.2. Measures

The items that were used to measure the constructs in this study are displayed in Table 3. Source credibility and trustworthiness were measured by a scale developed by Ohanian (1990) and recently used by Senecal and Nantel (2004). Information quantity was measured by two items derived from Park et al. (2007), and information diagnosticity was measured using three items derived from Jiang and Benbasat (2007). Consumer information adoption was measured by a scale used in previous studies (Cheung et al., 2009; Sussman & Siegal, 2003).

In addition, three scales for measuring consumer ratings, rankings, and information quality were developed for this study. The scales were developed using the procedure recommended by Gerbing and Anderson (1988) and Churchill (1979). The scale development process is explained in detail in Appendix 1. Some pictures were included in the questionnaire to help respondents distinguish between the overall ranking and ratings (see an example in Appendix 2).

3.3. Sample profile

The socio-demographic characteristics of the sample are presented in Table 2. The sample was primarily composed of individuals aged 18–35 (97% of the sample) from European countries, primarily from the UK and the Republic of Ireland. This sample composition may result from the questionnaire being available in English, which reduced the number of non-English speaking respondents. The age range can be considered a limitation; however, individuals in this age group use consumer reviews the most (Nielsen, 2013).

Additionally, although the focus on European consumers can be considered a limitation, it may also be viewed as useful for widening the geographic and cultural scope of e-WOM research, as existing e-WOM studies are largely based on US and Asian consumers (Chan & Ngai, 2011).

4. Analysis and findings

Both the convergent and discriminant validity of the model were tested. Convergent validity was assessed using the average variance extracted (AVE) and Composite Reliability (CR). The factor loadings for all constructs ranged from 0.752 to 0.939, which is higher than the recommended cut-off of 0.5 while CR values were well above the threshold of 0.6 (Fornell & Larcker, 1981), thus demonstrating that the scales measure the concepts that they were designed to measure. Reliability was assessed for each construct with Cronbach's α (Nunnally, 1978), which ranged from 0.854 for information quality to 0.913 for information quantity. All items had an overall Cronbach's α value of 0.881, which signifies a very good level of reliability for the items and scale that were used in this study (see Table 3). All factor correlations were below the 0.85 threshold (Fornell & Larcker, 1981). Moreover, for adequate discriminant validity, the AVE for each latent variable included in the model should be greater than the squared correlation estimate (Fornell & Larcker, 1981), and Table 4 demonstrates that these requirements have been satisfied.

The overall model fit was measured using Wheaton, Muthen, Alwin, and Summers's (1977) relative/normed chi-square (x^2/df), yielding a satisfactory value of $x^2/df = 2.144$, which is below the recommended threshold of 3 (Kline, 2011). Moreover, all factor loadings were statistically significant ($p = 0.000$). The goodness-of-fit index (GFI) was 0.927, and the comparative fit index (CFI) was 0.973; thus, both were above

Table 2
Socio-demographic characteristics of the respondents.

Dimension	Items	Percentage
Gender	F	46.7
	M	53.3
Age	18–25	63.5
	26–35	33.5
	36–45	1.5
	46–54	1.5
	>55	0
Economic status	70.000 € and above	0.5
	50.000–69.000 €	0.5
	30.000–49.000 €	5.4
	10.000–29.000 €	35.2
	Under 9.999 €	36.6
	No answer	21.8
Nationality	Republic of Ireland or UK	92.9
	Other European countries	3.6
	United States	1.5
	Others	2

Table 3
Items used in the study, Loadings, and Cronbach's alpha.

Construct	Items	Loadings	α	CR
Overall Product Ranking (RANK)	Has reduced the number of alternative products/services that I was considering buying	0.818	0.909	0.935
	Has helped me to rapidly identify the best (and the worst) products/services	0.871		
	Has guided my purchase decision to a specific product/service	0.873		
	Has facilitated my purchase decision	0.887		
	Has enabled me to identify the product/service that could satisfy my needs	0.854		
Customer Ratings (RATINGS)	Customer ratings have helped me to learn about the product	0.850	0.899	0.933
	Have improved my understanding of the quality of the product's features	0.939		
	Were useful in order to evaluate the quality of product specifications/features	0.931		
Information quality (INFOQUAL)	The information from online reviews was credible	0.850	0.854	0.899
	The information from online reviews was relevant to my needs	0.804		
	The information from online reviews was based on facts	0.789		
	The information from online reviews was of sufficient depth (degree of detail)	0.804		
	The information from online reviews was of sufficient breadth (spanning different subject areas)	0.752		
Source Credibility (SC)	The reviewers were credible	0.862	0.878	0.917
	The reviewers were experienced	0.779		
	The reviewers were trustworthy	0.894		
	The reviewers were reliable	0.886		
Info Quantity (INFOQUANT)	There quantity of information was sufficient to satisfy my needs	0.846	0.913	0.834
	The quantity of review information is large	0.846		
Information Diagnosticity (DIA)	The information provided in online reviews was helpful for me to evaluate the product	0.862	0.858	0.913
	The information provided in online reviews was helpful in familiarising me with the product	0.900		
	The information provided in online reviews was helpful for me to understand the performance of the product	0.884		
Information Adoption (ADO)	Review made it easier for me to make purchase decision. (e.g., purchase or not purchase).	0.838	0.856	0.904
	Online reviews have enhanced my effectiveness in making purchase decision	0.877		
	Online reviews have motivated me to make a purchase decision	0.858		
	The last time I read online reviews I adopted consumers' recommendations and purchased (or not purchased) the recommended product/service	0.777		

the suggested cut-off of 0.9 (Hu & Bentler, 1999). The standardised root mean square residual (SRMR = 0.055) yielded a favourable value in relation to the accepted threshold of 0.08 (Hu & Bentler, 1999). The root mean square error of approximation (RMSEA), which indicates the amount of error in the model, was 0.057; such a value indicates a good model fit rather than an excellent fit (with a recommended cut-off of 0.06) (Hu & Bentler, 1999; Kline, 2011). Based on the x^2/df, GFI, CFI, RMSEA, and SRMR, the structural equation model shows a good fit (Table 5).

The structural equation model was tested using the statistical software Amos 18.0, and the results are presented in Table 5. Based on the results, the most important antecedents of perceived information diagnosticity were *information quality* (stand. $\beta = 0.555$; $p < 0.001$), *customer ratings* (stand. $\beta = 0.372$; $p < 0.001$), and *overall product ranking* (stand. $\beta = 0.237$; $p < 0.001$). Thus, the results support the following hypotheses: H1a, H4, and H5. Contrary to our predictions, *source credibility* did not exhibit a strong predictive power in its relationship with the dependent variable, but this relationship is deemed to be significant (stand. $\beta = 0.132$, $p < 0.01$); thus, H2 is accepted. However, the relationship between information quantity and information diagnosticity was revealed to be weak and non-significant, thus rejecting H3 (stand. $\beta = 0.032$, not significant). The findings also show that information quality is a strong predictor of source credibility (stand. $\beta = 0.601$; $p < 0.001$), thus supporting H1b. Finally, the relationship between *information diagnosticity* and *information adoption* is positive and highly significant (stand. $\beta = 0.831$; $p < 0.001$); thus, H6 is accepted.

5. Discussion

The diffusion and adoption of product reviews have become more widespread among consumers. As discussed in the literature review section, only a few studies have investigated the antecedents of the helpfulness of reviews, and most of these studies used a dataset obtained from Amazon's reviews and 'helpful votes' left by other users to recognise the characteristics of helpful reviews (e.g., Mudambi & Schuff, 2010; Pan & Zhang, 2011). The current research adopted dual-process theory (Deutsch & Gerard, 1955) by extending its application to the online environment and investigated the determinants of information diagnosticity from the consumer perspective and the extent to which this diagnosticity leads to information adoption with regard to OCRs. From the theoretical perspective, the tested model proved that dual-

Table 4
Mean, SD, correlations, and average variance extracted.

Variable	Mean	SD	1	2	3	4	5	6	7
1. RANK	5.7	1.115	**0.741**	–	–	–	–	–	–
2. RATINGS	5.6	1.138	0.708	**0.824**	–	–	–	–	–
3. INFOQUAL	5.2	0.917	0.530	0.400	**0.641**	–	–	–	–
4. SC	5.1	0.991	0.433	0.369	0.476	**0.734**	–	–	–
5. INFOQUANT	4.9	1.443	0.366	0.298	0.627	0.262	**0.716**	–	–
6. DIA	5.8	1.005	0.637	0.583	0.638	0.453	0.336	**0.778**	–
7. ADO	5.7	1.015	0.735	0.632	0.586	0.439	0.415	0.626	**0.703**

Note. Off-diagonal values are squared correlations and on-diagonal values are AVEs.
Note. All correlations are significant at $p < 0.001$.

Table 5
Structural equation modelling results.

Goodness of fit of the model		Hypotheses	Relationship	Standardised regression weight	*t*	Supported vs. non supported
x^2/df	2.144	H1a	INFOQUAL > DIA	0.555***	10.166	Supported
Chi-squared	354.366	H1b	INFOQUAL > SC	0.601***	7.781	Supported
GFI	0.927	H2	SC > DIA	0.132**	3.172	Supported
CFI	0.973	H3	INFOQUANT > DIA	0.032	1.238	Non-supported
RMSEA	0.057	H4	RANK > DIA	0.237***	3.999	Supported
SRMR	0.055	H5	RATINGS > DIA	0.372***	9.270	Supported
		H6	DIA > ADO	0.831***	10.013	Supported

*** Indicates $p < 0.001$.
** Indicates $p < 0.01$.

process theory can be used to investigate the antecedents of information diagnosticity and information adoption in the online environment.

The findings reveal that the informational influence of e-WOM is stronger than the normative influence and that information quality represents the most important antecedent of information diagnosticity in e-WOM. However, this study also found that the normative cues, namely, overall product rankings and customer ratings, show a significant, strong, and positive relationship with information diagnosticity; source credibility was found to exhibit a weak but significant relationship; and information quantity does not appear to influence the dependent variable. Thus, it can be concluded that the normative influence also operates in the online environment even when 'the others' are not physically present and not easily identifiable. This finding implies that reviews with the highest level of information quality and crowd opinions are perceived by consumers to be the most helpful information when becoming familiarised with a product and assessing its quality and performance. Our results suggest that in e-WOM, both informational and normative influences play an important role in determining how consumers assess the quality of products.

Previous findings have suggested that the quality of information in online reviews influences consumers' purchase intentions in high-involvement conditions (e.g., Park et al., 2007). In this study, we found that the quality of information is a strong predictor of information diagnosticity. In contrast to previous studies that considered various information quality dimensions borrowed from information systems research (e.g., Cheung et al., 2008; Park et al., 2007), the current study has developed and tested a new scale for measuring information quality for OCRs and included the following dimensions: information depth and breadth, factuality, relevance, and credibility. Among the information quality dimensions identified here, information depth was also found to be an important dimension of information quality in the work of Mudambi and Schuff (2010) and found to be a predictor of information helpfulness.

Additionally, we have demonstrated that the quality of information affects credibility judgements referring to the source of information, and this finding also advances the e-WOM literature. In particular, high-quality information from online reviews will reflect positively on how reliable a source will be perceived; conversely, when the quality of information provided by a reviewer is poor, the evaluation of the reliability of the information source will be negatively affected. In the e-WOM context, consumers cannot make inferences about the credibility of a source in the absence of verbal and paraverbal cues. Indeed, the source of communication is often anonymous and is not physically present. This study's findings show that consumers use information quality dimensions related to the message of the review to assess the credibility of a source: the more the information contained in a review is relevant to consumer needs, based on facts, credible, detailed and complete, the more credible the source of communication will be perceived.

Additionally, this study's findings show that the perceived credibility of a source has a weak influence on how diagnostic the information in OCRs will be perceived. This result shows how some factors have different influences in online and offline settings. Although source credibility has been established as a major influence on consumer decisions in offline settings (e.g., Eagly & Chaiken, 1993; Hovland et al., 1953; McGinnies & Ward, 1980), consumers in online settings rarely attempt to make assumptions about a source based on the information displayed on his/her online profile (e.g., helpful votes received by a reviewer or the number of reviews published), because they do not find them to be critical to assessing the quality of a product or service. Rather, this study found that information quality and base-rate information such as rankings and customer ratings exert a stronger influence on consumers' assessment of product quality. This finding may result from rising concerns regarding the reliability of reviewers, as the mass media frequently reports stories of hotel managers posting negative reviews about their competitors or offering money to reviewers in exchange for glowing reviews in independent online review websites (e.g., Gartner, 2012; Lim, Nguyen, Jindal, Liu, & Lauw, 2010; Tuttle, 2012). Users of review websites are aware that an online profile can be easily manipulated (Dellarocas, 2003), and it is a not a guarantee of reliable content. Therefore, consumers most likely prefer to peruse the content of a review to evaluate the quality and performance of a product rather than examining the profile of the source of communication to make inferences about his expertise or reliability. In summary, credibility in e-WOM is not a characteristic inherent to the source per se but is rather an evaluation made by the receiver based on the quality of information provided by a reviewer.

The study's findings reveal that information quantity is not an important predictor of information diagnosticity. This result may have arisen because consumers consider the customer ratings of the features of a product and its (overall) ranking and subsequently shortlist and read only high-quality reviews to learn about a product and its quality and performance. The quantity of reviews can be considered as an indicator of the popularity of a product, which affects consumer purchase intentions (Park et al., 2007) and predicts product sales (e.g., Liu, 2006); however, information quantity may not be perceived as an useful indicator of the quality or performance of a product. Although the number of reviews may still indicate popularity, it is not necessarily synonymous with product quality, especially when the majority of reviews are not positive or when there are very contrasting views among reviewers. Therefore, we can conclude that consumers prefer to read high-quality reviews together with crowd opinions on a product's performance rather than considering a large number of reviews as reliable indicators of the quality of a product.

This study has introduced the constructs of consumer ratings and rankings as normative influences of online review diagnosticity in e-WOM communications. Overall product rankings and consumer ratings are types of information subsuming the *wisdom of the crowd*. An overall product ranking summarises the proportion of positive, neutral, and negative reviews for a product by displaying the average number of stars that have been awarded to the product by all reviewers, whereas a customer rating indicates the average evaluation given by reviewers on the various features of a product or service. Both overall rankings and ratings have been found to be important

determinants of information diagnosticity in this study, which therefore advances our understanding of (consumer) crowd opinions and their relevance to e-WOM communications. This result contrasts with social cognition theorists, who assume that while making judgements, consumers tend to underuse base-rate information such as summary statistics in favour of more individuating information because of their vividness and concreteness (Bar-Hillel, 1980; Borgida & Nisbett, 1977; Nisbett & Ross, 1980). The present result also contrasts with more recent e-WOM research showing that consumers may be more interested in a single negative review and may thus ignore the aggregate rating (Qiu et al., 2012). In this study, we provided evidence that consumers do not ignore aggregate ratings or rankings; rather, consumers use them to learn about product performance and quality. Overall rankings and product feature ratings serve as effective information for consumers seeking to learn about products because such rankings and ratings reveal the average evaluation that many customers have given to the performance/quality of a product and its features, which facilitate consumers in the comparison among similar products. The fact that ranking and rating evaluations summarise the evaluation of many customers likely has the effect of reassuring consumers about the reliability of such evaluations. In fact, the average evaluation of many reviewers is most likely perceived to be more objective and reliable than the perspective or experience of only one or two reviewers.

Finally, previous studies revealed that the perceived diagnosticity of website information positively affects consumer attitudes towards shopping online (Jiang & Benbasat, 2007). In this study, perceived information diagnosticity from OCRs was found to affect consumers' information adoption, which advances our understanding of the links between information diagnosticity and adoption in e-WOM communications. This result indicates that when the information provided in online reviews is judged to be helpful to become familiarised with a product and to discern its quality and performance, consumers are more likely to consider this information in their decision-making process.

6. Managerial implications

The results of this study have important implications for marketing managers in e-commerce and other industries. Marketers in organisations that publish consumer reviews online must ensure that the quality of reviews hosted on their website is high. In practice, in many review websites, the only indicator of the helpfulness of a review is the number of helpful votes, namely, the evaluation of how helpful a review has been for other consumers who have read it. For example, websites such as Tripadvisor ask users the following question: “Was this review helpful?” Consumers can then vote ‘yes’ if they found the review to be helpful. However, previous research has found that helpful votes can be easily manipulated by spammers (Lim et al., 2010), which means that review helpfulness must be assessed in more effective ways. The breadth, depth, relevance, factuality, and credibility of the information provided in OCRs should be leveraged by marketing managers of CRWs to improve the overall quality of the information hosted on their websites. Marketers can adopt the information quality criteria identified in this study as guidelines for review submissions.

Additionally, this study has proved that the quantity of reviews is not helpful to consumers seeking to familiarise with a product, although information quality is indeed useful. Thus, we recommend that managers find ways to better signal the most helpful reviews hosted on a specific website. Managers could achieve this objective by adopting a star rating system to provide visual indications on the level of review quality to enable consumers to more easily find high-quality comments. Facilitating the identification of helpful reviews could ease consumers' information processing by ensuring that they do not need to spend a great deal of time evaluating the degree of helpfulness of each review.

Information quality may also be an important factor in the competition among different CRWs. In fact, if the quality of information for a product is perceived to be of low quality, such as emotional and vacuous comments, then consumers may judge the information to have no utility for learning about a product; thus, they may feel that they do not possess sufficient information about a product to be able to proceed to purchase it. Such low-quality reviews may also lead consumers to switch to a competitor's website or to check other information sources or channels to learn about a product.

Furthermore, marketing managers of the reviewed brands or products could adopt reviews with high information quality published on independent review websites to promote their business; accordingly, they could identify the best reviews (in terms of information quality) published on independent CRWs and display them on their own websites or on affiliated e-commerce platforms to provide a different form of information for potential consumers and to show that the company welcomes consumers' public scrutiny.

The finding that ratings and overall product rankings emerged as strong antecedents of information diagnosticity implies that marketers of CRWs should make rankings and ratings more visible and easy to locate to improve consumers' experience. Second, a wider range of information shortcuts, such as statistics or other forms of crowd opinion, should be provided to facilitate consumers' evaluation of product quality during the decision-making process.

Marketing managers of the reviewed products/brands can use the reviews, ratings and ranking obtained on popular and independent CRWs to leverage their popularity and to influence consumer evaluations of the quality and performance of their products. For example, Kia Motors used the ‘best car manufacturer in 2012’ award received from Which? and the more than 10,000 consumer reviews filtered and published by Reevoo on www.Kia.co.uk to build their ‘reviews and recommendations’ TV advertisement (Kia Motors, 2014). Thus, if a company or product is ranked highly by consumers, then the same company should exploit this information to strengthen the arguments used in other communications to persuade consumers about the quality of their products.

Information about the overall ranking and ratings of products could be hosted on a company's own website to assist in comparing the different products offered. In this regard, reviews and rating companies such as Reevoo currently provide private businesses with the possibility to host independent reviews on their website, which also includes customer ratings customised according to the specific performance criteria of a product. For example, for a product such as a car, a customer can rate the car from one to ten according to its comfort, driving enjoyment, practicality, fuel economy, build quality and the like; by contrast, the criteria for a washing machine may include its ease of use, features, cycle times, and noise.

Considering that a large number of customers trust online reviews more than branded communications (Nielsen, 2013), the integration of reviews and ratings into the marketing communications mix could reduce the lack of trust towards brand communications and persuade consumers about the quality of products using the customer voice.

7. Limitations and future research

The present study has some limitations. First, this research is based on the use of OCRs of tourism-related products. Future research could test the proposed model across different product types, such as utilitarian products (e.g., smartphones, vehicles) to generalise the results of this study. Moreover, the sample was primarily composed of respondents from the UK and the Republic of Ireland. Although this type of sample responds to the need to

widen the geographic scope of e-WOM research (Chan & Ngai, 2011), it could be useful to replicate the study in other contexts.

Moreover, additional research is needed to identify other antecedents of review diagnosticity. For instance, scholars could consider new constructs, such as the vividness of information (e.g., customer pictures or videos of a product), website recommendations and the like, which could improve the predictive power of the model.

Moreover, in this study, we found that information diagnosticity leads to information adoption; however, future research could test whether information diagnosticity is also an important antecedent of customer purchase intentions or loyalty to a CRW.

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Appendix 1. Scale development process

The interview method is suggested as a valid route to start a scale development process by Churchill (1979). Following Churchill (1979), 12 subjects with expertise in online consumer reviews were interviewed, namely consumers who regularly read and sometimes publish reviews on consumer review websites on accommodations and/or restaurants. The sample come from a network of acquaintances and interviewees were selected according to their experience in using consumer reviews and had occupations ranging from public workers to professionals. Their ages ranged between 24 and 45 years, and were balanced between males and females. The interview format asked respondents to narrate their experience with online consumer reviews, to describe the characteristics of high quality reviews in terms of the capacity of the information provided to be helpful to familiarise, to understand, and to evaluate the quality and the performance of a product. They were also asked to elaborate on the theme discussed by providing examples from their experience. Through the support of an iPad, additional questions were directed to ask respondents to indicate other types of information that they regarded as most helpful on travel consumer review websites (e.g. tripadvisor.com). The data were analysed through open coding (Strauss & Corbin, 1998), with an attempt to identify existing themes from the literature as well as new constructs.

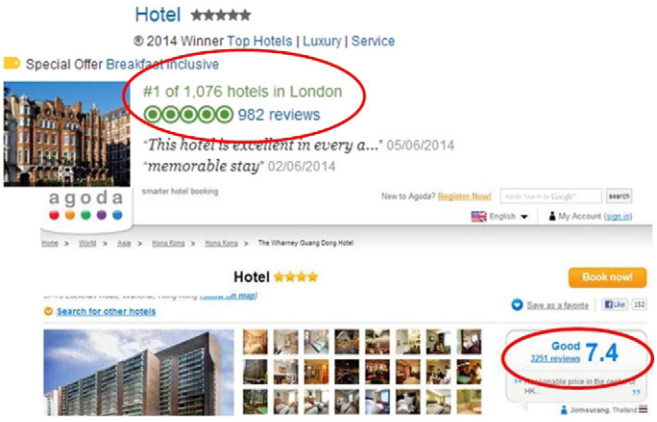
The results of the interviews enabled the development of the items for the new scales of information quality, overall ranking, and customer ratings. These items were tested with 13 academics for improving language and structure. Some items were removed as were judged too ambiguous and open to misinterpretation.

Subsequently, the questionnaire was sent out for pilot testing. The next stage followed the procedure suggested by Gerbing and Anderson (1988), which recommends testing Cronbach alpha, item to total correlations, exploratory factor analysis.

First, we plotted the item-to-total scale correlations. Items that produced a sharp drop in the plotted pattern were removed. A principal component analysis using Varimax rotation was then performed to remove overlapping items across dimensions. The exploratory factor analysis removed items that had factor loadings below .50, high cross-loadings above .40 and low commonalities below .30. Cronbach's alpha values for the scales developed which loaded below the threshold of .70 were also removed (Bagozzi & Yi, 1988). In total, four items were deleted and not included in the final version of the questionnaire. Table 3 in the paper presents the final list of items which were retained for confirmatory factor analysis.

Appendix 2

Picture 1. Overall ranking.



Picture 2. Consumer ratings.

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