Consumer perceptions of information helpfulness and determinants of purchase intention in online consumer reviews of services

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Abstract

Online consumer reviews offer an unprecedented amount of information for consumers to evaluate services before purchase. We use the dual process theory to investigate consumer perceptions about information helpfulness (IH) in electronic word-of-mouth (eWOM) contexts. Results highlight that popularity signals, two-sided reviews, and expert sources (but not source trustworthiness) are perceived as helpful by consumers to assess service quality and performance. Although two-sided reviews exercise a significant influence on perceived IH, their influence on purchase intention was indirectly mediated by IH. IH predicts purchase intention and partially mediates the relationship between popularity signals, source homophily, source expertise, and purchase intention.

Keywords: electronic word of mouth; services; dual process theory; perceived information helpfulness; purchase intention

Introduction

An increasing number of consumers trust and use online consumer reviews (OCRs) – a specific type of electronic word-of-mouth (eWOM) communication – to assess the quality and performance of the products and services they consider purchasing. The exponential growth of OCRs has stimulated a great deal of academic research, which has provided evidence of the influence that OCRs have on sales [e.g., 18, 51, 83] and on several aspects of consumer behavior including information adoption, product preferences, and purchasing intention [15, 25, 27, 45, 61, 78, 81].

As a result of the increasing importance of consumer reviews in consumer decisions, some third-party e-tailers are being stimulated to enable consumers to post OCRs for the products and services they sell. However, not all customer reviews or the information offered on these websites are helpful. In addition, the proliferation of websites offering customer reviews and wealth of reviews available may disorient consumers attempting to evaluate the quality and performance of services before purchase. More third-party e-tailers are attempting to convey to customers relevant information and signals that help them to understand and evaluate the quality and performance of products sold online [42]. These signals are, for example, the number of "helpful votes" provided by the users of a website that highlight the reviews they read and value as helpful. Research has shown that helpful OCRs increase the sales of e-tailers [6, 30].

Existing research on eWOM has mainly focused on attempting to understand the determinants of review helpfulness. To assess review helpfulness, existing studies mostly draw upon the evaluation of the observation of textual details from databases of reviews obtained from websites such as Amazon, which use voting mechanisms asking readers about the extent to which an OCR was helpful [e.g., 1, 4, 23, 38, 45, 52, 54, 59, 62]. However, it has been suggested that helpful voting mechanisms can be easily manipulated [59], and a large

proportion of reviews, particularly more recent ones, have few or no helpfulness votes [11]. In addition, previous studies using large datasets have had inconsistent conclusions on the determinants of review helpfulness [38]. Moreover, previous research efforts have not analyzed consumers' perception of information helpfulness (IH). Third-party e-tailers that sell services (i.e., Booking.com) provide several types of information to help consumers assess the quality of services including recommendation signals and popularity signals (i.e., number of reviews per service), which, in parallel with review messages, may help customers to diagnose the quality and performance of the services sold by these organizations. Previous studies have not measured the role that the above-mentioned typologies of information play on consumers' perceived IH. In our study, we use perception measures because existing studies that used datasets from Amazon and similar websites, although useful, mainly investigated the "visible" aspects of review helpfulness and focused on single reviews. However, some other factors such as perceived source homophily or perceived source expertise and trustworthiness or the helpfulness of recommendation and popularity signals cannot be measured through quantitative textual analysis [27]. We believe that these factors provide a more holistic understanding that helps explain perceived IH. To fill this gap, in this study, we measure the determinants of perceived IH of services (i.e., tourism services) from the consumer's perspective.

Dual process theory has been adopted as the theoretical framework that underpins this study because it provides a lens for exploring the influences that social and informational factors have on an individual's psychological processes [19]. Informational influences are based on a receiver's judgment of the relevant content of a message and include elements such as perceived information quality and source characteristics, whereas normative cues indicate the social pressure on individuals to conform to the opinions and expectations of a group [19]. In this study, informational influences included two-sided reviews, the perceived expertise and

trustworthiness of a source, and the perceived similarity (homophily) between a source and a receiver. By contrast, normative influences include crowd evaluations of service performance, such as third-party e-tailers' recommendations based on overall ranking score, and the crowd's behavior, such as popularity signals. In this context, the crowd consists of the large, anonymous, and disintegrated group of contributors of consumer reviews to third-party e-tailers.

In summary, we use the dual process theory to explain the influence that informational and normative factors have on consumers' perceptions of IH of tourism services in third-party e-tailers publishing consumer reviews.

Information and online review helpfulness in third-party e-tailers

eWOM 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" [35]. eWOM in the form of OCRs has attracted considerable interest from researchers in the past decade.

Third-party e-tailers are, for example, in the tourism sector organizations such as Booking.com who sell on behalf of a service provider and enable their customers to write and publish reviews and ratings about the accommodation they have purchased and experienced. The results of previous studies have concluded that OCRs directly affect sales of diverse products and services [e.g., 6, 12, 51]. In addition, researchers have also established that OCRs influence a wide range of consumer attitudes and behaviors including information adoption [25, 81], product considerations and choice [41, 71, 77], brand awareness of as well as attitudes toward goods [48] and services [77], and purchase intentions [27, 48, 49, 56, 61, 82].

The second important concept in this study is IH. Information in a social commerce platform is deemed to be helpful if it provides information that is perceived by consumers to be helpful to become familiar with, understand, and evaluate the quality and performance of a product sold online [42]. In the eWOM literature, scholars have recently focused their attention on the determinants of helpful votes to a review. Table 1 summarizes the relevant literature on review helpfulness, illustrating that most existing studies analyze consumer reviews for goods posted on e-tailer's websites such as Amazon.com, and that have created large datasets and used the review's "helpful votes" that a review receives to measure review helpfulness [1, 4, 23, 38, 45, 52, 54, 59, 62].

There is a dearth of studies that, from a consumer's perspective, analyze more holistically the determinants of IH in third-party e-tailers. A key contribution paper is to take a more holistic approach to understanding the factors that individual consumers feel influence review helpfulness. As mentioned above, previous studies in the e-WOM literature mainly used available data and the helpful votes as a dependent variable [e.g., 23, 52, 54]. We differ from previous researchers, as in this study, we do not use existing (secondary) data and do not focus solely on the helpfulness of a single review message. Instead, we focus on consumers' perceptions of IH based on their purchase experience by looking at various types of information such as e-tailer's recommendation and popularity signals. We argue that these types of information may help consumers in assessing the quality of services sold online and explain their decision-making process.

Understanding the determinants of IH in the service context may be even more interesting than in a goods context, as tourism services are more difficult to assess due to their intangibility, variability, perishability, inseparability, and nonstandardized nature [7]. In addition, researching consumer's perception of IH is also important because it has recently been noted that the voting mechanism can be easily manipulated [59], and research on textual

analysis of available data does not consider less "visible" factors that can be important influencers of consumer perception in a service context. For instance, understanding what makes information helpful can provide insights into how consumers assess the quality of services sold on third-party e-tailers.

----------**Add Table 1 here**----------

Theoretical background: dual process theory

The dual process theory postulates that individuals are influenced by others because they are dependent on them either for information that removes ambiguity and thus establishes subjective validity (*informational influence*) or for reasons of social approval and social acceptance (*normative influence*) [19, 37, 82]. Normative influences can be defined as "an influence to conform to the positive expectations of another, whereas informational influences can be defined as an influence to accept information obtained from another as evidence about reality" [19]. Informational influences come into play when individuals are uncertain about a situation or an object, because stimuli are intrinsically ambiguous or because there is social disagreement [37]. In this way, consumers may conform to others because they believe that other peoples' interpretation of an ambiguous situation or a set of circumstances may be more accurate than theirs and will help them to choose the right course of action [37]. Important informational influences include the content, the source, and the receiver of information [13, 14, 38].

Normative influences concern the mechanisms by which others (e.g., peers, reference groups) influence individuals' behavior and attitudes, which cause them to accept group norms, opinions, and judgments in order to avoid social withdrawal and exclusion.

Although informational influences appear to play a key role in influencing an individual's behavior on the Internet [41], group influence in the form of crowd pressure is also present

and operates in eWOM communications. For third-party e-tailers, the normative influence on individuals materializes in the form of a large, anonymous, and disintegrated mass of people – *the crowd of customers* – that exercises social pressure on an individual's opinions and behavior. For instance, e-tailer's recommendation signals enable consumers to gauge the opinion of the crowd of users about the performance of a specific service, whereas popularity signals such as the number of reviews per product enable them to infer the crowd's behavior. The number of reviews indicates how popular a service is through the choice of the crowd and guides consumer choices through a mechanism of imitation [41]. Consistently, we argue that individuals on the Internet may conform to what others think or do.

Given the importance of helpful reviews on an e-tailer's sales [30], it is still not very clear how normative and informational influences affect consumers' evaluation of IH or their purchase intentions for services sold on third-party e-tailers. Drawing on the dual process theory, we argue that social influence in eWOM communications may occur through informational influences and/or normative influences. Informational influences include the quality of the arguments provided in consumer reviews, the expertise, trustworthiness, and similarity (homophily) of a source, whereas normative influences include performance evaluations (e-tailer's performance signals) and number of reviews per service (measure of popularity). In the paragraphs that follow, we conceptualize and discuss each of these constructs in more detail.

Hypotheses development

Informational influences

Two-sided reviews

Two-sided information refers to a (review) message that discusses both the positive and the negative sides of a service [43], which is in contrast to one-sided information that only

presents positive (or negative) aspects of a product/service [13]. Previous studies that have focused on review text characteristics adopted datasets of customer reviews from e-tailers, measuring review length, readability, and linguistic correctness [4, 16, 30, 38, 52, 54, 59, 62]. However, services evaluation is often subjective and due to the high level of emotions embedded in the evaluation of services. Thus, it may be more important for a consumer to access consumer reviews that are balanced and are relevant for understanding whether a particular service is able to satisfy his/her particular needs [26]. In the context of celebrity endorsements, Kamins et al. [43] found that two-sided information elicited a higher evaluation of the sponsor in terms of perceived overall quality of service.

In this study, we hypothesize that an OCR that contains both positive and negative comments about a service is more likely to be perceived by consumers as helpful to learn more about a service and to assess whether it suits their needs. In fact, the review of both positive and negative sides of a service may help a consumer to understand the strengths and weaknesses of a service and better evaluate it. Thus:

Hypothesis 1a: Two-sided reviews positively influence perceived information helpfulness.

In addition, research revealed that consumers find two-sided reviews as more trustworthy [13, 26]. Two-sided arguments, as dimension of information quality, are meant to be more persuasive than one-sided ones [22, 43] because they provide information that goes against the advertiser's interest [44]. A more informative review set may result in more favorable consumer associations and an increase in behavioral intention. A review that contains both positive and negative comments about a service is generally perceived as more credible, and therefore, it may be more influential in consumer decisions [26]. Thus, we hypothesize:

Hypothesis 1b: Two-sided reviews positively influence consumers' purchase intention.

Source trustworthiness

Source credibility incorporates two main dimensions: expertise and trustworthiness [39, 53]. Previous studies did not disentangle the effects of the trustworthiness and expertise of the source on consumer behavior in eWOM settings [27, 81, 82]. Source trustworthiness refers to consumers' perceptions that a source of communication is reliable, unbiased, and honest [58]. In eWOM communications, consumers may assess source trustworthiness by looking at whether the reviewer provides detailed information about himself/herself (e.g., a real profile picture), his/her real name, his/her origin, and lifestyle [26]. However, perceived trustworthiness is based on how consumers feel about a source of communication, and a source that is perceived as trustworthy is generally perceived as a source that can be relied upon. Several scandals exposed by mass media globally have increased consumers' concerns over the level of trustworthiness of the source of communication in websites such as Yelp, TripAdvisor, and Amazon [26]. Thus, we argue that the perceived trustworthiness of the source may be more important to assess the helpfulness of the information provided in a review.

Hypothesis 2a: Source trustworthiness positively influences information helpfulness.

Source trustworthiness is particularly important in eWOM contexts because it is difficult to infer who the reviewer really is and the interests behind his/her decision to post a review of a service. A reviewer who is willing and capable of telling the truth is judged to be trustworthy and his/her message (review) will be accepted [21, 26, 39, 82]. However, when the reviewer lacks trustworthiness, consumers will discount the message and consider it as biased or invalid; hence, the message will result as unpersuasive [26]. Thus, we hypothesize that the perceived trustworthiness of the source may predict consumer purchase intentions.

Hypothesis 2b: Source trustworthiness positively influences purchase intention.

Source expertise

Source expertise is derived from consumers' perceptions of the knowledge, skills, or expertise possessed by a source in a specific domain [58]. In contrast to WOM, eWOM exhibits a form of asynchronous computer-mediated communication between anonymous sources that have no prior relationships. Therefore, evaluating the expertise of a source can be a difficult task in eWOM contexts [60]. In this context, expertise assessment must be made from the relatively impersonal text-based resource exchange provided by actors in the review websites [9]. Although scholars have found that source credibility (including the source trustworthiness and expertise dimensions) affects perceived credibility of eWOM messages [13], research on the influence of source expertise on review helpfulness has provided mixed findings. For instance, Willemsen et al.'s [80] findings suggest that expertise claims are weakly related to the perceived usefulness of information for both search and experience goods in Amazon, whereas Racherla and Friske [68] conclude that a reviewer's expertise is negatively correlated with helpfulness in a service context. We observe that third-party e-tailers increasingly provide signals that help consumers make inferences about reviewers' expertise. For example, in Tripadvisor.com, consumers assess the expertise of a source based on the number of reviews submitted and on the reviewer's badge [26]. Accordingly, in addition to reading its review, such information can contribute to a better assessment of source expertise. In general, people rely more on expert sources in the evaluation of the quality and performance of both products and services. If consumers perceive a source to be knowledgeable, they will believe the source to be more able to provide helpful information for assessing the quality and the performance of a service. Thus, we hypothesize that expert sources are likely to provide helpful information.

Hypothesis 3a: Source expertise positively influences information helpfulness.

In offline WOM, marketing scholars have proved that source expertise and trustworthiness positively influence consumer purchase intentions and purchase behavior [31, 34].

Noncommercial sources are generally perceived as more credible sources and are among the most persuasive influencers in interpersonal and mass communications [10, 39, 53, 73]. Although previous research has proved the relationship between source credibility and purchase intentions in eWOM contexts [82], there is a lack of research on the influence of source expertise on purchase intentions. We argue that a more expert source is likely to be perceived to possess greater awareness and knowledge of services available in a category. As a result, a message from an expert is more likely to have a significant impact on a consumer's purchase decisions. Moreover, when making a purchase decision, consumers will rely more on reviews from expert sources (reviewers), which will be more likely to affect their behavior. Thus, we hypothesize:

Hypothesis 3b: Source expertise positively influences consumers' purchase intention.

Source homophily

Source homophily explains group composition in terms of the similarity of members' characteristics and the extent to which "pairs of individuals who interact are similar with respect to certain attributes such as beliefs, values, education, social status, etc." [69]. Festinger's [24] theory of social comparison suggests that people compare their attitudes and capabilities to those of others. If they find there are similarities between themselves and another person, they will implicitly assume that they have related needs and preferences. In this study, we examine perceptual homophily with an online source, which is concerned with similarities among people regarding their likes, dislikes, values, and experiences [10, 31]. In the online context, consumers do not have face-to-face interactions, but they can still make inferences about their similarity with a reviewer by reading his/her reviews and profile information. In this way, consumers can learn more about the personality, values, experiences, and preferences of a reviewer.

Researchers suggest that consumers tend to have greater levels of interaction, trust, and understanding with others who are similar to them [3, 70]. Following these studies, we argue that consumers will find more helpful information coming from people who are similar to them in terms of their viewpoints, experiences, and preferences. Service quality and essence can vary from one customer to another. Owing to this higher level of variability of services compared to goods, consumers may want to retrieve more information from people who are similar to them. For example, a backpacker will find the opinion or reviews of people who share the same style of travel more helpful to assess service quality, whereas a consumer from a specific country may find the reviews coming from people from the same country of origin to be helpful. Therefore, we propose:

Hypothesis 4a: Perceived source homophily positively influences information helpfulness.

In addition, scholars have attempted to measure the influence of homophilous ties on consumer decisions. For instance, Brown and Reingen [10] argued that homophilous sources of information are more influential than heterophilous ones, which should result in a greater influence. Thus, a source that is perceived to be similar by a receiver of communications should be more persuasive than a source that appears to be dissimilar [21]. Therefore, consumers may find the recommendations from sources (reviewers) that are similar to them to be more influential because they fit their interests, attitudes, and preferences. Thus, we hypothesize the following:

Hypothesis 4b: Perceived source homophily positively influences consumers' purchase intention.

Normative influences

E-tailers' recommendations

In traditional retailer stores, consumers can ask staff, test or try a product, or directly view and experience the products that they intend to buy. However, these opportunities are not

available online and particularly with services, which cannot be tested or tried before purchase. It follows that e-tailers must leverage informational cues or signals that facilitate consumers' ability to make accurate quality assessments regarding the services they sell [63]. Currently, many third-party e-tailers provide recommendations to communicate service quality in order to facilitate consumers' choices. Third-party e-tailers' recommendations can be defined as any symbol, icon, or signal that is presented by the website in an effort to guide consumers toward some services that are recommended based on some criteria. For example, Agoda.com and Booking.com use an ok-hand icon to signal their preferred hotels, which they believe offer the best value for money based on reviewers' overall feedback, whereas TripAdvisor.com awards a "Traveller's choice certificate" to accommodation that consistently obtain outstanding traveler reviews and ratings on the website. As these recommendations signal the expected quality of the offer and they are based on all customers' ratings, it is believed that they will influence consumers' assessment of the quality and performance of the services they are considering buying. Thus, we hypothesize:

Hypothesis 5a: e-Tailers' recommendations positively influence information helpfulness.

In addition, we also expect that e-tailers' recommendations will influence consumers' purchase intentions. Owing to their intangibility, it is sometimes more difficult to discern differences between many services offering to satisfy the same need. For instance, a popular destination may offer several similar accommodations in the same area (e.g., the city center). When consumers are uncertain about which service to purchase, they may look at cues that can direct their choice. As third-party e-tailers' recommendations make a product to stand out from the crowd, they may reduce the uncertainty related to the purchase of a service that is not very differentiated from others. Such recommendations may be perceived as more competent and knowledgeable because consumers may believe that the seller has better information and is knowledgeable of all available services on offer in a specific category. In

this situation, third-party e-tailers' recommendations can induce consumers to buy a specific service instead of others. Thus, we hypothesize:

Hypothesis 5b: e-Tailers' recommendations positively influence consumers' purchase intention.

Service popularity signals

A service can be perceived as popular when many people talk about it and/or purchase it. Third-party e-tailers often provide information about the number of people who have purchased and reviewed a service. Such information is believed to provide an indication about service popularity [12]. In consumer review websites, the volume of consumer reviews is perceived by consumers as an indicator of market performance [12, 41] or of the popularity of a service, which is associated with the number of consumers who have purchased it [60]. For instance, some third-party e-tailers such as TripAdvisor facilitate consumers by short listing only the most popular services on offer based on the number of consumers who have reviewed it. In other contexts, the number of download counts may indicate perceived quality and reliability for software products [33].

The level of popularity within third-party e-tailers may assist consumers to evaluate service quality and forecast service performance. In addition, a large number of reviews increase the chance to find the right information that can assist consumers to assess service quality. As a result, consumers may feel more comfortable in evaluating the quality and performance of a service if many people have reviewed it. Thus:

Hypothesis 6a: Service popularity signals positively influence perceived information helpfulness.

In addition, researchers have found that information quantity such as best-seller lists and download counts influence consumers' decisions [33]. In eWOM research, information

quantity has been shown to affect consumers' purchase intention and choice [41, 61, 82], and company's sales [18, 51]. Social influence scholars point out that when individuals are uncertain about a situation, they observe what other people do and imitate their behavior [2]. Such imitative behavior can also occur online. For example, when consumers search for a service to purchase, they may look at the number of reviews per service, which is indicative of how many consumers are buying that service. This information can reassure consumers of the level of quality of a service, namely, if many people are buying it, it must be a good service. In fact, consumers' purchase confidence can be improved through observing or imitating other consumers' purchase behavior [82]. Thus, we test whether service popularity signals also influence consumer purchase intentions. Therefore, we hypothesize:

Hypothesis 6b: Service popularity signals positively influence consumer purchase intention.

Perceived information helpfulness and consumer purchase intentions

Existing studies in eWOM have mainly focused on the antecedents of helpful votes [e.g., 52] rather than on the links between perceived IH and consumers' purchase intention. In this study, we argue that if users believe that the information provided on the e-tailer website will help them to become familiar with a service and evaluate its quality and performance before purchase, they will be more likely to purchase that service. Thus:

Hypothesis 7: Information helpfulness positively influences consumers' purchase intention.

Methodology

Data collection

The data collection was carried in Hong Kong (HK), which was selected as the country base for this study because Internet penetration is very high. Data were collected at the HK International Airport by asking travelers in the waiting areas who have had recent experiences

using OCRs when booking accommodation and restaurants to complete an online questionnaire using an iPad provided by one of the researchers of this study.

Data were collected using an online questionnaire created using professional survey design software (Survey Monkey) that 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 both in English and in Cantonese. The backward translation method was used. The questionnaire was first available in English and was translated into Cantonese by a professional with a bilingual (English and Cantonese) language proficiency. A second Cantonese native speaker translated back the Cantonese version into English. No differences emerged between these two versions. For the main study, during a period of two months, a total of 611 responses were collected. However, 41 questionnaires were excluded because they were not completed properly, which yielded a total of 570 usable questionnaires. No incentive was associated with the data collection technique adopted in this study.

Measures

The questionnaire included control questions to test the validity of the data collected. For example, some questions were asked about the last time OCRs were used in order to screen consumers who had not used online reviews recently.

Most of the items and scales used in this study have been shown to have a high reliability in previous studies. Source expertise and trustworthiness were measured using a scale developed by Ohanian [58] that has been used in eWOM research with Cronbach's α ranging from 0.84 to 0.91[71]. IH was indexed using three items developed by Jiang and Benbasat [42], which had also shown good reliability (Cronbach's $\alpha = 0.80$). To measure purchase intentions, we used the widely utilized scale developed by Dodds et al. [20], which had Cronbach's α ranging from 0.96 to 0.97. Source homophily was assessed using Gilly et al.'s [31] scale,

which was recently adopted in the context of eWOM service research [3] (Cronbach's α = 0.939).

We could not use the scale available in the literature to measure service popularity. The items for the scale used to measure information quantity developed by previous scholars [61] were judged ambiguous by respondents and did not really fit the meaning of the construct in our study, which is service popularity. In addition, information quantity is defined by Park and colleagues as the quantity of arguments or information for a product/service on a website [61]. However, in this study, we refer to popularity signals as the number of published reviews per service that makes a service to stand out from the crowd. Therefore, a new scale was developed to avoid any confusion.

In total, two scales for measuring service popularity and e-tailer's recommendations were developed specifically for this study. In order to avoid any ambiguity with some of the constructs of the study, some pictures taken from real third-party e-tailers and used in the questionnaire to refer to some of the constructs used in this study are given in Appendix 1. Appendix 1 also provides an explanation of the scale development process.

Sample profile

The sample was composed of individuals aged 18–25 (60% of the sample) and 26–45 (35% of the sample) years, and all respondents were Chinese and had various educational background (i.e., 14% elementary school, 15% high school, 64% undergraduate degree, 5 postgraduate degree, and 2% no degree). This sample composition can be considered as a limitation; however, individuals in this age group are the most likely to use OCRs and the Internet penetration in HK is among the highest in the world (75%) [55].

Analysis and findings

We conducted a confirmatory factor analysis (CFA) to check for construct validity, and the results are shown in Table 2. Fit indices of CFA indicate a good fit for the measurement model: χ^2 = 707.43, incremental fit index (IFI) = 0.950, comparative fit index (CFI) = 0.950, Tucker–Lewis index (TLI) = 0.942, and root mean square error of approximation (RMSEA) = 0.055.

Convergent validity was assessed through average variance extracted (AVE), composite reliability (CR), and Cronbach's α. AVE values of all the constructs were above the recommended level of 0.5, and CR values comprised between 0.853 and 0.940, thus well above the threshold of 0.6 [5] (Table 2). Scale reliability was also assessed for each construct with Cronbach's α [57], which ranged from 0.750 for two-sided reviews to 0.940 for source homophily (see Table 2). Some of the scales used in this study contain two items. We have reviewed the literature on testing the reliability of two-item constructs, and we decided to use Pearson correlation and Spearman–Brown coefficient to test construct reliability. In our case, the results show that the values of Cronbach's α and Spearman–Brown coefficient are almost identical for the two-item constructs. For two-sided reviews, we had the following coefficients: Cronbach's α = 0.750, Pearson correlation = 0.6, Spearman–Brown coefficient = 0.750. For source expertise, we had the following values: Cronbach's α = 0.838, Pearson correlation = 0.722, Spearman–Brown coefficient=0.839. For source trustworthiness, we had the following values: Cronbach's α = 0.889, Pearson correlation = 0.8, Spearman–Brown coefficient = 0.889.

The discriminant validity was examined using three measures: Fornell & Larcker's [29] test, cross-loadings, and HTMT ratio [36]. First, for discriminant validity to be supported, the AVE for each latent variable included in the model should be greater than the squared correlation estimate [29, 32]. The results presented in Table 3 show that the AVEs range from 0.684 to 0.758 and are greater than the corresponding shared variance for all possible pairs of

constructs shown on the upper triangle of the table, thus demonstrating discriminant validity. Second, the cross-loadings presented in Table 4 indicate that each item loads higher on its own construct than any others. Third, the heterotrait–monotrait (HTMT) ratio of correlations shown in Table 5 indicates that all the values in the table, except the one between source expertise and source trustworthiness, are below 0.85, the most conservative threshold for establishing discriminant validity [36, 79]. According to Henseler et al. [36], for conceptually similar constructs, $HTMT_{inference}$ criterion can be used, which suggest that the value of HTMT ratio of correlation should be lower than 1. The value between the two conceptually similar constructs of source expertise and source trustworthiness in our study is 0.938, and thus it is acceptable. The above test results suggest that discriminant validity of the constructs can be confirmed.

In this study, all the data for all exogenous variables were collected through using a survey. This requires testing for the potential presence of common method variance (CMV) among these variables. The questionnaire did include a construct (marker variable) that was theoretically unrelated to indicators in the model. The marker variable technique [50] was adopted with an attempt to control for CMV by including "a measure of the assumed source of method variance as a covariate in the statistical analysis" [64]. When the marker variable was introduced into the model, the CFA showed that CMV among all eight exogenous variables shows a value of 7.2% (0.39). Therefore, CMV does not pose a threat in this study [64].

The overall SEM fit provided a value of $x^2/df = 2.438$, which is below the recommended threshold of 3. The CFI was = 0.947, NFI was = 0.918, the TLI was = 0.939, and the IFI was = 0.947; thus, all were above the suggested cutoff of 0.9 [32]. The root mean square error of approximation (RMSEA) was = 0.056, thus below the recommended cutoff of 0.06 [32]. Based on these results, the SEM shows a good fit (Table 6).

We tested our hypotheses using structural equation modeling (SEM) with the AMOS 22.0 statistical program, and the results are presented in Table 6. The output of SEM shows that service popularity (β = 0.452; p < 0.001), two-sided reviews (β = 0.252; p < 0.001), and source credibility (β = 0.552; p < 0.005) all show a strong, highly significant, and positive relationship with IH. Contrary to our expectations, source trustworthiness (β = - 0.305, p = nonsignificant), source homophily (β = - 0.033; p = nonsignificant), and e-tailer's recommendations (β = 0.047; p = nonsignificant) show a nonsignificant relationship with IH.

----------**Tables 2, 3, 4, 5, 6 here** ----------

Mediation analysis

To test for hypotheses H1b, H2b, H3b, H4b, H5b, and H6b, the mediation role of perceived IH was examined using the bootstrapping method as recommended by Preacher and Hayes [65] and Amos 22. Bootstrapping is a particularly useful approach to alternative ones such as the Sobel test [72]. Specifically, we tested whether two-sided reviews, source trustworthiness, source expertise, source homophily, e-tailers' recommendation, and service popularity have indirect effects on purchase intention through the mediation of perceived IH. We examined the estimation results of direct effects without a mediator, direct results after the mediator (satisfaction) is entered, and the indirect results. A mediation effect can be established if the indirect effect is significant [32]. The results of testing the indirect effects of the six independent variables on purchase intentions through perceived IH are presented in Table 7. First, the indirect effect of two-sided information on purchase intentions was positive and significant (95% CI = [0.473, 0.242]). According to Hair et al. [32], if both the direct and indirect effects from the X to Y are significant, there is a partial mediation effect; if the direct effect becomes insignificant when the mediator is added, and the indirect effect is significant, there is a full mediation effect. If the direct effect never was significant, but indirect effect is, there is an indirect mediation effect. In our case, direct effect without mediator and its direct

effect with mediator of two-sided information were both insignificant; hence, this suggests that IH performed an indirect mediation role. Second, the indirect effect of source trustworthiness on purchase intentions was not significant (95% CI = [0.038, -0.653]), thus indicating that IH did not have a mediation effect. Third, the indirect effect of source expertise on purchase intentions was significant (95% CI = [0.208, 0.065]). As its direct effect without mediator and its direct effect with mediator were both significant, it indicates that IH had a partial mediation effect. Fourth, the indirect effect of source homophily on purchase intentions was significant (95% CI = [0.223, 0.074]). As its direct effect without mediator and its direct effect with mediator were both significant, it indicates that IH had a partial mediation effect. Fifth, the indirect effect of e-tailers' recommendations on purchase intentions was not significant (95% CI = [0.095, -0.003]), indicating that IH did not have a mediation effect.

Finally, the indirect effect of service popularity on purchase intentions was significant (95% CI = [0.425, 0.156]). As its direct effect without mediator and its direct effect with mediator were both significant, it indicates that IH had a partial mediation effect. Finally, Table 8 provides a summary of the results.

----------**Tables 7, 8 here**----------

Discussion

In this study, we have developed and tested a model of the informational and normative predictors of IH and consumers' purchase intentions in the service sector and made several theoretical and practical contributions.

Previous studies investigating review helpfulness have mostly used textual analysis of "helpful votes" from existing databases of online reviews on goods to shed light on the most

helpful reviews [e.g., 23, 52, 54, 59, 62]. Instead, in this study, we focused on consumers' perceptions of IH. We have adopted the dual process theory to test hypotheses in our study and the tested model agrees with Deutsch and Gerard [19] and LaTour and Manrai [47] who state that informational and normative influences are often found together.

Our research advances social cognition and behavioral influence theories by showing that people conform to and are influenced by "anonymous" crowds when they are uncertain about a situation or about a service that they plan to buy. An interesting finding that is contrary to social psychology paradigms [e.g., 2, 75] is that the normative influences in the online environment may operate in private settings. Consumers conform and accept the recommendations of crowds of anonymous sources and internalize them without the presence of group surveillance when they privately purchase services, assisted by reviews from third-party e-tailers. The belief of the rightness of others' advice and behavior leads consumers to accept recommendations and act in a way that conforms to what the crowd recommends or does, which implies a private behavioral change. This result suggests that social psychology paradigms need to be updated to reflect consumer behavior in online settings.

In addition, this is one of the first studies to use perceptual measures to study the determinants of perceived IH within the context of eWOM. Our results identify the different information types that consumers use to familiarize with services and to assess their quality and performance prior to purchase.

A normative influence such as service popularity signal is particularly helpful for Hong Kong consumers attempting to assess the quality and performance of services based on how many consumers have purchased and reviewed the service. A new scale was developed to measure this construct as an existing scale in literature [e.g., 61] was perceived as too ambiguous by respondents and not fitting the concept of product popularity. The newly developed scale achieved a high level of reliability and can be used in future studies. It is surprising to note

that popularity cues are more influential than two-sided reviews when consumers are seeking to evaluate the quality of potential service alternatives that could fit their needs. This finding is in line with Cheung, Xiao and Liu [15] who found that social information cues (i.e., peer consumer purchase) is more influential than opinion-based social information in an online beauty community. This finding means that consumers highly consider the number of reviews per service when they assess different alternatives. This result implies that when processing information for services in third-party e-tailers, consumers are increasingly adopting heuristic information cues (i.e., performance signals) to reduce the amount of information to process in the time they have to come to a decision (bounded rationality). The importance of heuristic information in consumer purchase decisions confirms the findings of previous studies testing the influence of perceived quantity of reviews on purchase intentions [15, 82]. The number of reviews per service is meant to increase consumers' confidence about the potential quality of the product. Thus, consumers view popularity signals as diagnostic information for assessing service quality, and they probably assume that widespread acceptance is an indicator of high quality [74] such as that if many people are buying this service, it must be good.

In this study, we considered the influence of two-sided reviews on IH. Previous studies' findings conclude that perceived information quality (information depth, breadth, factuality, relevance, and credibility) [27], review depth, and length predict review helpfulness [4, 16, 38, 52, 54, 59]. Our findings emphasize the importance of a new information quality dimension, which is specific to eWOM and is difficult to measure through textual analysis: two-sided reviews. Previous studies found a link between two-sided arguments and persuasiveness [17, 22, 43] and review credibility [13, 14]; in our study, we found that consumer reviews containing information about the positive and negative sides of a product are helpful to consumers to learn the quality and performance of services. Consumers use reviews from other customers because, different from one-sided marketing communications

that present only the positive side of products and services, these reviews discuss both the positive and negative sides of a service. Our results also suggest that two-sided reviews do not directly influence consumer purchase intentions on third-party e-tailers; their influence is indirectly mediated by IH.

Previous studies on the relationship between source (reviewer) credibility and review helpfulness had contrasting findings as discussed in a recent meta-analysis of the literature on review helpfulness [38]. For instance, source credibility was found to have a limited effect on information diagnosticity [27]; in another study, scholars found a nonsignificant or a negative relationship with review helpfulness [68], whereas Hong et al. [38] found a significant and positive relationship with review helpfulness. We believe that by disentangling the effects of source trustworthiness and source expertise, we have contributed to shed light on some of the contrasting findings obtained in past research, thus demonstrating that different dimensions of source credibility determine different results in consumers' evaluation of information and behavior in eWOM contexts. Interestingly, the relationship between source expertise and perceived IH was found to be positive and significant, which is consistent with the dual process theory and Hong et al.'s findings [38]. On the contrary, source trustworthiness was found not to predict IH. We can infer that consumers may find it difficult to assess source trustworthiness, as it is really hard to prove whether a reviewer is genuine or not [26]; hence, consumers use other "source cues" such as the degree of expertise of the source to evaluate the helpfulness of the provided information. Therefore, in eWOM contexts, source expertise matters the most to consumers when they assess IH. Consumers may be aware that not all consumer reviews are reliable [26], and trustworthiness is not evident in online reviews, so they have to rely on expert sources.

Interestingly, our results highlight that perceived source expertise affects purchase intention, even if the relationship is partially mediated by IH. This finding supports the importance of

source credibility as evidenced in face-to-face WOM, attribution theory in advertising [e.g., 10, 31, 34, 53], and in eWOM literature [82]. Thus, the more a source is perceived as expert, the higher the likelihood that his/her review will influence consumer purchase decisions. However, we did not find support for the relationship between source trustworthiness and purchase intentions, which shows that source expertise and source trustworthiness have a different influence on consumer behavior in eWOM contexts.

We tested for the first time the relationship between source homophily and perceived IH, which was nonsignificant. It appears that when consumers search information to evaluate the quality of available services, they focus more on the content of a review, as well as on the expertise of the reviewer or on how popular a service is, rather than referring to how similar the reviewer is to the receiver. We also tested the relationship between source homophily and purchase intentions, which was instead significant. In face-to-face WOM research, scholars found mixed results: in some studies, perceptual homophily was found to be directly related to interpersonal influence [31], whereas in others, there was no support for the fact that homophilous sources exert greater influence on receivers' decision making [10]. In the present study, we have found that that perceptual homophily affects purchase intention (with partial mediation of IH), and this result can be explained by the fact that in the purchase decision stage, consumers may favor the online reviews of people with experiences, viewpoints, and preferences that are similar to theirs [70], which in the end will be more persuasive than reviews from dissimilar sources.

In this study, we developed and tested a scale for measuring e-tailer's recommendation signals, which has shown a high level of reliability (Cronbach's $\alpha = 0.921$). We have, for the first time, tested the IH of third-party e-tailers' recommendations and their influence on purchase intention. Interestingly, our findings show that third party e-commerce operators' recommendations do not predict IH, and their influence on purchase intentions is not

mediated by IH. We can advance a hypothesis for this result: consumers may be suspicious of recommendations coming from a commercial website and will probably not use it to shortlist available services or to decide which service to buy.

Finally, our results suggest that IH predicts consumers' purchase intention. This result advances our understanding of the links between IH and consumer behavior in eWOM settings. This indicates that when a website enables consumers to familiarize themselves with a service and to discern its quality and performance, consumers are more likely to make a purchase.

Managerial implications

Important managerial implications can be drawn from the results of our study. First, third-party e-tailers selling services must ensure that they provide helpful information to their customers. However, with information, we also refer to signals that help consumers learn about a service and assess their quality and performance prior to purchase. The higher the information is helpful, the higher the website conversion rates will be.

This study provides managers with an indication of the characteristics of the most helpful information that could guide online marketers and website designers in developing signals for use by consumers and reviewers in the service sector. Helpful consumer reviews are two-sided, namely, they provide both positive and negative comments about a service. Accordingly, managers can use some specific signals to label the negative and positive comments in a consumer review to make it stand out from the crowd of comments and better assist consumers' learning of services.

Furthermore, it is important to ensure reviewer profile pages provide visible information that clearly communicates a reviewer's credibility in terms of his/her expertise, preferences, knowledge, as well as likes and dislikes. Such information should appear as close as possible

to a review so that consumers can easily make inferences about reviewers' credibility and their similarity with a reviewer (source homophily). Social commerce operators such as Tripadvisor.com could use a ranking system to appraise the credibility of reviewers based on their experience in general (e.g., a traveler's expertise) as well as their expertise with a specific service (e.g., a tourism destination), which could be measured in terms of the number of reviews posted, helpful votes awarded, and other criteria. For example, reviewers could also be ranked based on their helpful votes received. By integrating more information about the credibility of reviewers, e-commerce operators can enhance purchase intentions of services.

Normative influence emerged as antecedents of IH and as influencers of consumers' purchase intentions. By presenting information on crowd evaluations and crowd behavior, third-party e-tailers can make it easier for consumers to evaluate services, thereby facilitating purchasing decision. We therefore recommend that e-tailers should adopt a wider range of summary statistics to evaluate, for example, how different services are ranked according to other competitors and based on specific attributes. For instance, for a service such as a financial advisor, the overall ranking scores could be provided for the main service attributes including the quality of advice, transparency, availability, value, and the like.

Finally, the respondents of this study did not find the recommendations provided by the website as helpful for learning about a service's quality. This result may be due to readers trusting more the recommendations of anonymous reviewers than the recommendations coming from commercial sources [26]. One recommendation to e-commerce operators would be to increase the transparency of the criteria used to assess available products in order to enhance the perceived trustworthiness of these recommendations.

Limitations of the study and suggestions for future research

Similar to all studies, this research is not exempt from limitations. First, the sample was composed of Chinese respondents; therefore, it would be valuable to replicate the study in other geographical contexts. Although we wanted to contribute to the literature on online IH in service research, future research could compare goods and services or focus on other service types or classifications (e.g., hedonic vs. utilitarian services).

The correlation between source trustworthiness and expertise was particularly high; however, their effect on the dependent variable was very different, which motivated us to separate the two dimensions of source credibility to disentangle their effect on IH. When we tested the SEM model excluding source trustworthiness, there was not much variation in the standardized coefficients (see Appendix 1).

The phenomenon of fake reviews is growing, and this can affect consumer's attitude toward websites that publish consumer reviews without effectively assessing their authenticity [e.g., 26, 76]. Perceived website trustworthiness could affect the influence that some constructs in our model (including service popularity signals, e-tailers' recommendations) have on consumer decisions.

In addition, some third-party e-tailers such as TripAdvisor.com are partnering with social networking websites to enable readers to identify friends among the reviewers of a service. This implies the possibility to retrieve and read the comments from strong ties, which are known to play an influence on service purchase decision in eWOM [7]. Thus, future research could test the influence of website trust and tie strength on the constructs used in our model. Existing research on eWOM helpfulness is mainly based on quantitative studies that rely on databases from a specific website (i.e., Amazon.com). However, consumers may use several reviews from various websites before making a purchase decision. An in-depth qualitative study of consumer information processing in eWOM is still lacking but would be valuable for identifying other antecedents of IH.

Future research could also measure the influence played by different information quality dimensions identified in this study on IH in the service context.

Finally, we believe that cultural differences in consumers' information processing should be explored. For instance, it is plausible to expect that consumers from different culture and countries seek, process, and evaluate IH differently.

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Figure 1. Theoretical framework.

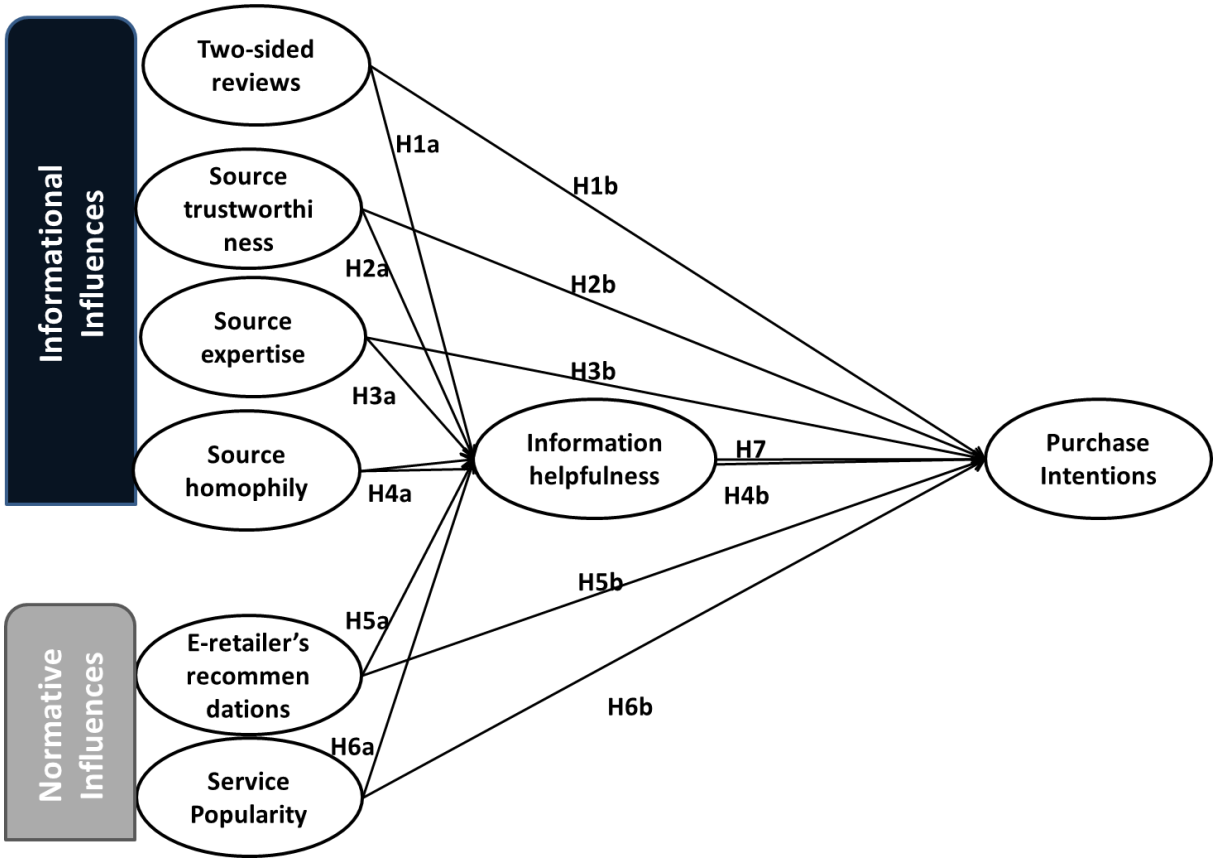


Table 1. Literature review. Antecedents of review helpfulness.

Author	Sample, website, and product/service type	Method of analysis	Key findings
Mudambi and Schuff (2010) [52]	1,587 reviews from Amazon. Search (digital camera, cell phone, laser printer) and experience products (music CD, MP3 player, video game).	Regression analysis	Extreme reviews, review length (word count), and product type influence review helpfulness. Product type acts as a moderator. Word count is a highly significant predictor of helpfulness for both experience and search goods. Extreme ratings are less helpful than reviews with moderate ratings for experiential goods.
Pan and Zhang (2011) [59]	Study 1: 40,000 reviews from Amazon. 300 products Study 2: 490 reviews from Amazon of video games and camera.	Regression analysis and content analysis	Longer and more positive reviews are more helpful than shorter and negative ones. For products with a small number of reviews, each review is particularly helpful due to the scarcity of information available. An inverted-U-shaped relationship between expressed reviewer innovativeness and review helpfulness is found.
Ghose and Ipeirotis (2011) [30]	Data about the economic transactions on Amazon.com of top sellers among audio and video players, digital cameras, and DVDs.	Econometric, text mining, and predictive modeling techniques	Subjectivity, informativeness, readability, and linguistic correctness in reviews matters in influencing sales and perceived usefulness. Reviews that have a mixture of objective, and highly subjective sentences are negatively associated with product sales, compared to reviews that tend to include only subjective or only objective information.
Cao et al. (2011) [11]	3,460 user reviews for 87 software programs in CNETD.	Text mining techniques	Reviews with extreme opinions receive more helpfulness votes than those with mixed or neutral opinions.
Korfiatis et al. (2012) [46]	37,221 book reviews collected from Amazon.	Regression analysis	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) [68]	3,000 reviews from Yelp of products (furniture stores) and services (restaurants and beauty spas)	Regression analysis	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) [66]	Experiment with 168 University students. Reviews of Multimedia speakers	Experiment	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.
Baek et al.(2012) [4]	75,226 online consumer reviews from Amazon from 28 product categories.	Regression analysis	Review rating, reviewers' credibility (peripheral cues), and the content of reviews (central cues), influence the helpfulness of reviews. High-ranked reviewers, lengthy reviews and reviews with a frequent use of negative words or that are consistent with the average rating are most helpful. Real name exposure alone does not enhance reviewers' credibility.
Filieri (2015) [27]	Survey of 354 users of consumer reviews for accommodations and restaurants.	Structural equation modeling	Source credibility, information quality, overall ranking score, and customer ratings affect information diagnosticity.
Park and Nicolau (2015)	5,090 reviews from Yelp.com of 45 restaurants in London	Regression analysis	Consumers perceive extreme ratings (positive or negative) as more useful and enjoyable than moderate ratings, giving rise to a U-shaped line,

[62]	and New York.		with asymmetric effects: the size of the effect of online reviews depends on whether they are positive or negative.
Liu and Park (2015) [52]	They use 5,090 reviews from Yelp of 35 restaurants in London and of 10 restaurants in New York	Regression analysis	They found that the number of friends, Elite awards, and fans (connoting the reviewer's reputation), the star rating, the squared star rating and word count had a positive influence on helpful votes. They also found that perceived enjoyment, when added to the equation, highly contributed to explain the dependent variable, while review complexity had no effect on review usefulness.
Ahmad and Laroche (2015) [1]	Reviews from Amazon.com	Latent semantic analysis and experiment	Happiness in the review has a positive effect on helpfulness of the review. Happiness in the review is more helpful than hope in the review. Anxiety is negatively related with review helpfulness. Disgust in the review has a positive effect on helpfulness of the review and is more helpful than reviews with anxiety feelings. Certainty expressed through these emotions mediates the effect of emotions on the helpfulness vote.
Chua and Banejee (2015) [16]	They use 7.897 reviews of 150 books collected from Amazon.com	Regression analysis	Reviewer profile and review depth are positively linked with review helpfulness but negatively related to review rating. Users seem to prefer reviews posted by reviewers with a positive track record.
Quaschning et al. (2015) [67]	They use review data of 1,300 online reviews for 117 different books from Amazon.com; 160 undergraduate students from Ghent University with a 2 (review valence) x 3 (context valence) between-subjects design	Multilevel regression analysis	They found that consistent reviews are perceived as more helpful than inconsistent reviews, independent of them being positive or negative.
Fang et al. (2016) [23]	They use 19,674 online reviews of 106 attractions within a tourism destination (i.e., New Orleans) from TripAdvisor.	Regression analysis	They found that some reviewer characteristics, namely reviewers writing more reviews stressing positive sides (i.e., mean rating higher than mode rating), and some review characteristics, such as review readability and extremity, predicted review helpfulness.
Hong et al. (2017) [38]	Literature review	Meta-analysis	They found that review depth, review age, reviewer information disclosure, and reviewer expertise have positive influences on review helpfulness. Review readability and review rating are found to have no significant influence on review helpfulness.
Karimi and Wang (2017) [45]	They use a sample of 2,178 reviews from mobile gaming applications.	Regression analysis	They found that the reviewer profile image affect review helpfulness. They also found that review length moderates the effect of reviewer profile on review helpfulness.
Fong et al. (2017) [28]	They use 500 reviews of a hotel on TripAdvisor.	Content analysis, three-way log-linear analysis.	They found that dual- (vs. single-) valence reviews appear more frequently in extremely negative than extremely positive ratings, but less frequently in moderately negative than moderately positive ratings. Men posted more dual-valence reviews than women when the rating was extremely negative.

Table 2. Items used in the study, Cronbach's α, CR, factor loadings, and CFA results.

Construct	Items	α	CR	Factor Loadings*
Two-sided reviews (TWOSIDED)	1.Discuss both the pros and cons of a service 2.Two-sided (contains positive and negative comments)	0.750	0.763	0.910 0.831
Source Expertise (SE)	1. Credible 2. Experienced	0.839	0.836	0.825 0.870
Source Trustworthiness (ST)	1.Trustworthy 2. Reliable	0.899	0.872	0.877 0.881
Source Homophily (HOMO)	1. Have the same experiences as I do 2. Have the same values as I do 3. Have the same viewpoints as I do 4. Have the same preferences as I do	0.930	0.935	0.883 0.913 0.955 0.849
eTailer Recommendation (eTailRECOM)	1. I look at the recommendations provided by this website to make up my mind 2. The recommendations provided by this website are helpful because they allow me to identify the best services 3.This website's recommendations facilitate my choice of the service I'm going to buy 4. I trust the recommendations of this website 5. I rely on the service recommended by this website a lot	0.921	0.931	0.844 0.892 0.854 0.847 0.834
Service Popularity (POP)	1. The higher the number of reviews, the more popular the service is 2. The more the reviews, the easier is to evaluate service's quality 3. It makes me feel more confident about the service's quality when many people have reviewed it	0.843	0.862	0.829 0.779 0.858
Information Helpfulness (INFOHELP)	1. Provided valuable tips on services 2. Was helpful for me to evaluate the service I was planning to book 3. Was helpful to familiarize myself with the service I was planning to book 4. Was helpful for me to understand the performance of the service provider I was planning to book	0.913	0.923	0.897 0.822 0.917 0.822
Purchase Intentions (PUR)	1. If I was shopping for service, the likelihood I would purchase the service on this website is high 2. My willingness to buy a service from this website would be high if I was shopping for such a service 3. The probability I would consider buying the service is high	0.892	0.926	0.898 0.886 0.911
χ^2 = 707.43, IFI = 0.950, CFI = 0.950, TLI = 0.942, RMSEA = 0.055				

*****Factor Loadings of Rotated Component Matrix. Extraction Method: Maximum Likelihood Rotation Method: Varimax with Kaiser Normalization.

Table 3. Means, SD, correlations, and average variance extracted (AVE).

Variable	Mean	SD	1	2	3	4	5	6	7	8
1. TWO-SIDED	5.1	1.024	**.759**	-	-	-	-	-	-	-
2. SE	4.9	1.028	.447	**.719**	-	-	-	-	-	-
3. ST	4.9	1.104	.395	.690	**.773**	-	-	-	-	-
4. SH	4.6	0.959	.347	.548	.608	**.743**	-	-	-	-
5. POP	5.2	1.130	.584	.464	.414	.270	**.677**	-	-	-
6. eTailRECOM	4.6	1.175	.316	.440	.465	.521	.267	**.730**	-	-
7. INFOHELP	5.2	1.029	.603	.535	.453	.306	.683	.318	**.749**	-
8. PUR	5.0	0.987	.341	.490	.450	.474	.404	.495	.424	**.807**

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

Table 4. Cross loadings.

ITMES	TWO-SIDED	INFOHELP	SH	POP	PUR	SE	ST	eTailRECOM
SH_1	0.315	0.200	**0.893**	0.244	0.429	0.503	0.550	0.430
SH_2	0.339	0.266	**0.928**	0.220	0.444	0.509	0.556	0.490
SH_3	0.305	0.269	**0.932**	0.229	0.448	0.497	0.547	0.464
SH_4	0.346	0.321	**0.894**	0.274	0.464	0.496	0.564	0.509
TWO-SIDED_1	**0.848**	0.499	0.256	0.483	0.304	0.367	0.313	0.281
TWO-SIDED_2	**0.933**	0.578	0.367	0.578	0.448	0.431	0.395	0.287
PUR_1	0.363	0.435	0.431	0.373	**0.822**	0.476	0.435	0.447
PUR_2	0.372	0.426	0.401	0.425	**0.866**	0.453	0.438	0.397
PUR_3	0.383	0.464	0.433	0.430	**0.892**	0.456	0.433	0.393
PUR_4	0.392	0.453	0.441	0.411	**0.902**	0.493	0.433	0.398
SE_1	0.396	0.480	0.543	0.392	0.515	**0.932**	0.761	0.445
SE_2	0.442	0.514	0.476	0.465	0.486	**0.923**	0.742	0.378
ST_1	0.393	0.417	0.584	0.398	0.468	0.772	**0.948**	0.458
ST_2	0.371	0.445	0.571	0.386	0.479	0.765	**0.950**	0.425
eTailRECOM_1	0.285	0.352	0.431	0.304	0.440	0.419	0.408	**0.869**
eTailRECOM_2	0.242	0.284	0.389	0.243	0.372	0.361	0.349	**0.858**
eTailRECOM_3	0.295	0.332	0.415	0.249	0.400	0.401	0.405	**0.862**
eTailRECOM_4	0.261	0.189	0.523	0.152	0.378	0.360	0.420	**0.867**

eTailRECOM_5	0.282	0.249	0.491	0.213	0.431	0.377	0.426	**0.869**
INFOHELP_1	0.490	**0.869**	0.322	0.588	0.485	0.467	0.384	0.329
INFOHELP_2	0.582	**0.874**	0.203	0.621	0.417	0.437	0.377	0.221
INFOHELP_3	0.523	**0.905**	0.256	0.619	0.430	0.498	0.431	0.287
INFOHELP_4	0.557	**0.884**	0.276	0.594	0.465	0.483	0.412	0.309
POP_1	0.522	0.530	0.303	**0.818**	0.386	0.393	0.357	0.246
POP_2	0.522	0.612	0.212	**0.896**	0.427	0.398	0.362	0.285
POP_3	0.531	0.647	0.186	**0.901**	0.417	0.415	0.362	0.178

Table 5. Heterotrait–monotrait ratio (HTMT).

	TWO-SIDED	INFOHELP	SH	POP	PUR	SE	ST
INFOHELP	0.733						
SH	0.416	0.333					
POP	0.747	0.784	0.302				
PUR	0.513	0.566	0.537	0.542			
SE	0.563	0.613	0.621	0.555	0.623		
ST	0.485	0.506	0.668	0.478	0.560	0.938	
eTailRECOM	0.382	0.354	0.562	0.306	0.517	0.505	0.515

Table 6. Structural equation modeling results.

Goodness of Fit of the Model		Hypotheses	Relationship	Standardized regression weight *(β)*	*t*	Supported vs. Rejected
x^2/df	2.438	**H1a**	TWO-SIDED→ INFOHELP	0.252***	4.068	Supported
CFI	0.947	**H2a**	ST → INFOHELP	-0.305$^{n.s.}$	-1.755	Rejected
NFI	0.918	**H3a**	SE → INFOHELP	0.552**	2.841	Supported
TLI	0.939	**H4a**	HOMO → INFOHELP	-0.033$^{n.s.}$	-0.686	Rejected
IFI	0.947	**H5a**	eTailRECOM→INFOHELP	0.047$^{n.s.}$	1.255	Rejected
RMSEA	0.056	**H6a**	POP → INFOHELP	0.452***	6.531	Supported
Chi-Square	754.932	**H7**	INFOHELP → PUR	0.474***	10.373	Supported

*Note: *** indicates p < 0.001, ** indicates p < 0.005, * indicates p < 0.05.*

Table 7. Mediation analysis: bootstrapped mediator models.

Relationships	Direct effect without mediator	Direct effect with mediator	Indirect effect CI at 95% Upper bounds	Indirect effect CI at 95% Lower bounds	Mediation type observed
H1b TWOSIDED → INFOHELP→ PUR	-0.011 n.s.	-0.036 n.s.	0.473	0.242	Indirect mediation
H2b ST → INFOHELP→ PUR	-0.044 n.s.	-0.039 n.s.	0.038	-0.653	Not significant
H3b SE → INFOHELP→ PUR	0.210*	0.166*	0.208	0.065	Partial mediation
H4b SH → INFOHELP→ PUR	0.193*	0.168*	0.223	0.074	Partial mediation
H5b eTailRECOM → INFOHELP→ PUR	0.272*	0.219*	0.095	-0.003	Not significant
H6b POP → INFOHELP→ PUR	0.207*	0.135*	0.425	0.156	Partial mediation

Notes: **significant at $p < 0.01$; *significant at $p < 0.05$; NS: not significant

Table 8. Summary of findings.

Hypotheses	Nature of the influence	Description of hypotheses	Result
H1a	Informational influence	Two-sided information positively influences perceived information helpfulness.	Supported
H1b		Two-sided information positively influences consumers' purchase intentions.	Rejected
H2a		Perceived source trustworthiness positively influences information helpfulness.	Rejected
H2b		Perceived source trustworthiness positively influences consumers' purchase intentions.	Rejected
H3a		Perceived source expertise positively influences information helpfulness.	Supported
H3b		Perceived source expertise positively influences consumers' purchase intentions.	Supported
H4a		Perceived source homophily positively influences information helpfulness.	Rejected
H4b		Perceived source homophily positively influences consumers' purchase intentions.	Supported
H5a	Normative Influence	E-tailers' recommendations positively influence information helpfulness.	Rejected
H5b		E-tailers' recommendations positively influence consumers' purchase intentions.	Rejected
H6a		Service popularity positively influences perceived information helpfulness.	Supported
H6b		Service popularity positively influences consumer purchase intentions.	Supported
H7		Information helpfulness positively influences consumers' purchase intentions.	Supported
H8	Mediation effect	Information helpfulness mediates the relationship between informational and normative influences on purchase intentions.	Partially Supported

Appendix 1

Scale development process

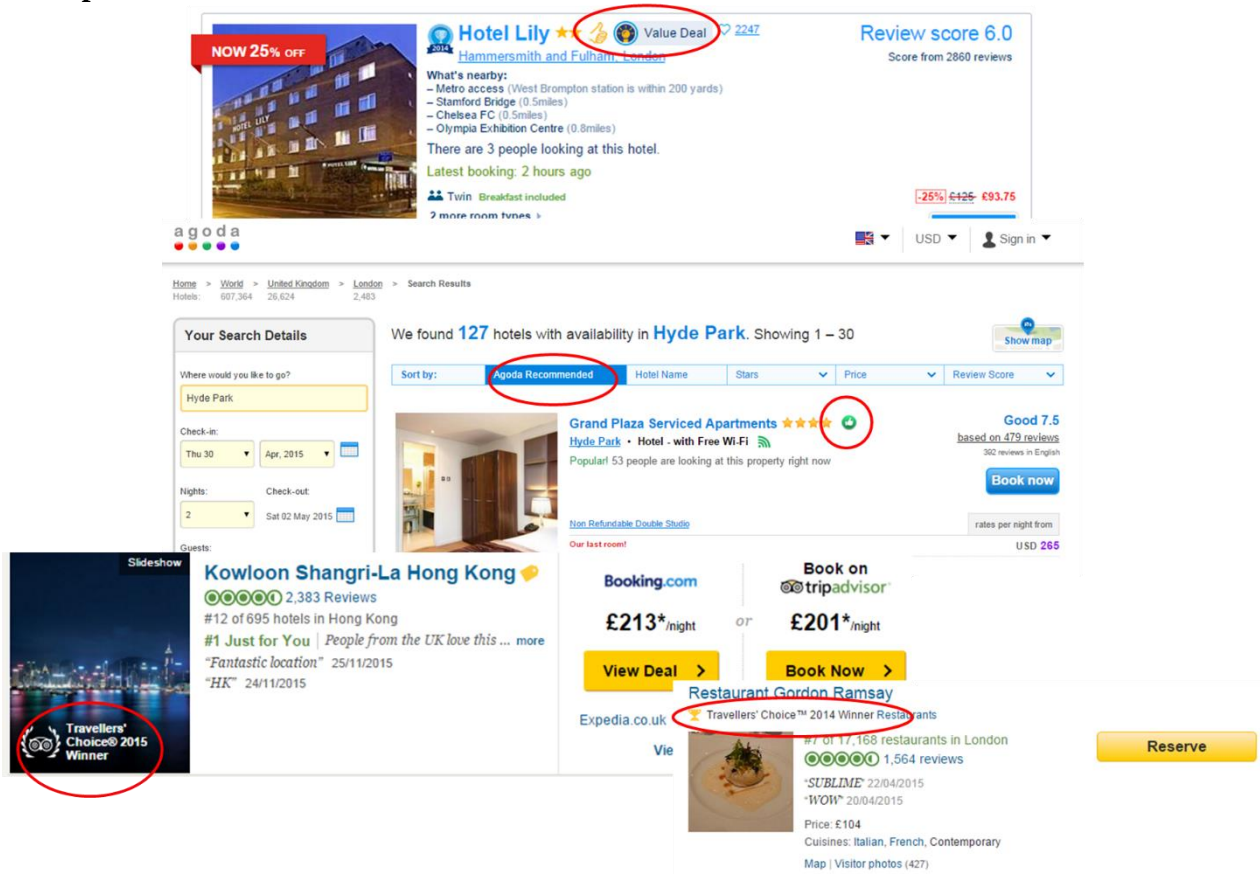
The newly developed items were included in the questionnaire that was pilot tested two times: the first time with six academics with expertise in survey design, and the second time with a convenience sample of 51 users of e-retailer's websites publishing consumer reviews of accommodation and restaurants. The pilot test enabled improvement and refinement of the items and constructs used in the study.

Exploratory factor analysis by principal component analysis using Varimax rotation was performed. Using factor loadings of 0.5 or higher, low commonalities below 0.30 and Cronbach's α and composite reliability values above the threshold of the 0.60 benchmark proposed by Bagozzi and Yi (1988), we tested the validity and reliability of the newly developed scales. This test led to the deletion of some items (e.g., two items for popularity signals).

The Kaiser–Meyer–Olkin sampling adequacy coefficient was 0.917, which is classed as meritorious (Hair et al. 2010) and indicates that the matrix is factorable, and the assumptions for carrying out factor analysis were met. The remaining items were used to perform subsequent explanatory factor analysis with the final sample.

Examples of the pictures included in the questionnaire

Example of e-seller's recommendations



Example of popularity signals

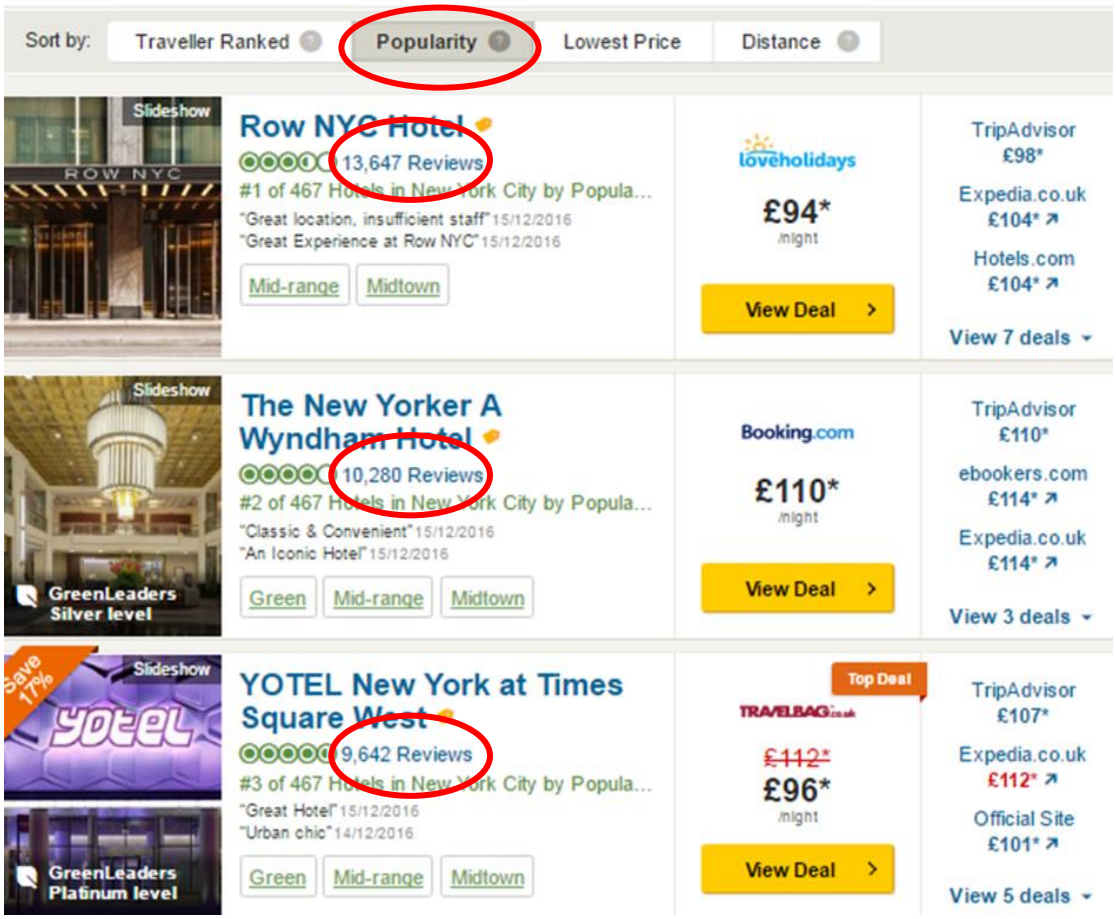


Table X. Alternative structural equation modeling (excluding source trustworthiness).

Goodness of fit of the model		**Hypotheses**	**Relationship**	**Standardized regression weight** *(β)*	***t***	**Supported vs. Rejected**
x^2/df	2.814	**H1a**	TWO-SIDED→ INFOHELP	0.253***	4.069	Supported
NFI	0.915	**H3a**	SC → INFOHELP	0.264**	4.466	Supported
TLI	0.933	**H4a**	HOMO → INFOHELP	-0.073$^{n.s.}$	-1.625	Rejected
IFI	0.942	**H5a**	eTailRECOM→ INFOHELP	0.047$^{n.s.}$	1.260	Rejected
RMSEA	0.057	**H6a**	POP → INFOHELP	0.452***	6.483	Supported
Chi-Square	696.531	**H7**	INFOHELP → PUR	0.474***	10.388	Supported

*Note: *** indicates p < 0.001, ** indicates p < 0.005, * indicates p < 0.05.*