SIMULTANEITY AND INTERACTIVITY OF THE EFFECTS OF COMMUNICATION ELEMENTS ON CONSUMERS' DECISION MAKING IN EWOM SYSTEMS

Xinwei Wang
Department of Information Systems and Operations Management
University of Auckland
New Zealand
xinwei.wang@auckland.ac.nz

Hock-Hai Teo
Department of Information Systems
National University of Singapore
Republic of Singapore
disteohh@nus.edu.sg

Kwok Kee Wei
Department of Information Systems
City University of Hong Kong
Tat Chee Avenue, Kowloon, Hong Kong
isweikk@cityu.edu.hk

ABSTRACT

Electronic word-of-mouth (EWOM) systems have become an inalienable and indispensable part of electronic commerce and evolved into a rich information environment that contain a set of communication elements. Understanding how these communication elements operate simultaneously to shape consumers' decision with the product in the EWOM context is a prerequisite for designing value-adding EWOM systems. Drawing on Elaboration Likelihood Model and the additivity and the bias hypotheses, we document the roles of multiple communication elements in EWOM systems, namely the product review, the informant profile, the peer rating indicator, and the informant status indicator, in affecting a consumer's acceptance of the product in an EWOM system. Through an experimental study, we observe that the acceptance of the product is positively affected by the diagnosticity of the product review and the informant's credibility. The diagnosticity of the review is in turn affected by the congruence between its coverage and the consumer's personal consumption needs. Informant credibility is influenced by the concentration of the informant's past information contribution on the focal product category and this relationship is moderated by the system artifact that displays the informant's status.

Keywords: Electronic word-of-mouth; Diagnosticity; Informant credibility; Recommendation acceptance; Elaboration Likelihood Model

1. Introduction

Information systems that support consumption experience sharing among ordinary consumers have been widely incorporated in electronic commerce platforms (e.g., Amazon.com). Mobilizing and facilitating electronic word-of-mouth (EWOM), these EWOM systems help consumers gain product knowledge and make purchase decisions [Dellarocas 2003; Kumar & Benbasat 2006]. A typical EWOM system constitutes a rich communication environment encompassing various communication elements. Specifically, it not only presents basic product information (e.g., descriptions, specifications, photos, etc.), but also contains (1) product reviews that describe product features, detailed consumption processes and the consumer's perception of and attitude toward the product, (2) profiles of informants (i.e. consumers who submit product reviews to the EWOM system) such as their total number of review contributions, past product reviews, etc., and (3) system artifacts such as peer rating indicators and informant status indicators that are meant to facilitate or enhance one's processing of product reviews and informant profiles (refer to Figure 1 for examples of EWOM communication elements).

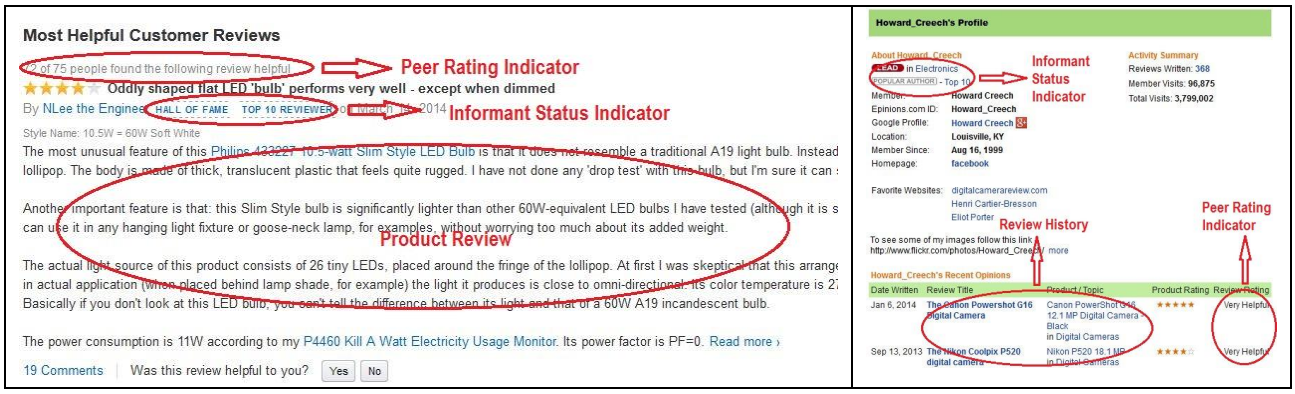

Figure 1: Examples of EWOM Communication Elements

While the prevalence of EWOM systems in e-commerce has led to phenomenal growth of EWOM literature, how the various communication elements (i.e., the review itself, the information related to the informant, and system artifacts) simultaneously operate when consumers process EWOM in order to make consumption decisions has received scant attention. The extant EWOM literature has mainly focused on the characteristics of product reviews in influencing EWOM communications and other important communication elements have been largely neglected. In an attempt to fill this knowledge gap, the present study investigates the simultaneity and mutual interrelatedness of the effects of various communication elements on consumers' decision making in EWOM systems. Specifically, we explore how product reviews, informant profiles, peer rating indicators, and informant status indictors would shape consumers' decision with the product presented in the EWOM system.

We approach the study by conceptualizing EWOM communications as a persuasion process in which EWOM systems attempt to shape potential consumers' attitude to and decision with a product using informants' product reviews. In this persuasion process, the relative centrality of various communication elements in affecting consumers' product attitude is different. Thus, we draw on the Elaboration Likelihood Model (ELM) [Petty & Cacioppo 1986a; Petty & Cacioppo 1986b] to investigate the roles of EWOM communication elements. ELM posits that an individual's attitude toward a persuasive attempt can develop along a central route whereby one systematically and thoughtfully scrutinizes all relevant information associated with the message or along a peripheral route whereby one effortlessly attends to communication cues and makes an inference based on heuristic rules. We map the roles of representative communication elements in EWOM systems to ELM and predict that they would influence consumers' product decisions either in a central or a peripheral manner. Furthermore, we employ the additivity and the bias hypotheses [Chaiken & Maheswaran 1994] to more precisely explain the complex relationship among communication elements in EWOM systems. The two hypotheses supplement ELM and propose that under some conditions, peripheral cues can coexist with central cues to influence decision making. The additivity hypothesis posits that peripheral cues can have an additive effect on the formation of attitude toward a persuasive attempt when central cues are operating. The bias hypothesis suggests the moderating effects of peripheral cues such that the effects of central cues in persuasive communications can be strengthened or weakened by peripheral cues. With the additivity and the bias hypotheses, we delineate how the central and the peripheral communication elements in an EWOM system would interplay to affect consumers' decisions with the product.

The study extends EWOM literature by showing clearly the interactive and complementary relationship among various communication elements in EWOM systems. It contributes to theory building surrounding EWOM systems by employing ELM in two distinct ways. First, extending the one-level application of ELM in extant research (e.g., [Tam & Ho 2005]), we classify typical EWOM communication elements into central or peripheral cues and organize them into a two-level hierarchical structure. On the first level, one's product attitude in EWOM communications is based on the assessment of a central cue – product review diagnosticity, and a peripheral cue – informant credibility. On the second level, the central and peripheral cues on the first level have their own central and peripheral cues respectively. Specifically, product review diagnosticity is shaped by a central cue, the congruence between one's consumption needs and the product information contained in the product review and a peripheral cue, the peer rating indicator. Similarly, informant credibility is influenced by a central cue, the concentration of the informant's past product reviews on the focal product category, and a peripheral cue, the informant's status indicator. Second, unlike past studies that implicitly view central cues and peripheral cues to operate exclusively, we apply the additivity and the bias hypotheses to explore the simultaneity and interactivity of the operations of these two types of cues. By

explicating the roles of these communication elements in EWOM systems, we contribute to a deeper understanding of what system information and artifacts are valuable to consumers' decision-making. System practitioners could accordingly design and fine-tune EWOM systems to increase their value to potential consumers and informants alike.

2. Theoretical Background

2.1. Electronic Word-of-Mouth Systems

Table 1: A Summary of Studies of the Effects of EWOM on Consumers' Decision Making

Study	Study Object	Communication Elements Studied			Level of Analysis
		Review	Informant	System Artifacts	
Ba & Pavlou (2002)	Sellers in Auction	-	-	Seller ratings	Collective
Chevalier and Mayzlin (2006)	Product/Movie	-	-	Product ratings	Collective
Clemons et al. (2006)	Product/Beer	-	-	Product ratings	Collective
Duan et al. (2008)	Product/Movie	-	-	Product ratings	Collective
Forman et al. (2008)	Product/Book	-	Self-disclosed identity information	Product ratings and peer rating indicator	Collective
Pavlou and Dimoka (2006)	Sellers in Auction	Contents - sellers	-	-	Collective
Qiu et al. (2012)	Product/ Speaker	Contents - valence	-	Product rating	Individual
Mudambi & Schuff (2010)	Product/6 different products	-	-	Product rating	Collective
Jensen et al. (2013)	Product/CD	Contents - lexical characteristics	-	-	Individual
Benlian et al. (2012)	Product/Digital Camera	Compared to seller recommendation	-	-	Individual

An EWOM system is an Internet-based information system that publishes product reviews generated by ordinary consumers based on their real consumption experiences. The importance of EWOM systems in e-commerce has been well recognized [Dellarocas 2003; Kumar & Benbasat 2006] because they can facilitate consumers to gain product knowledge and make consumption decisions even when they are separated from sellers and unable to interact with the products. For many consumers, a product purchase is in many ways not the purchase of a physical good itself but of an experience that the goods afford [Pine & Gilmore 1998]. Consumers tend to look beyond the factual attributes and acquire more information of product features that unfold during the consumption process [Holbrook & Hirschman 1982; West & Broniarczyk 1998] when making decisions. Thus, product reviews in EWOM systems are a valuable informational source that could assist consumers to assess products thoroughly and make better informed consumption decisions [Benlian et al. 2012; Ghose & Ipeirotis 2007; Mudambi & Schuff 2010].

Given the important role of EWOM systems in e-commerce, practitioners have devised many system features in an attempt to increase its effectiveness. These features have led EWOM systems to evolve into a rich communication environment. They not only present EWOM information in the form of product reviews, but also provide information about the source of the EWOM, which is referred to as informants, and a set of system artifacts, including the peer rating indicator and informant status indicator.

The fast development of EWOM in e-commerce has attracted much research with a predominant focus on numerical ratings of products. Effects of other important communication elements in EWOM communication, including those related to product reviews and informants, have largely been unexplored (See Table 1 for a summary of EWOM literature).

2.2. Literature on Elaboration Likelihood Model (ELM)

EWOM systems provide a platform where a potential consumer's attitude to and decision with a product are influenced by other people's consumption experiences. Toward this end, the Elaboration Likelihood Model (ELM) [Petty & Cacioppo 1986a], which explains how an individual's attitude toward a communication target (e.g., a product) develops, represents a good fit with our research context.

ELM proposes that individuals may follow two routes when assessing communication targets. A central route is taken when the individual's assessment of the target is based on systematic, effortful, and cognition-intensive elaboration of the information associated with the target. The peripheral route is followed when the individual engages in less thoughtful processing and attitudinal change is triggered by peripheral cues that are not central to the true merits of the target. While the majority research employing ELM has viewed central cues and peripheral cues as operating exclusively such that one takes either the central route or peripheral route at any point in time, there is evidence that the two routes can co-exist [Chaiken & Maheswaran 1994; Kang & Herr 2007; Loken 2006; Petty & Cacioppo 1986b]. Chaiken and Maheswaran [1994] proposed the additivity and the bias hypotheses to account for the two forms of co-existence of central and peripheral routes.

The additive co-existence proposition states that peripheral cues can influence judgments directly and independently [Chaiken & Maheswaran 1994]. In this case, peripheral cues operate as central cues such that individuals would process them thoughtfully [Petty & Cacioppo 1986b]. Kirmani and Shiv [1998] documented that peripheral cues could be elaborated and processed carefully and therefore could shape attitude when they are perceived to be relevant to the information being conveyed and when individuals' cognitive resources are relatively high. Specifically, information source, which is generally viewed as a peripheral cue, may function as a persuasive argument if the information from that source is central to the evaluation of the true merit of a target regardless of the availability of cognitive resources [Petty & Cacioppo 1986b; Puckett et al. 1983].

The bias co-existence proposition describes the interdependence of central and peripheral routes where peripheral processing may bias the effects of central cues [Chaiken & Maheswaran 1994]. Individuals may use peripheral cues to determine the allocation of cognitive resources for the processing of central cues [Heesacker et al. 1983; Petty & Cacioppo 1986b; Puckett et al. 1983]. Studies suggest a cross-route [Scholten 1996] where peripheral cues interact with central cues such that, compared to unattractive ones, attractive peripheral cues will enhance the processing of central cues and therefore strengthen their effects. Additionally, peripheral cues may help establish expectancies on the communication target and thus bias the interpretation of central cues [Chaiken et al. 1989; Chaiken & Maheswaran 1994]. One may engage in a two-stage processing of an unfamiliar target. First, an initial attitude is formed based on the peripheral cue. A favorable peripheral cue would lead to more positive attitude [Chaiken & Maheswaran 1994]. Carrying the initial attitude, the individual will then proceed to the second stage to process the central cue. The positive baseline attitude induced by the peripheral cue would be strengthened if the central cue is also strong and favorable. The attitude formed under the combined influences of favorable peripheral and central cues will be more positive than that formed under the influence of any single type of cues.

2.3. Application of ELM in EWOM Communication

ELM and the additivity and the bias hypotheses, which predict communication outcomes through examining the individual's cognitive processing of communication arguments and cues, form our theoretical foundation. We conceptualize that a consumer's decision with the product presented in the EWOM system hinges on the characteristics of the product review and the informant. In this evaluation process, the former acts as a central cue and the latter a peripheral cue. This classification maps to the ELM literature in which the information is viewed as a central cue and the source of the information is viewed as a peripheral cue.

ELM suggests that, when one is taking a central route, one's attitude to a communication target is a function of the quality and strength of the persuasion argument associated with the target [Petty and Cacioppo 1986a]. In the EWOM context where product reviews serve as the arguments for a product, their quality is mainly reflected in review diagnosticity, which refers to their ability to enable consumers to obtain information pertaining to the characteristics of the product [Qiu et al. 2012]. Thus, we focus on review diagnosticity as the central cue influencing consumers' decision with the product in an EWOM system. Further, we explore what review characteristics could affect a review's diagnosticity. Prior research has revealed that product review content characteristics, such as its depth (number of words), and valence (positive vs. negative), can influence the attitude toward the review [Jensen et al. 2013; Mudambi & Schuff 2010; Qiu et al. 2012]. However, in the relatively large body of EWOM literature, the effect of whether the contents can address a particular consumer's consumption needs on his/her evaluation of the review has not been explored. Given consumption is often goal-driven and consumer information search prior to consumption is therefore also driven by the goal, whether such information seeking goal can be satisfied by the review could determine a consumer's evaluation of the review. Thus, we focus on the congruence between a consumer's consumption needs and product information in the review as the review characteristic influencing

review diagnosticity.

EWOM literature has also documented the effect of EWOM informants' credibility on consumers' evaluation of the products they have endorsed [Chang & Wu 2014; Jensen et al. 2013]. Because the information about informants is limited in EWOM due to its anonymity nature, it is interesting to identify the factors that influence one's evaluation of the credibility of an informant. In this study, we suggest that informants' objective review history recorded in the EWOM system would act as an important cue signaling the informant's credibility.

We also investigate the effects EWOM system artifacts on consumers' evaluation of product review and informant. Specifically, we focus on peer rating indicators and informant status indicators. Peer rating indicators are created in EWOM systems to reflect the usefulness of a product review based on the evaluations from peer consumers who have read and/or utilized the review. They report the aggregate usefulness perceptions from peer consumers. Informant status indicators are used to demonstrate an informant's status within the system based on the system's assessment of the informant's contribution and/or expertise. We focus on peer rating indicators and informant status indicators for two reasons. First, they are two widely implemented artifacts in EWOM systems. On the one hand, these indicators can serve as recognition of the informant's contribution and achievement and thus motivate further contribution. On the other hand, they may also help other consumers evaluate product recommendations. However, to date, the effects of peer rating and informant status indicators on consumers' decision making have not been examined in tandem. Second, the two types of indicators have strong conceptual linkages with product reviews and informant profiles, the two key communication elements in EWOM systems. Hence, they may play a pivotal role in consumers' decision processes.

In what follows, we integrate the ELM, the additivity and the bias hypotheses, and the EWOM literature to theorize the relationships among the identified EWOM communication elements and develop our research model, which is depicted in Figure 2.

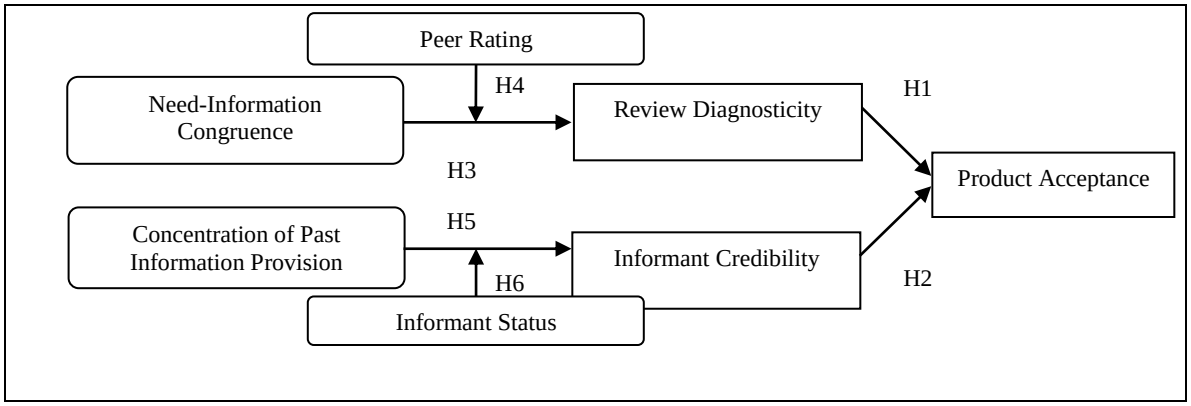

Figure 2: Research Model

3. The Evaluation of Product in EWOM Systems

3.1. Review Diagnosticity and its Effect on Product Acceptance

Consumption is a goal-driven process through which consumers' needs are satisfied. To make a purchase decision, consumers often need to diagnose whether and how well a product can meet their consumption expectations, especially for features and performance that unfold during the consumption process [Kempf & Smith 1998]. The trend of experience economy [Pine & Gilmore 1998] has further increased the value of the information that can facilitate consumers to diagnose the consumption experiences the product can afford. Diagnosticity describes the extent to which a product interaction enables one to judge experiential attributes of the product [Kempf & Smith 1998; Qiu et al. 2012]. It is determined by the perceived correlation between the product information and the judgment a potential consumer's needs to make [Qiu et al. 2012]. For instance, when buying a dress, in addition to factual information such as its size and materials, a consumer may also want to know the texture of the material and whether it is comfortable to wear. The best way to assess these features is through a direct interaction with the product. Thus, fostering a diagnostic interaction process has been suggested as an important marketing strategy to enhance consumers' product attitude [Kotler 1988; West & Broniarczyk 1998].

However, the separation between the consumer and the product in e-commerce poses a challenge for gaining diagnostic product information through direct product interactions. EWOM systems have been developed as a solution to help potential consumers diagnose whether a product can afford the expected consumption experience.

To the extent that product reviews in EWOM systems reproduce informants' product interaction processes, they can bridge the interaction gap between consumers and products. Although unable to interact with a product directly, consumers can learn about product features and evaluate product performance by reading product reviews.

According to ELM, central cues are those that can reveal the true merits of a communication target. In EWOM communications, the target is the product and the associated product reviews serve as supporting arguments to justify informants' product attitude. Therefore, we propose that a product review would operate as a central cue in influencing a consumer's evaluation of the product. Furthermore, we recognize that, just as conventional WOM information has differential levels of diagnosticity [Herr et al. 1991], product reviews may vary in their inherent ability in conveying product features and performance [Ghose & Ipeirotis 2007]. A product review could be more diagnostic when it contains product information that the consumer is interested than when it does not. For instance, when booking a hotel, a consumer might be concerned about the safety of the hotel's surroundings. A review containing the hotel's safety information could thus be perceived to be diagnostic.

ELM maintains that the central cues that contain substantial and well-grounded arguments in favor of the advocacy are more effective in producing attitudinal changes than the weak ones that provide superficial or less-cogent arguments. From consumers' standpoint, review diagnosticity reflects their subjective perception of the strength of the review in helping them evaluate whether the product can satisfy their unique needs. A diagnostic review would be the one that can address whether their personal consumption needs could be satisfied. On the contrary, a non-diagnostic review, though meant to support the recommendation, could not show clearly how the product would perform in the areas critical to a consumer. Thus, a diagnostic review can lead the consumer to form a more positive attitude toward the product, leading it to be adopted [Qiu et al. 2012] whereas a non-diagnostic review may render consumers uncertain about the product.

H1*: The diagnosticity of the product review will have a positive effect on the acceptance of the product presented in the EWOM system.*

3.2. Informant Credibility and its Effect on Product Acceptance

In EWOM communications, informants endorse a product as spokespersons. In informant-mediated communications, whether informants can effectively influence other people's attitude toward the communication target depends on their credibility [Gershoff et al. 2003; Grewal et al. 1994; O'Keefe 2002; Tormala et al. 2007; West & Broniarczyk 1998; White 2005]. O'Keefe [2002] indicated that informant credibility encompasses two dimensions – expertise and trustworthiness. Expertise reflects the extent to which the informant is in a position to know the truth of the product. Expert informants are expected to have needed knowledge backgrounds that enable them to develop accurate product evaluation formula, give thorough examinations of products, and provide objective descriptions and useful recommendations. Trustworthiness assesses whether informants are inclined to tell the truth of their own product perceptions [O'Keefe 2002]. A trustworthy informant is expected to have no intention to mislead the information recipient and therefore tell the truth of a product. Substantial studies have confirmed the positive effect of informant credibility, including both expertise and trustworthiness, on information acceptance (e.g. [Andrews & Shimp 1990; Chang & Wu 2014; Kang & Herr 2007]).

The ELM literature tends to view informant characteristics as peripheral cues that are unlikely to affect the evaluation of a persuasive attempt by a serious individual who has the necessary cognitive resources to process the persuasion. However, there is evidence that a peripheral source cue can be significant even when issue-relevant elaboration is high [Kahle & Homer 1985; Petty & Cacioppo 1986b]. The additivity hypothesis proposes that source characteristics, though more peripheral in nature compared to issue arguments, may serve as issue-relevant arguments and exert significant additive influence on attitude in the high elaboration condition [Kirmani & Shiv 1998]. They are effective because, just as central cues, they help individuals to believe that the communication is fairly grounded and therefore persuasive. We extend this additive effect of informants to our study. In EWOM contexts, informant credibility, though a peripheral cue, may act as an informative argument to affect a consumer's attitude to the product. Consumers' decisions with the product may depend on the credibility of the informant because the lack of formal control of information and informants in the system may give rise to consumers' concerns about the accuracy and validity of EWOM information.

Consumers tend to gauge an informant's expertise and knowledge bias regarding the product he or she endorses [Eagly et al. 1978]. Writing product reviews for EWOM systems will activate the informant's product knowledge structure, which will in turn guide the informant in retrieving product consumption information from memory. Expert informants tend to have a well-established knowledge structure of a category of products. The structure can comprehensively cover important product features and attributes that may be of interest to majority consumer [Murphy & Wright 1984]. On the contrary, due to their limited product interactions, novice informants may have incomplete product knowledge and are incognizant of the essential attribute structure of a product category. The differentiation in product knowledge between experienced and novice informants could lead the former to provide

relatively less biased information pertaining to product features and attributes than the latter. Conceivably, consumers would be more confident with the product that an experienced informant has endorsed.

Further, the absence of informant identity verification and the powerfulness of EWOM systems in influencing consumption may invite manipulative information from unethical vendors to mislead consumers [Dellarocas 2006; Miller et al. 2005] or reviewers with ulterior motives for intentional bragging or faultfinding [Sen & Lerman 2007]. Therefore, we expect that consumers would like to ensure that the EWOM information is from trustworthy informants. Consumers may question the validity of the product information in EWOM systems if they are not able to verify whether the sources have ulterior motives [DeCarlo 2005]. If consumers could somehow make sure that the informant is trustworthy, they would be less uncertain about the product information.

As the credibility of EWOM informant is defined by expertise and trustworthiness [O'Keefe 2002], both of which are expected to shape a consumer's attitude toward the communication target, we hypothesize,

H2*: The perceived informant credibility will have a positive effect on the acceptance of the product presented in the EWOM system.*

4. The Evaluation of Product Review in EWOM Systems

4.1. The Antecedent of Review Diagnosticity

According to ELM, central cues are associated with the true merits of a communication target. In the EWOM communication context, diagnostic product reviews should enable a consumer to accurately evaluate the product's attributes. However, given that a product generally has multiple attributes and different consumers often have varying preference weights for these attributes, it is conceivable that consumers may concentrate on different product attributes when evaluating product information. Therefore, product reviews in EWOM systems may vary in their abilities to convey product attribute information to consumers who often have a wide diversity of consumption needs and diagnostic product reviews should have a high level of relevance to a particular consumer's consumption needs. As ELM tends to view that message relevance affects persuasion through a central route [Kahle & Homer 1985; Petty & Cacioppo 1986b] , we propose that whether a product review is relevant to a consumer's consumption needs operates as a central cue to affect review diagnosticity.

Personal needs shape many aspects of consumption behavior [Stanton & Lowenhar 1974], including product information searching. Prior to considering a product and searching for relevant information, consumers tend to develop cognitive structures for product evaluation that arise from their personal consumption needs. During product evaluation, these cognitive structures are activated and consumers relate them to product information and focus on the performance of a product in the areas that pertain to their needs. If product information regarding their needs is available, they would be able to evaluate whether the product meets their needs. Thus the product information is perceived to be diagnostic, persuasive, and unambiguous. On the contrary, information diagnosticity is low if product information cannot allow consumers to evaluate the product's attributes that they are concerned about. Non-diagnostic product information would cause consumers to be unsure about the product's performance and to experience a difficult decision-making process.

In EWOM communications, if the informant only provides information about the product attributes in which he or she is interested in the review, the consumers whose preferences differ from those of the informant will be likely to find the review to be less diagnostic because they are not able to assess the product performance in the areas they deem important. Heterogeneity of consumption needs increases the possibility of mismatch of needs between an informant and a consumer. A product attribute that concerns the consumer most may not be equally important to the informant and thus may not be included in the informant's product review in the EWOM system. As diagnosticity assessment is task specific [Gershoff et al. 2001], a product review that is unable to facilitate the consumer to gain the needed product knowledge would be perceived as non-diagnostic. On the contrary, when the product attributes described in the EWOM review are congruent with the consumer's consumption needs, the consumer is able to diagnose the product through reading the review.

H3*: The congruence of a product review with the consumer's consumption need will heighten the perception of the diagnosticity of the review.*

4.2. The Effect of Peer Rating Indicators

Peer rating indicators, presented along with product reviews in EWOM systems, represent an endorsement for the reviews. The value of the indicator is computed based on other consumers' evaluations of usefulness of the focal product review. The peer rating indicator may trigger heuristic thinking that "as the product information is helpful to other consumers in their evaluation of the product, it should be useful to me too." Indeed, such heuristic rule could be confirmed by the social influence theory [Asch 1966; Cialdini 1993], which predicts that people tend to follow others' in decision making. Consumers may refer to other consumers' opinions on the review to decide whether it can allow them to diagnose the performance of the product.

Applying ELM, we conceptualize that a peer rating indicator would operate as a peripheral cue because it is not as central as review content to reflect the true merit of the product review. Consumers will not be able to evaluate whether the product review can address their consumption needs by merely referring to the helpfulness value. Thus the presence of a peer rating indicator would not affect diagnosticity assessment directly. Instead, it could affect consumers' processing of the more central communication element – the review content. The bias hypothesis suggests that a peripheral cue could produce inferences or expectancies of the probable validity of the persuasive message [Chaiken & Maheswaran 1994]. Thus, before reading the review for detailed product information, the consumer may rely on the peer rating indicator to form an expectation of the review [Forman et al. 2008]. A high helpfulness value of a review could predispose consumers to a more favorable attitude toward it. The resultant relatively high baseline attitude would then be updated after consumers scrutinize the product review. If the information contained in the product review matches their consumption needs, consumers would develop a more favorable attitude toward the review when the peer rating indicator carries a high score than when the indicator is unavailable because of the biased attitudinal baseline. When mismatch occurs, the initial attitudinal bias induced by the presence of the peer rating indicator may diminish because ultimately the review itself should be the most important basis of attitude formation.

H4*: The peer rating indicator will positively moderate the effect of the congruence of a product review with the consumer's consumption needs on review diagnosticity.*

5. The Evaluation of the Informant in EWOM Systems

5.1. The Antecedent of Informant Credibility

Consumers often assess informants by examining their past performance in product recommendations [Ganzach 1994; Gershoff et al. 2001]. For instance, movie critics' past ratings and opinions are used by filmgoers to gauge their ability, which in turn affects the acceptance of their recommendations [Gershoff et al. 2001; Gershoff et al. 2003; West & Broniarczyk 1998]. In our context, EWOM systems can identify and accumulate informants' review histories, which could be used by consumers to assess their credibility.

We suggest that the characteristics of EWOM informants' past reviews may serve as a central cue to indicate their credibility. Describing an informant's activities, the review history could be one of the limited and relatively objective cues that can provide clues about the informant's ability. Specifically, the concentration of product reviews from an informant on a particular product category could indicate that the informant might be experienced with and have an in-depth understanding of the product category, and would thus exhibit low knowledge bias. Meanwhile, an informant's reviews of different products in the same product category could demonstrate that he/she has no strong intention to promote a particular product, thus showing low reporting bias. Therefore, the concentration of product reviews on the focal product category would help a consumer to evaluate the credibility (including expertise and trustworthiness) of the informant.

H5*: The concentration of an informant's past reviews on the focal product category will heighten the perceived informant credibility.*

5.2. The Moderating Effect of Status Indicators in EWOM Recommendation

Status indicators such as "product advisor" or "top reviewer" are another set of system artifacts often implemented to help consumers assess informants in EWOM systems. These indicators, awarded to informants according to certain criteria stipulated by the systems, could be interpreted as an official certification and recognition of informants' abilities and achievements and positively enhance e-commerce participants' perception of exchange partners [Pavlou & Gefen 2004]. We propose that these indicators serve as peripheral cues for consumers to evaluate informants because they cannot essentially change informants' characteristics; instead, they affect how consumers process the information that defines these characteristics.

As suggested by the bias hypothesis [Chaiken & Maheswaran 1994], peripheral cues may bias the effects of central cues by establishing prior expectancies of communication target. Individuals may have higher expectation of the target when it is associated with a favorable peripheral cue than when it is not, leading them to process the target with a positive bias. Status recognition from the EWOM system may predispose the individual to form a higher overall informant assessment. When such a favorable assessment is confirmed after the individual attends to the informant's review history, the final informant credibility assessment will be established on a stronger positive foundation than otherwise. Therefore status recognition by the system should strengthen the positive effect of the concentration of the informant's review history on the focal product category on informant assessment.

H6*: The informant status indicator will positively moderate the effect of the concentration of product review history on the perceived informant credibility.*

6. Research Methodology

6.1. Study Design and Manipulations

A 2 x 2 x 2 x 2 (need-information congruence: congruent vs. incongruent; concentration of past product reviews: concentrated vs. non-concentrated; peer rating indicator: present vs. absent; status indicator: present vs. absent) full-factorial between-subject experiment was designed. We chose the target product based on three criteria. First, the product category should be relatively familiar to subjects so that we can better capture how judgments are formed in a naturally occurring environment. Second, we would like to have a product for which consumers often turn to others for information and advice. Third, to ensure realism, we need a product whose information is often obtained online. Based on these criteria, we chose a hotel as the target experiment product [Wang et al. 2015].

The study participants were told that they were going to travel abroad to visit a city and needed to search for hotels online. They were to assume that, during their online search, they had come across a hotel from a web-based consumer recommendation portal, which was specifically developed for this study, and were asked to evaluate the presented hotel and indicate the likelihood to book the hotel. The webpage presented the hotel displayed a brief hotel description and some basic hotel information such as services and facilities, which were held constant across treatments, as well as a set of EWOM communication elements, including the hotel review and its peer rating indicator, and the informant's profile and status indicator (see Figure 4).

The hotel review posted by the informant contained the manipulation of *need-information congruence*, which reflects whether the product review in the EWOM system addresses the consumer's personal consumption needs. There were two review versions. Both versions described five attributes of the recommended hotel, three of which were consistent across treatments. The other two attributes were used for need-information congruence manipulation. During the task introduction (i.e., prior to browsing the experiment recommendation portal), subjects were told to assume that, to plan the trip, they had conducted some research on the city they would be visiting. They were then asked to read a short article, presented as their research results, introducing the city's attractions, food, etc. Of particular importance, the article contained two pieces of information priming their accommodation needs. First, it mentioned that some city areas were unsafe and tourists should be cautious when selecting accommodations. Second, it stated that the city had extensive network of public transportation connecting most of the places of attractions and to make best use of the transportation network to explore the city, one can choose an accommodation with ease of transportation accessibility. The review version containing information congruent with subjects' accommodation needs described the hotel's safety and transportation accessibility, whereas the incongruent version described the hotel in another two areas (i.e., decoration and amenities). Table 2 presents this manipulation.

Table 2: The Manipulation of Need-Informant Congruence

Condition	Manipulations	Remarks
Congruence Version of the Hotel Review	I have just returned from XXX (city name). I stayed in the hotel Novella for 3 days during my trip to XXX. After arriving at the hotel lobby, I was approached by friendly and helpful staff who helped to create a welcoming atmosphere in the hotel. The check-in process was efficient. <u>The hotel is close to the subway so you can get there from the airport and train station straightway. The hotel is located in a quiet yet safe neighborhood and you don't need to worry if you come back late in the night.</u> Both the room and bathroom were clean. I had my breakfast in the hotel restaurant which offered a lot of choices. The food quality was quite good. I would like to recommend hotel Novella to other tourists	The underlined part allows consumers to assess the product features that are important from their perspectives.
Incongruence Version of the Hotel Review	I have just returned from XXX (city name). I stayed in the hotel Novella for 3 days during my trip to XXX. After arriving at the hotel lobby, I was approached by friendly and helpful staff who helped to create a welcoming atmosphere in the hotel. The check-in process was efficient. <u>The hotel was decorated in a tasteful and pleasant manner. The furniture went well with the decoration style and the materials used were of high quality. The room contained all essential amenities such as TV, minibar, fridge, hairdryer and was well maintained.</u> Both the room and bathroom were clean. I had my breakfast in the hotel restaurant which offered a lot of choices. The food quality was quite good. I would like to recommend hotel Novella to other tourists.	This version does not contain information related to the consumer's consumption need. The underlined part reflects this manipulation. The rest is the same as the above version.

a. Non-concentration/Peer rating indicator/Status indictor

b. Concentration

c. Peer rating indicator

d. Status indicator

Figure 4. Screenshots of Selected Experimental Webpages

We conducted three pretests. The first pretest, which checked whether the city introduction could activate accommodation needs for hotel safety and transportation accessibility, was administered to 24 subjects who were similar to the actual participants demographically. Half of the subjects read the introduction version priming the two needs and half read the introduction where the description of city safety and transportation was removed. Then they were asked to rank seven hotel attributes. Results show that subjects reading the priming version ranked hotel safety and transportation accessibility higher than subjects reading the version without priming (Safety: $F= 10.39$, $p < 0.01$; Transportation: $F= 8.97$, $p < 0.01$). In the second pretest, another 24 subjects were recruited to examine whether the two versions of hotel review addressed safety and transportation needs differently. They were equally distributed across the two versions and asked to evaluate how well the hotel review addressed their consumption needs regarding hotel safety and transportation accessibility. Results reveal significant effects of review versions (Safety: $F= 22.676$, $p < 0.01$; Transportation: $F= 21.909$, $p < 0.01$). The third was conducted to ascertain that the two versions of reviews would not have an impact on one's evaluation of the informant because prior research has shown that three characteristics of the product review, including lexical complexity, two-sidedness, and affect intensity, influence informant's credibility [Jensen et al. 2013]. In the pretest, we presented the two versions of hotel reviews to participants and asked them to evaluate the lexical complexity, two-sidedness, and affect intensity with a 7-point likert scale developed on the basis of Jensen et al. (2013). 26 subjects from the same population as the main study participated in this pretest and were evenly distributed between the two review versions. Results reveal that the two versions did not differ in all of the three aspects (all $Fs < 1$, ns). Thus, we conclude that the text manipulations would not lead to variances in subjects' evaluation of the informant's credibility.

Concentration of Past Reviews captures whether the informant's past product reviews focuses on the focal product category, i.e., hotel or an irrelevant product category, which was set as movies in this study. Under the concentration condition, the system showed that the informant had 15 reviews on hotels in the country that the participants would be visiting. Under the non-concentration condition, the system presented that the informant had only one hotel review, which was the one subjects were viewing, and 14 other reviews on movies. A webpage was created to display the detailed information about the 15 reviews (i.e., hotel and movie names). The webpage could be accessed via the link that was embedded in the informant's ID. Subjects would be directed to the webpage when they clicked the link. Moreover, we implemented a mouseover effect with the informant's ID. When subjects moved the pointer over the informant ID, a message box showing the review history popped up (see Figure 4a-b). The message box provided an overview of the informant's profile, including total number of reviews and the number of reviews in different product categories. It also contained the link to the webpage of review history so that if subjects wanted to gain more information about the informant's reviews, they could click the link to do so.

The *peer rating indicator* and *informant status indicator* were manipulated as presence or absence. The peer rating indicator, consisting of a comment (i.e., "rated very helpful") and a five-star icon, was displayed along with the review for the presence manipulation and was removed for the absence condition (Figure 4a&c for presence and 4b&d for absence). "Top Reviewer" was displayed next to the informant's ID for the presence manipulation, and removed for the absence manipulation (Figure 4a&d for presence and 4b&c for absence).

6.2. Construct Operationalization and Control Variables

Review *diagnosticity* reflects how well the EWOM product review conveys the product features from the consumer's perspective. It was measured with a scale adapted from Kempf & Smith (1998). *Informant credibility* was measured with two dimensions. *Informant credibility*, reflecting consumers' perceptions of informants' expertise for conveying accurate product information and consumers' trust in informants for providing non-misleading and reliable product information, was measured with the scale from Ohanian (1990). The *product acceptance* describes the consumer's willingness and intention to accept the hotel from the EWOM system and was measured with the scale adapted from Gershoff et al. (2003). All constructs used 7-point likert scales. Table 3 summarizes our research constructs and Table 4 lists the instruments used.

Table 3: Summary of Research Constructs

Construct	Definition	Treatment in the study
Product acceptance	The consumer's willingness and intention to accept the product presented in the EWOM system.	Measured
Diagnosticity	The extent to which a product review enables one to judge important experiential attributes of the product. It is determined by the perceived correlation between the product information and the judgment a potential consumer needs to make.	Measured

Informant credibility	The extent to which an informant is in a position to know the truth of the product and at the same time is inclined to tell the truth of his/her own product perception.	Measured
Need-information congruence	The extent to which the product review in the EWOM system addresses the consumer's personal consumption needs.	Manipulated
Concentration of the review history	The extent to which the informant's past product reviews focuses on the focal product category.	Manipulated
Peer rating indicator	It is a system artifact in the EWOM system that reflects the usefulness of a product review based on the evaluations from the peer consumers who have read and/or utilized the review.	Manipulated
Status indicator	It is a system artifact in the EWOM system that indicates informants' status based on the quantity and quality of their product review contributions. Examples of status indicators include "product advisor" and "top reviewer".	Manipulated

Table 4: The Measurement Instruments

Construct (Code)	Scale	Source
Review Diagnosticity (DIAT)	1. The hotel review helped me to evaluate the hotel. (strongly disagree/strongly agree)	[Kempf & Smith 1998]
	2. The hotel review familiarized me with the hotel in aspects that I am interested in. (strongly disagree/strongly agree)	
	3. The hotel review let me know the performance of the hotel in aspects that I am interested in. (strongly disagree/strongly agree)	
	4. The hotel review enabled me to directly evaluate if the hotel could meet my needs. (strongly disagree/strongly agree)	
Informant Credibility (CRED)	1. The person who submitted the hotel review is reliable. (strongly disagree/strongly agree)	[Ohanian 1990]
	2. The person who submitted the hotel review is sincere. (strongly disagree/strongly agree)	
	3. The person who submitted the hotel review is trustworthy. (strongly disagree/strongly agree)	
	4. The person who submitted the hotel review is experienced. (strongly disagree/strongly agree)	
	5. The person who submitted the hotel review is knowledgeable. (strongly disagree/strongly agree)	
	6. The person who submitted the hotel review is qualified. (strongly disagree/strongly agree)	
Product Acceptance (ACPT)	1. What is the likelihood for you to accept the recommendation of the hotel from the system? (not at all/very likely)	[Gershoff et al. 2003]
	2. What is the probability for you to follow the recommendation of the hotel from the system? (not at all/very probable)	
	3. How influential is the recommendation of the hotel from the system on your decision as to whether to choose this hotel? (not at all/very influential)	
Online Experience	No. of Internet purchase in the past 6 months	Self-developed for the study
Hotel Booking Experience (BOOK)	1. I have online hotel booking experience. (strongly disagree/strongly agree)	
	2. I sometimes book hotels online. (strongly disagree/strongly agree)	
	3. I am familiar with online hotel booking. (strongly disagree/strongly agree)	
Travel Experience (TRAV)	1. I travel a lot. (strongly disagree/strongly agree)	
	2. I travel frequently. (strongly disagree/strongly agree)	
	3. I am an experienced traveler. (strongly disagree/strongly agree)	

Individuals' characteristics could affect their EWOM acceptance behavior. Thus, multiple methods were used to control for the effects of possible confounding variables and improve the study's internal validity. Personal characteristics, including age, gender, online experience, and experience with hotel booking and traveling, were

controlled by assigning subjects randomly across treatments. They were also captured in the experiment and included in the data analyses.

6.3. Study Procedures

A total of 400 students from a large university participated in this study. Upon arriving at the experiment venue, the participants were told that the study's purpose was to explore how consumers use Internet information to make decisions and the specific purposes were not mentioned to minimize the demand effect and to increase study rigor. They first completed an online pre-experiment questionnaire collecting their demographic information. Then they were told they would travel to a city abroad and asked to read the introduction to the city. They were next instructed to look for a hotel for the trip and given the task of evaluating a recommended hotel. After the task briefing, they were randomly assigned across experimental treatments. After their self-paced exploration of the webpages, the participants were required to report the likelihood that they would book the hotel presented in the system and to assess the product review and the informant. We measured the product decision prior to information and informant assessments to minimize the demand effect.

To ensure our participants would be involved and motivated in the study and can thus represent actual e-commerce consumers who expend significant cognitive resources in processing EWOM communication elements, we sought to elicit a high level of decision responsibility for hotel booking by telling participants that their friends would be traveling with them and they would assume the task of finding a hotel for the trip and need to explain to their friends about their choices. Increasing one's decision responsibility has been shown to be an effective strategy to induce high information processing motivation [Petty & Cacioppo 1986a].

7. Data Analysis and Results

7.1. Manipulation and Control Checks

Control checks on the participants' demographic data were performed to confirm that the random assignment was successful. A MANOVA test confirmed that there were no significant differences in gender ($F=1.311$, $p=0.286$), age ($F=0.867$, $p=0.534$), Education ($F=0.823$, $p=0.339$), online experience ($F=0.586$, $p=0.625$), hotel booking ($F=0.737$, $p=0.324$), and travelling experience ($F=0.470$, $p=0.704$) across the 16 experimental conditions.

As the manipulation check on need-information congruence had already been performed in the pretest, the experiment questionnaire only checked the manipulations pertinent to review concentration and the deployment of the two system indicators[1]. Results showed that all participants perceived the treatments as intended. To insure that the participants had followed our instruction to assume a high decision responsibility in information processing, they were asked for their comfort level in justifying their decisions to their friends. The mean response was significantly higher than the neutral value of four.

The participants' click stream data was logged to test whether they had visited the webpages that contained the treatments, including the review and the informant's review history. Three were removed for not having accessed the hotel review page which contained the detailed review and 21 were removed for not having accessed the informant's review history. The data of 376 participants were entered in the subsequent analyses and each treatment had 21-25 participants (see detail profile in Table 5).

7.2. Assessment of the Measurement Instruments

Exploratory factor analysis using principal component extraction and varimax rotation was first performed. Three factors emerged with eigenvalues above 1.0 (Table 6). They were consistent with the intended constructs.

Instrument reliability was assessed with Cronbach's alpha against the threshold 0.707 [Nunnally 1978]. Convergent validity was assessed with construct composite reliability against the cut-off value of 0.707 [Nunnally 1978] and the average variance extracted by each construct against 0.5 [Fornell & Larcker 1981]. Table 4 reports these assessments and results were satisfactory. Discriminant validity was assessed with the criterion that each item should correlate more with other items of the same construct than with items of other constructs [Campbell & Fiske 1959; Cook & Campbell 1979]. As shown in Table 7, in all cases, the correlations between two constructs (off-diagonal items) were less than the square root of the average variances extracted (AVE) by the items measuring a construct (diagonal items), indicating that the measures discriminated adequately between the constructs [Fornell & Larcker 1981]. Given the adequate performance of the measurement instruments, we averaged the scores of all indicators for each construct to form construct values and used them for hypothesis analyses.

[1] They were, "The reviewer's past review focused on hotels" and "The reviewer has written many hotel reviews" for review concentration; "Was there any system indicator on the helpfulness of the hotel review?" and "the customer hotel review was indicated to be very helpful" for the peer rating indicator; and "Was there any indicator on the status of the person who had submitted the hotel review?" and "the person who had submitted the hotel review was indicated as Top Reviewer in the system" for the status indicator.

Table 5: Subject Profile

Demographic Variables	Categories	Frequency (Percentage)
Gender	Male	200 (53.19%)
	Female	176 (46.81%)
Education	1st year in university	46 (15.11%)
	2nd year in university	90 (23.94%)
	3rd year in university	86 (22.87%)
	4th year in university	71 (12.23%)
	Postgraduate	83 (22.07%)
Age	19 and below	23 (6.12%)
	20-24	264 (70.21%)
	25-30	72 (19.15%)
	Above 30	17 (4.52%)
No. of Internet Purchase in the Past 6 Months	Never	19 (5.05%)
	Below 10	147 (39.10%)
	10-29	134 (35.64%)
	30-49	56 (14.89%)
	50 and above	20 (5.32%)

Table 6: Statistics for Measurement Instrument Assessment

		Factors			Loading	Means (SD)	Cronbach's Alpha	Composite Reliability	AVE
		1	2	3					
Product acceptance	PROD1	.078	**.828**	.319	0.911	4.735 (1.201)	0.875	0.981	0.945
	PROD2	.042	**.857**	.302	0.927				
	PROD3	.102	**.776**	.210	0.846				
Diagnosticity	DIAT1	.231	.156	**.796**	0.734	4.682 (1.198)	0.828	0.990	0.899
	DIAT2	.069	.221	**.871**	0.897				
	DIAT3	.062	.271	**.885**	0.834				
	DIAT4	.167	.216	**.778**	0.876				
Credibility	CRED1	**.817**	.175	.082	0.832	4.248 (1.032)	0.886	0.953	0.834
	CRED2	**.793**	.267	-.020	0.779				
	CRED3	**.768**	.304	-.110	0.823				
	CRED4	**.749**	-.035	.125	0.802				
	CRED5	**.837**	.025	.113	0.793				
	CRED6	**.796**	.086	.205	0.804				

Table 7: Discriminant Validity Assessment

	Construct	1	2	3
1	Diagnosticity	**0.948**		
2	Credibility	0.303	**0.913**	
3	Product acceptance	0.694	0.390	**0.972**

7.3. Hypotheses Testing

To test H1 and H2, we performed linear regression on the likelihood of booking the hotel. We first input the control variables to construct the base model (Model 1), and then added the independent variables (i.e., review diagnosticity and informant credibility) (Model 2). Regression results of the two models indicate that review diagnosticity (H1) and informant credibility (H2) both had significant positive effects on the hotel booking likelihood (t-value was 6.58 and 3.95 respectively) (see Table 8).

Table 8: Linear Regression on Product Acceptance

	Model 1			Model 2		
Independent Variables	B (std. err)	Std. Coefficient	T-value	B (std. err)	Std. Coefficient	T-value
Age	.232 (.241)	.109	.963	.211 (.157)	.119	1.344
Gender	.058 (.122)	.025	.476	.028 (.178)	.027	.157
Travel Experience	.080 (.073)	.108	1.101	.054 (.073)	.038	.741
Booking Experience	.034 (.067)	.053	.0507	.048 (.076)	.046	.632
Online Experience	-.046 (.078)	-.028	-.590	-.073 (.095)	-.089	-.768
Diagnosticity				.474 (.072)	.549	6.583***
Credibility				.269 (.068)	.217	3.956 ***
R^2	0.037			0.461		
ΔR^2	0.424					

Notes: *** p< .001

H3 predicted that the congruence between the consumer's consumption needs and product performance revealed in the product review would increase perceived diagnosticity of the review and H4 posited that the presence of a peer rating indicator would strengthen the above effect. An ANCOVA test on perceived diagnosticity with control variables, the concentration of the informant's review history on the focal product category and the presence of status indicator as covariates confirms the positive congruence effect. When the consumer's consumption needs and product performance revealed in the product review were congruent, the mean diagnosticity was 5.25; however, it was reduced to 4.13 in the incongruent condition ($F = 40.02$, $p < 0.001$). Hence, H3 was supported. However, our results did not support H4. When the peer rating indicator was absent, the difference of perceived diagnosticity between the congruent condition and the incongruent condition was 1.21. When the peer rating indicator was present, the difference of perceived diagnosticity between the congruent condition and the incongruent condition was 1.11 ($F = 0.142$, $p > .10$). Figure 5 plots the effects.

H5 predicted that the concentration of the informant's past product reviews on the focal product category would positively affect the perception of informant credibility and H6 further posited that this effect would be more pronounced if the informant status indicator was available. An ANCOVA test on informant credibility with control variables, the congruence between the review and information needs, and the presence of the peer rating indicator as covariates reveals a significant main effect of the concentration of past reviews on the focal product category and its interaction with the status indicator. The difference in informant credibility between the concentrated condition and the non-concentrated condition was significant ($M_{concentrated} = 4.65$, $M_{non\text{-}concentrated} = 3.95$, $F = 14.71$, $p < 0.001$). Further, the difference of informant credibility between the concentration condition and the non-concentration condition was 0.24 when the status indicator was unavailable. When the status indicator was present, the difference increased to 0.80 ($F = 4.47$, $p < 0.05$). Hence, H5 and H6 were both supported. Figure 6 plots the effects.

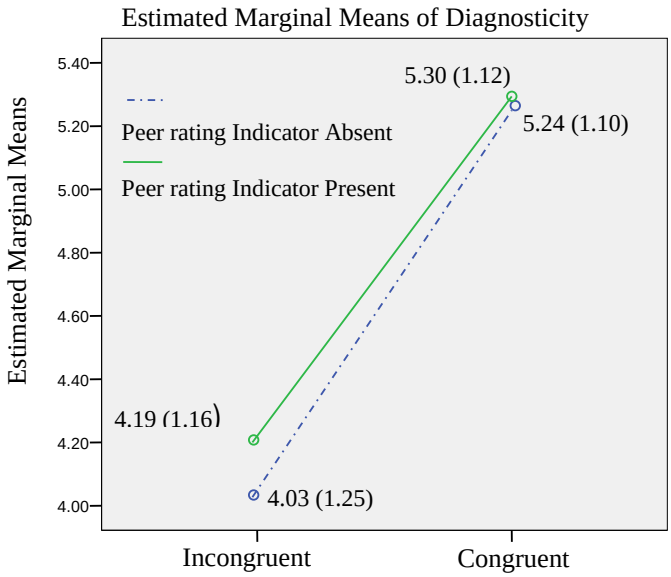

Figure 5: Plot of the Effects on Diagnosticity

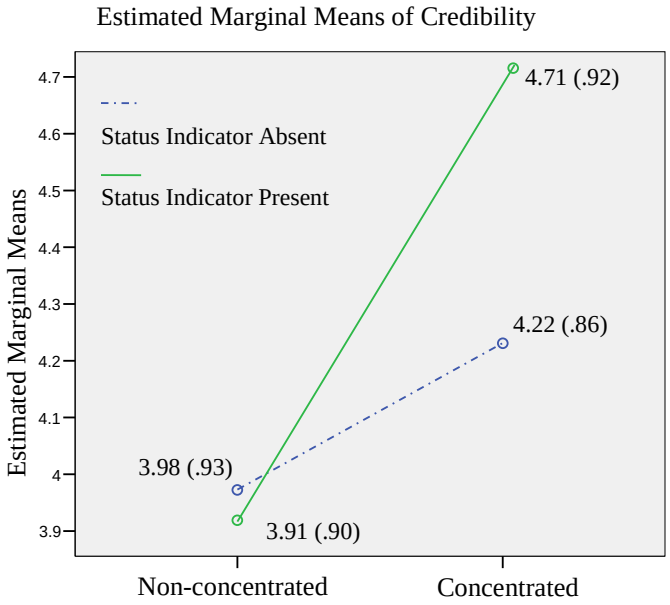

Figure 6: Plot of the Effects on Credibility

8. Discussions

8.1. Summary of Findings

This study examines consumers' product decision making in an EWOM system. The research model, drawing on ELM and the additivity and the bias hypotheses, illustrates the effects of multiple communication elements in the EWOM system on consumers' acceptance of the product presented in the system.

The results confirm our central thesis that the acceptance of a product in EWOM systems will be influenced by the ability of the product reviews in addressing consumers' interests, which is labeled as the diagnosticity of the reviews in the study, and the credibility of the informant providing the reviews. We show that when reading a product review, consumers not only acquire product information, but also engage in review diagnosticity assessment to determine whether the product information is relevant to their consumption needs. When consumers feel that the product review is unable to help them accurately evaluate the product, they will be more likely to discount the

review and less likely to accept the product. This finding is consistent with previous studies in other contexts (e.g., [Kempf & Smith 1998] in marketing; [Jiang & Benbasat 2005; Qiu et al. 2012; Suh & Lee 2005] in IS), which also suggest that diagnosticity assessment is an important cognitive operation that consumers engage in when processing product information. The results further reveal that whether the content of a review can address a consumer's consumption needs is important for diagnosticity assessment. If the product review provides information that a consumer is interested to know about the product, a high diagnosticity evaluation will ensue. Conversely, if the EWOM product review does not contain the information that the consumer is interested in, it will lead to a low diagnosticity perception.

We also show that the informant's characteristics have an additively positive effect in influencing the acceptance of the product. Databases in EWOM systems have the ability to store vast reviews submitted by informants. This study suggests that these are important assets for EWOM system operators because they not only embody product information, but also help trace an informant's review history, which is an important cue demonstrating the informant's credibility. Consumers tend to assess informants in EWOM systems on the basis of their review histories and will factor that assessment into their product decision making process. An informant who has consistently posted reviews in the EWOM system on a particular category of product will be perceived to be credible. We further find that a positive endorsement of an informant's status by the EWOM system, as shown by informant status indicators, will strengthen the positive effect of the concentration of review history. Informants whose review contributions in the EWOM system have been focused on a particular product category and who are at the same time visibly featured to have gained a certain level of recognition from the EWOM system will be assessed to be more credible than those who have a focused review history but did not gain any recognition. We also observe that the impact of informant credibility on product decision is weaker than that of the review diagnosticity (β = 0.217 vs. 0.549), confirming that product information is more crucial than informant characteristics in influencing consumers' product attitude and acceptance decisions.

The only hypothesis we failed to validate is the interaction effect between the presence of peer rating indicators and the congruence of product review with a consumer's needs. The underlying logic of this hypothesis is that, compared to the case where the peer rating indicator is unavailable, a high peer rating value shown by the indicator could lead the consumer to process the product review with a positive bias, which would then result in a higher diagnosticity evaluation of the product review when it meets the consumers' information needs. However, our data only confirmed the main effect of the congruence between a product review and the consumer's needs. A possible explanation could be that consumers' assessments of an experiential product review may be primarily based on whether it could help them gain needed knowledge of the product from their own consumption perspectives and would not be significantly affected by a third party's endorsement. If our conjecture is correct, the study implies that to the extent that consumers have clear expectations for the product, their evaluation of the product review in an EWOM system are less likely to be influenced by other review readers' opinions or system endorsement.

It should be noted that the above findings were obtained under the condition that our study participants were assuming a relatively high decision responsibility, and therefore were motivated to expend adequate cognitive resources to process EWOM communication elements. In addition to satisfying the prerequisite for the application of the additivity and the bias hypotheses, which operate only when a decision maker's cognitive resource is sufficient, our study condition is also of high practical relevance because real consumers tend to expend more cognitive resources when making consumption decisions.

Overall, the empirical results show that ELM and the additivity and the bias hypotheses provide a useful and reliable theoretical foundation to model the processes whereby various communication elements in an EWOM environment affect consumers' acceptance of products when using the EWOM system.

8.2. Limitations and Future Directions

Our study comes with some caveats that readers should be aware of when interpreting and generalizing the findings. This study was carried out with an experimental EWOM system. The internal validity was enhanced with the control of various confounding factors (e.g., product price, familiarity with the system, etc.). Though the external validity of our conclusions could be compromised to a small extent, the value of this experimental study lies in its explication of the cognitive mechanisms whereby various communication elements exert effects on consumers' choices. Experimental design affords us the ability to observe an individual's cognitive operations as well as to isolate and control any unnecessary influences. Nevertheless, we suggest that many factors associated with the product, the product review, and the EWOM system can be explored to enrich our understanding of EWOM communications.

First, to isolate other confounding effects, this study has focused on positive reviews only. Given that EWOM systems could be used as an outlet by consumers to voice dissatisfaction with a product and that negative product information constitutes a sizable proportion of EWOM information [Chang & Wu 2014; Hu et al. 2015], future

research can be carried out to examine how consumers process both negative and positive product information in tandem.

Second, the participants in our study only dealt with one product review. Products tend to receive multiple reviews in EWOM systems. Indeed, it is a common challenge for consumers to decide their weight formula for multiple pieces of information with different need-information-congruence properties and from different informants with varying backgrounds. More research can be done to explore how consumers deal with such complex situations and what decision aids could be employed. Nevertheless, the present study provides a useful groundwork and suggests certain important factors that researchers should pay attention to when exploring how consumers handle and process multiple reviews in an EWOM system.

Third, our study only included two system artifacts, namely peer rating indicators and informant status indicators. This was not driven by their superiority in influencing consumers' decisions but rather by their close relationships with the product review and the informant, two central communication elements in EWOM systems. There are many other equally important communication elements in EWOM systems worth further exploration, such as the visual rating of the product and the recency of the review. We suggest that future research could incorporate our theorizing that EWOM system artifacts will act as peripheral cues to affect a potential consumer's processing of product reviews. For instance, compared with a low recency review, a high recency one can signal the product information to be more relevant and up-to-date, leading the consumer to devote greater attention and cognitive resources to read the review, which in turn increases the effectiveness of the review in shaping the consumer's attitude toward the product. Further, this recency effect could be more pronounced for hi-tech and IT products that often undergo frequent upgrading. We therefore call for more research on other EWOM system artifacts.

Fourth, it should be noted that, the hypothesized relationships have been validated using self-reported responses collected altogether at one time. This data collection method may give rise to the concern about its ability to reveal the causal effects of the independent variables (e.g., review diagnosticity) on the dependent variables (e.g., product acceptance). Although the experiment method can provide strong evidence of causality [Imai et al. 2013], we nevertheless highlight that caution should be exercised when evaluating the relationships established here.

In addition to addressing the above limitations of this study, future research can also extend our research along several directions. First, researchers can enhance the research model by incorporating other interesting information system research constructs. For example, studies can examine how the perceived usefulness of the EWOM systems, an important factor from technology acceptance model [Davis 1989] that has been recently applied to the context of acceptance of system-based recommendations [Giboney et al. 2015], would be affected by such factors as product review diagnosticity, peer rating indicators and information status factors. Second, future studies could also relax the study's assumption that there is no relationship between consumers and informants in EWOM systems and explore EWOM communications within a virtual social network where relationships exist between informants and consumers. Indeed, initial attempts in this direction have been made recently (e.g. [Arazy et al. 2009; Brown & Lee 2007; Dan-Gur & Rafaeli 2007]). A possible research direction is to explore what system mechanisms could be developed to help consumers and informants form social ties in EWOM communications and to investigate how these ties would affect consumer decision making in the EWOM context. Third, integrating the research of product heterogeneity in EWOM communications (e.g., [Lu et al. 2014]) with the present study, future study could investigate product characteristics such as product type, brand, and price, and product familiarity on consumers' processing of the communication elements in the EWOM system. For example, product price could positively moderate the effects of EWOM communication elements that we have observed in our experiment because a higher price may lead consumers to expend more cognitive resources to process product reviews, informant information, and various system artifacts. On the other hand, product familiarity may negatively moderate the effects of EWOM communication elements because a higher familiarity could lead to reduced processing of EWOM communication elements. Thus, including product characteristics could be an interesting direction to advance EWOM research.

8.3. Contributions and Implications

The study makes important theoretical contributions in two key domains: EWOM research and the application of ELM. First, we contribute to theory building surrounding EWOM systems by involving a wider selection of EWOM communication elements and explicating their effects on consumers' cognitive processing of EWOM recommendations than prior literature does. EWOM systems are complex information environments replete with various information and system artifacts. Most prior studies tend to examine EWOM communication elements in a disparate fashion, without considering the EWOM information environment as a holistic system and the simultaneity and mutual interrelatedness of various communication elements. This study constructs an integrative and realistic EWOM information environment to uncover an individual's cognitive processes in this environment. Owing to our expanded selection of communication elements, this study is able to demonstrate the complexity of the operation of EWOM communication elements. We show that consumers can engage in thoughtful cognitive activities to process

various communication elements, including EWOM system information and artifacts, to form an attitude toward the EWOM product review, informant, and recommendation.

Second, this study identifies new factors in the EWOM context that will help individuals assess product review diagnosticity and informant credibility. Specifically, our study demonstrates that a plain text-based product information presentation that is congruent with the consumer's consumption needs is as important and effective as an IT-enhanced product presentation [Jiang & Benbasat 2005; Suh & Lee 2005] in affecting diagnosticity assessment. We also show that an EWOM informant's past information contribution history, a type of information unique to EWOM systems, is an important resource that an individual could tap to assess informant credibility.

Third, our study also re-affirms some findings in EWOM literature. We show that product reviews need to be specific in describing product performances in critical consumption aspects so as to allow consumers to diagnose the products effectively, which is in line with Pavlou and Dimoka's suggestion that the value of review texts lies in their ability to help consumers assess communication targets [Pavlou & Dimoka 2006]. We also demonstrate that consumers do take informants' backgrounds into consideration when assessing their product recommendations, reinforcing the observation of EWOM informants' demographic effects on product sales [Forman et al. 2008].

Fourth, the study also contributes to the general WOM literature. As a special form of WOM, EWOM encompasses information system features and mechanisms that are hard to implement in a WOM context. For example, with the interactivity afforded by computer-mediated communications, EWOM systems are able to obtain consumers' responses to reviews in the systems and convey these responses to new consumers. Also, EWOM system practitioners can deploy many system artifacts to influence consumers' decision-making processes. This study thus enhances the general WOM literature by examining how WOM has evolved on the Internet and how information systems as a whole can affect WOM communication.

With regard to ELM, we extend the classification of central and peripheral cues by showing that 1) individuals can engage in *multiple levels* of elaboration of communication cues (and not just one level as employed in the extant literature) in a complex EWOM communication environment, and 2) central and peripheral cues can operate simultaneously and peripheral cues can exert influence in an additive and/or interactive fashion. Our study shows that in an EWOM system where there is a hierarchy of cues, central and peripheral cues can operate simultaneously (i.e., review diagnosticity and informant credibility both affect product acceptance) and an operative peripheral cue can have its own second-level central and peripheral cues (i.e., effects of concentration of informants' review history on the focal product category as central cue and the informant status indicator as peripheral cue for informant credibility). While we failed to show that a central cue can be affected by its own second-level central and peripheral cues (i.e., the effect of the peer rating indicator on product review diagnosticity was insignificant), we conjecture that this failure may be just specific to this study only and should not be over-generalized. We suggest that researchers may consider such multiple-level application of ELM in other IS research areas such as human-computer interaction studies because the online environments are increasingly being packed with various types of information and artifacts. Additionally, departing from prior studies that have considered the exclusive operation of central cues and peripheral cues, we provide empirical support that the informant status indicator (peripheral cue) can strengthen the effect of informant past contribution history (central cue) on the assessment of informant credibility. Researchers should consider such possible co-existence of central and peripheral cues when applying ELM.

Our findings have many implications for EWOM system practitioners. This study shows that addressing consumers' personal needs is importance for EWOM product reviews and recommendations to be accepted. Hence, system practitioners should provide a mechanism to motivate and guide informants to provide feedback regarding as many product attributes as possible, a mechanism for consumers to specify their consumption needs, and a mechanism to generate the product review according to the needs of the consumers. By doing so, EWOM systems can facilitate informants to structure their reviews according to attributes (instead of free-flowing text) and entail an attribute-based presentation of the reviews to allow consumers to scrutinize product information more effectively. Through increasing the probability of the match between EWOM product reviews and consumers' needs, these mechanisms can lead to higher product review diagnosticity and facilitate consumers to make product decisions.

This study unequivocally highlights the importance of the "messenger" in addition to the "message". It is paramount that system practitioners provide mechanisms for consumers to gauge the informants' credibility. Our study shows that the concentration of review history on a certain focal product category and a mechanism to recognize the status of an informant based on her review performance played a key role in enhancing the credibility of the informant, which in turn affects the acceptance of products in the EWOM system. Clearly, system practitioners cannot view an informant's contribution as a one-off affair; they should cultivate a group of experts or opinion leaders for a particular product category over time and recognize their contributions. In this way, consumers will gradually perceive the value of the EWOM system or community that they are in. Based on these findings, one worthy takeaway of this study is that the implementation of an EWOM system needs to take a longitudinal

perspective to nurture a value-adding community of contributors/informants and consumers who are willing to appraise the performance of the contributors/informants. We believe that many EWOM systems have faded into oblivion because the operators have not sought to continuously strengthen the value of the EWOM systems over time.

9. Conclusion

EWOM systems have become an inalienable and indispensable part of electronic commerce. They are increasingly perceived as the lubricants in the wheels of trust in electronic commerce. To fully reap the benefits of EWOM in electronic commerce, EWOM systems should add value to potential online consumers' shopping experiences by providing suitable and credible recommendations. Unusable information from non-credible informants could turn potential consumers off, causing the demise of EWOM systems and their concomitant communities of informants and potential consumers. Understanding what aspects of EWOM systems can facilitate consumers' product evaluation is important. This study has identified the key communication elements that will enhance the likelihood of potential consumers' product acceptance in the EWOM context. Our study contributes to theory building surrounding EWOM systems by showing the multiple levels and simultaneous operation of central and peripheral cues in the systems. It also has important practical implications for improving EWOM systems through the proper design and use of system information and artifacts.

Acknowledgment

The work described in this paper was partially supported by the grant from the General Research Fund sponsored by the Research Grants Council of Hong Kong (CityU 1510/06H) and the grant from the Singapore Ministry of Education (R-253-000-107-112).

REFERENCES

Andrews, J. C., and T. A. Shimp. "Effects of Involvement, Argument Strength, and Source Characteristics on Central and Peripheral Processing of Advertising," *Psychology and Marketing*, Vol. 7, No. 3:195-214, 1990.

Arazy, O., N. Kumar, and B. Shapira. "Social Recommendations Systems: A Theory-Driven Framework for Social Recommender Systems," *IT Professional*, Vol. 11, No. 4:38-44, 2009.

Asch, S. E. 1966. "Opinions and Social Pressure," in *Small Groups: Studies in Social Interaction*, A. P. Hare, E. F. Borgatta and R. F. Bales (eds.), Alfred A. Knopf: New York, pp. 318-324.

Ba, S., and P. A. Pavlou. "Evidence of the Effects of Trust Building Technology in Electronic Markets: Price Premiums and Buyer Behavior," *MIS Quarterly*, Vol. 26, No. 3:243-268, 2002.

Benlian, A., R. Titah, and T. Hess. "Differential Effects of Provider and User Recommendations in E-Commerce Transactions: An Experimental Study," *Journal of Management Information Systems*, Vol. 29, No. 1:237-272, 2012.

Brown, J. A., and B. N. Lee. "Word of Mouth Communication within Online Communities: Conceptualizing the Online Social Network," *Journal of Interactive Marketing*, Vol. 21, No. 3:2-20, 2007.

Campbell, D. T., and D. W. Fiske. "Convergent and Discriminant Validation by the Multitrait and Multimethod Matrix," *Psychological Bulletin*, Vol. 56, No. 2:178-191, 1959.

Chaiken, S., A. Liberman, and A. H. Eagly 1989. "Heuristic and Systematic Information Processing within and Beyond the Persuasion Context," in *Unintended Thought*, J. S. Uleman and J. A. Bargh (eds.), Guilford Press: New York.

Chaiken, S., and D. Maheswaran. "Heuristic Processing Can Bias Systematic Processing: Effects of Source Credibility, Argument Ambiguity, and Task Importance on Attitude Judgment," *Journal of Personality and Social Psychology*, Vol. 66, No. 3:460-473, 1994.

Chang, H. H., and L. H. Wu. "An Examination of Negative E-Wom Adoption: Brand Commitment as a Moderator," *Decision Support Systems*, Vol. 59, No. 206–218, 2014.

Cialdini, R., Influence: Science and Practice (3rd ed. ed.), New York: HarperCollins, 1993.

Clemons, E., G. Gao, and L. Hitt. "When Online Reviews Meet Hyperdifferentiation: A Study of the Craft Beer Industry," *Journal of Management Information Systems*, Vol. 23, No. 2:149–171, 2006.

Cook, M., and D. T. Campbell, Quasi-Experimentation: Design and Analysis Issues for Field Settings (Boston, MA: Houghton Mifflin, 1979.

Dan-Gur, Y., and S. Rafaeli Year. "'Friends Group' in Recommender Systems: Effects of User Involvement in the Formation of Recommending Group," Twenty-Seventh International Conference on Information Systems2007, pp. 1357-1382.

Davis, F. D. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly,* Vol. 13, No. 3:319–340, 1989.

DeCarlo, T. E. "The Effects of Sales Message and Suspicion of Ulterior Motives on Salesperson Evaluation," *Journal of Consumer Psychology,* Vol. 15, No. 3:238-249, 2005.

Dellarocas, C. "The Digitization of Word-of-Mouth: Promise and Challenges of Online Reputation Mechanisms," *Management Science,* Vol. 49, No. 10:1407-1424, 2003.

Dellarocas, C. "Strategic Manipulation of Internet Opinion Forums: Implications for Consumers and Firms," *Management Science,* Vol. 52, No. 10:1577-1593, 2006.

Eagly, A. H., W. Wood, and S. Chaiken. "Causal Inferences About Communicators and Their Effect on Opinion Change," *Journal of Personality and Social Psychology,* Vol. 36, No. 4:424-435, 1978.

Forman, C., A. Ghose, and B. Wiesenfeld. "Examining the Relationship between Reviews and Sales: The Role of Review Identity Disclosure in Electronic Markets," *Information Systems Research,* Vol. 19, No. 3:291-313, 2008.

Fornell, C., and D. F. Larcker. "Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics," *Journal of Marketing Research,* Vol. 18, No. 3:382-388, 1981.

Ganzach, Y. "Inconsistency and Uncertainty in Multi-Attribute Judgment of Human Performance," *Journal of Behavioral Decision Making,* Vol. 7, No. 3:193-211, 1994.

Gershoff, A. D., S. M. Broniarczyk, and P. M. West. "Recommendation or Evaluation? Task Sensitivity in Information Source Selection," *Journal of Consumer Research,* Vol. 28, No. 3:418-438, 2001.

Gershoff, A. D., A. Mukherjee, and A. Mukhopadhyay. "Consumer Acceptance of Online Agent Advice: Extremity and Positivity Effects," *Journal of Consumer Psychology,* Vol. 13, No. 1&2:161-170, 2003.

Ghose, A., and P. G. Ipeirotis Year. "Designing Novel Review Ranking Systems: Predicting Usefulness and Impact of Reviews," The Ninth International Conference on Electronic Commerce, Minneapolis, Minnesota, USA., 2007.

Giboney, J. S., S. A. Brown, P. B. Lowry, and J. F. Nunamaker Jr. "User Acceptance of Knowledge-Based System Recommendations: Explanations, Arguments, and Fit," *Decision Support Systems,* Vol. 72, No. 1-10, 2015.

Grewal, D., J. Gotlieb, and H. Marmorstein. "The Moderating Effects of Message Framing and Source Credibility on the Price-Perceived Risk Relationship," *Journal of Consumer Research,* Vol. 21, No. 1:145-153, 1994.

Heesacker, M., R. E. Petty, and J. T. Cacioppo. "Field Dependence and Attitude Change: Source Credibility Can Alter Persuasion by Affecting Message-Relevant Thinking," *Journal of Personality and Social Psychology,* Vol. 51, No. 4:653-666, 1983.

Herr, P. M., F. R. Kardes, and J. Kim. "Effects of Word-of-Mouth and Product-Attribute Information on Persuasion: An Accessibility-Diagnosticity Perspective," *Journal of Consumer Research,* Vol. 17, No. 4:454-462, 1991.

Holbrook, M., and E. C. Hirschman. "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun," *Journal of Consumer Research,* Vol. 9, No. 2:132-140, 1982.

Hu, M., E. Rabinovich, and H. Hou. "Customers Complaints in Online Shopping: The Role of Signal Credibility," *Journal of Electronic Commerce Research,* Vol. 16, No. 2:95-108, 2015.

Imai, K., D. Tingley, and T. Yamamoto. "Experimental Designs for Identifying Causal Mechanisms," *Journal of the Royal Statistical Society-Series A,* Vol. 176, No. 1:5-51, 2013.

Jensen, M. L., J. M. Averbeck, Z. Zhang, and K. B. Wright. "Credibility of Anonymous Online Product Reviews: A Language Expectancy Perspective," *Journal of Management Information Systems,* Vol. 30, No. 1:293-324, 2013.

Jiang, Z., and I. Benbasat. "Virtual Product Experience: Effects of Visual and Functional Control of Products on Perceived Diagnosticity and Flow in Electronic Shopping," *Journal of Management Information Systems,* Vol. 21, No. 3:111-147, 2005.

Kahle, L. R., and P. M. Homer. "Physical Attractiveness of the Celebrity Endorser: A Social Adaptation Perspective," *Journal of Consumer Research,* Vol. 11, No. 4:954-961, 1985.

Kang, Y. S., and P. M. Herr. "Beauty and the Beholder: Toward an Integrative Model of Communication Source Effects," *Journal of Consumer Research,* Vol. 33, No. 1:123-130, 2007.

Kempf, D. S., and R. E. Smith. "Consumer Processing of Product Trial and the Influence of Prior Advertising: A Structural Modeling Approach," *Journal of Marketing Research,* Vol. 35, No. 3:325-337, 1998.

Kirmani, A., and B. Shiv. "Effects of Source Congruity on Brand Attitudes and Beliefs: The Moderating Role of Issue-Relevant Elaboration," *Journal of Consumer Psychology,* Vol. 7, No. 1:25-47, 1998.

Kotler, P., Marketing Management: Analysis, Planning, Implementation and Control (6th ed.), New Jersey: Prentice-Hall Inc., 1988.

Kumar, N., and I. Benbasat. "The Influence of Recommendations and Consumer Reviews on Evaluations of Websites," *Information Systems Research,* Vol. 17, No. 4:425 – 439, 2006.

Loken, B. "Consumer Psychology: Categorization, Inferences, Affect, and Persuasion," *Annual Review of Psychology,* Vol. 57, No. 453-485, 2006.

Lu, Q., Q. Ye, and R. Law. "Moderating Effects of Product Heterogeneity between Online Word-of-Mouth and Hotel Sales," *Journal of Electronic Commerce Research,* Vol. 15, No. 1:1-12, 2014.

Miller, N., P. Resnick, and Z. R. "Eliciting Informative Feedback: The Peer Prediction Method," *Management Science,* Vol. 51, No. 9:1359-1373, 2005.

Mudambi, S. M., and D. Schuff. "What Makes a Helpful Online Review? A Study of Customer Reviews on Amazon.Com," *MIS Quarterly,* Vol. 24, No. 4:601–629, 2010.

Murphy, G. L., and J. C. Wright. "Changes in Conceptual Structure with Expertise: Differences between Real-World Experts and Novices," *Journal of Experimental Psychology: Learning, Memory, and Cognition,* Vol. 10, No. 1:144-155, 1984.

Nunnally, J. C., Psychometric Theory (2nd ed.), New York: McGraw-Hill, 1978.

O'Keefe, D. J., Persuasion: Theory and Research (2nd ed.), Thousand Oaks, California: Sage Publications, 2002.

Ohanian, R. "Construction and Validation of a Scale to Measure Celebrity Endorsers' Perceived Expertise, Trustworthiness, and Attractiveness," *Journal of Advertising,* Vol. 19, No. 3:39-53, 1990.

Pavlou, P. A., and A. Dimoka. "The Nature and Role of Feedback Text Comments in Online Marketplaces:Implications for Trust Building, Price Premiums, and Seller Differentiation," *Information Systems Research,* Vol. 17, No. 4:391-412, 2006.

Pavlou, P. A., and D. Gefen. "Building Effective Online Marketplaces with Institution-Based Trust," *Information Systems Research,* Vol. 15, No. 1:37-59, 2004.

Petty, R. E., and J. T. Cacioppo, Communication and Persuasion: Central and Peripheral Routes to Attitude Change (New York: Springer-Verlag, 1986a.

Petty, R. E., and J. T. Cacioppo 1986b. "The Elaboration Likelihood Model of Persuasion," in *Advances in Experimental Social Psychology* L. Berkowitz (ed.), Academic Press: San Diego, CA, pp. 123-205.

Pine, B. J., and J. H. Gilmore. "Welcome to the Experience Economy," *Harvard Business Review,* Vol. 76, No. 4:97-105, 1998.

Puckett, J., R. E. Petty, J. T. Cacioppo, and D. Fisher. "The Relative Impact of Age and Attractiveness Stereotypes on Persuasion," *Journal of Gerontology,* Vol. 38, No. 340-343, 1983.

Qiu, L., J. Pang, and K. H. Lim. "Effects of Conflicting Aggregated Rating on Ewom Review Credibility and Diagnosticity: The Moderating Role of Review Valence," *Decision Support Systems,* Vol. 54, No. 1:631-643, 2012.

Scholten, M. "Lost and Found: The Information-Processing Model of Advertising Effectiveness," *Journal of Business Research,* Vol. 37, No. 2:97-104, 1996.

Sen, S., and D. Lerman. "Why Are You Telling Me This? An Examination into Negative Consumer Reviews on the Web," *Journal of Interactive Marketing,* Vol. 21, No. 4:76–94, 2007.

Stanton, J. L., and J. A. Lowenhar. "A Congruence Model of Brand Preference: A Theoretical and Empirical Study," *Journal of Marketing Research,* Vol. 11, No. 4:427-433, 1974.

Suh, K. S., and Y. E. Lee. "The Effects of Virtual Reality on Consumer Learning: An Empirical Investigation," *MIS Quarterly,* Vol. 29, No. 4:673-697, 2005

Tam, K. Y., and S. Y. Ho. "Web Personalization as a Persuasion Strategy: An Elaboration Likelihood Model Perspective," *Information System Research,* Vol. 16, No. 3:271-291, 2005.

Tormala, Z., P. Brinol, and R. E. Petty. "Multiple Roles for Source Credibility under High Elaboration: It's All in the Timing," *Social Cognition,* Vol. 25, No. 4:536-552, 2007.

Wang, M., Q. Lu, R. T. Chi, and W. Shi. "How Word-of-Mouth Moderates Room Price and Hotel Stars for Online Hotel Booking: An Empirical Investigation with Expedia Data," *Journal of Electronic Commerce Research,* Vol. 16, No. 1:72-80, 2015.

West, P. M., and S. M. Broniarczyk. "Integrating Multiple Opinions: The Role of Aspiration Level on Consumer Response to Critic Consensus," *Journal of Consumer Research,* Vol. 25, No. 1:38-51, 1998.

White, T. B. "Consumer Trust and Advice Acceptance: The Moderating Roles of Benevolence, Expertise, and Negative Emotions," *Journal of Consumer Psychology,* Vol. 15, No. 2:141-148, 2005.