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# Sources and impacts of social influence from online anonymous user reviews

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ABSTRACT

Consumers increasingly rely on online reviews to make purchase decisions. However, the process through which consumers are influenced by online reviews is not well understood. To fill the gap, we apply the social influence theory to theoretically explain and analyze this opinion change process. Specifically, we identify antecedents and consequences of two types of social influence from online user reviews: informational and value-expressive influence. From a survey conducted in a controlled laboratory environment, we found that perceived review quality positively impacts informational influence, while perceived review quality, consistency, and social presence jointly impact value-expressive influence. Interestingly, informational influence impacts both perceived decision quality and perceived usefulness of the website, while value-expressive influence only impacts perceived usefulness of the website. Surprisingly, consumer characteristics, including prior product expertise and self-monitoring, do not have significant effects on the formation of social influence online.



## 1. Introduction

Online user reviews are very important to consumers as 90% of consumers read online reviews before visiting a business [1]. Merchants across the globe and numerous websites are encouraging customers to provide online reviews through several ways such as star ratings, text, images, and videos [2]. Why do consumers often rely on user reviews to make purchase decisions? Burnkrant and Cousineau [3] stated that "*when a person is placed in a product evaluation situation in which he or she is unable to adequately assess the characteristics of the product from direct observation and contact, he or she will view the reactions of others as evidence about the 'true' nature of the product.*" Advances in electronic word-of-mouth (eWOM) enable individuals to access information on products and services with tremendous efficiency and flexibility [4,5]. Consequently, online user reviews can considerably affect consumers' decision quality and system evaluation, which are closely related to sales and firms' marketing strategies [6–8].

Because of their practical importance, online user reviews have been examined by researchers from diverse perspectives. Prior literature examines the impact of online reviews on product sales [6,9,10], marketing strategy [11,12,7], consumers' purchase decisions [6,8], and directional eWOM effects [13,14]. Online reviews have been shown to positively impact online information search [15,16], trust development [17], and system evaluation [18,19,8].

Despite a great amount of research efforts, the process through which consumers are influenced by online reviews is not well understood. Reviewers who provide reviews form a reference group that is salient and relevant for the online shopper. They exert social influence on the online shopper as they affect the shopper's perception or attitude toward the underlying product or service [4,5]. Therefore, we apply the social influence theory (SIT) [20] to theoretically explain and analyze such an opinion change process. Specifically, we recognize and differentiate two types of social influence from user reviews and explore their sources and consequences. In addition, this study considers key relevant consumer differences to explain different strengths of social influence for different groups of consumers. The specific research questions are *(1) What are the antecedents of different types of social influence developed from user reviews? (2) Will different types of social influence affect consumers' perceived decision quality and system evaluation? (3) Will consumer differences play a role in the formation of social influence from user reviews?*

The paper is organized as follows. We first review SIT and then propose a conceptual model based on SIT to explain how

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consumers' decision-making is affected by online reviews. We follow this with descriptions of the research methodology, data analysis, and findings. We conclude with discussion, conclusions, and avenues for further research.

## 2. Theoretical background

The impact of online user reviews on consumer purchase intentions and sales has been extensively studied in both the marketing (e.g., [7,21–23] and information systems (IS) literature (e.g., [24–27]. Online user reviews are valued by consumers because of the help they provide in making purchase decisions. Such value is confirmed by the consumer's perception of the quality of such decisions and of the usefulness of the system (in this case, the website). Perceived decision quality and perceived usefulness are, therefore, the two important dependent variables in this study.

As Chen et al. [63] pointed out, "Recommender systems research has mainly viewed the decision-making process as a 'black box'." Our research questions attempt to shine a light on this black box by investigating how online reviews affect the dependent variables through social influence. We first briefly review SIT, followed by discussion of IS studies based on social influence themes.

### 2.1. Social influence theory

SIT, developed by Kelman [28], is the classical socio-psychological theory that explains an individual's socially induced opinion formation and behavior change. It posits that changes in attitudes and actions are produced by social influence through different processes: compliance, identification, and internalization. Grounded on SIT, marketing researchers have identified three types of social influence, namely, normative influence, value-expressive influence, and information influence, which correspond to the three processes [3,29,30]. These three types of social influence are not mutually exclusive and may exist simultaneously with varying levels [20].

*Normative influence* occurs through the compliance process, when an individual accepts influence from another person or from a group because this individual hopes to achieve a favorable reaction from them. Individuals adopt the influence to attain specific rewards or avoid specific punishments. They do not adopt the behavior because they believe in its content because it is instrumental in the production of a satisfying social effect. For example, an employee adopts a behavior because of request from the supervisor.

*Value-expressive influence* occurs through the identification process when an individual adopts a behavior because this individual wants to associate with another person or a group who represent desirable values. In this type of influence, an individual attempts to be like or actually to be the other person by saying what others say and doing what others do. Moreover, an individual tends to anchor own behavior with a reference group to maintain self-definition as a group member. For example, an academic researcher spends much time on research-related activities to maintain his or her self-defining relationship with the research community.

*Information influence* occurs through the internalization process when an individual accepts influence because the induced behavior is intrinsically rewarding. The individual adopts the influence because he or she perceives it as inherently conducive to maximize own benefits.

### 2.2. SIT in the IS research

Recognizing the importance of social aspects of technology use, IS researchers have applied SIT to explain how external sources affect an individual's intention to adopt systems [31,32]. In the TAM2 model, *normative influence* occurs in the link between subjective norms and intention to use. For example, employees comply with the supervisor to adopt a system even if they do not want to use it personally. *Value-expressive influence* exists in the relationship between subjective norms and image. When important people of a person's group at work think that the person should adopt the system, he or she would do so to enhance his or her own status within the group. *Informational influence* occurs through the relationship between subjective norms and perceived usefulness. For instance, employees adopt a system because they expect that the new system would help their work.

In addition to TAM2, SIT has been adopted by other IS studies to explain individuals' system adoption. Management support could imply normative influence by reinforcing the importance of the technology to the organization [33]. Value-expressive influence affects the intention to use mobile services or play online games because individuals may feel a sense of belonging by maintaining their membership to a social group [34–36]. Informational influence exists when compelling messages received from others are internalized into an individual's own belief structure, thus influencing one's cognition about the expected outcomes of technology use [34,37]. All three types of social influences are positively related to attitudes toward using the technology [38,36,39].

More recently, in addition to SIT, researchers investigating online user behaviors and interactions have also employed concepts from a variety of social theories, such as the social exchange theory, the social identity theory, the Elaboration Likelihood Model, and others (see [40] for a review and [41] for a marketing perspective). Table 1 contains a review of some of the recent IS studies that are based on these social influence themes.

This research differs from prior research as follows. In previous research, social influence comes mainly from those whom an individual knows about, i.e., mostly supervisors, colleagues, or friends. However, in this study, social influence comes from total strangers. It is interesting to find out whether anonymous reviewers could exert social influence on consumers. In our context, user reviews are embedded and integrated within the system. As a result, system design is expected to play a role in facilitating the formation of social influence from reviewers. Furthermore, we simultaneously examine the sources and consequences of social influence. By exploring consumers' decision-making process, we intend to analyze how social influence mediates the relationship between content and system characteristics and consumers' evaluation of own decisions and system usefulness.

## 3. Research model

On the basis of SIT, we propose a research model to investigate how shoppers are influenced by online reviews. We differentiate between two types of social influence that are common in online retail websites: *informational influence* and *value-expressive influence*. Normative influence is excluded because it is not applicable in our research context. Normative influence occurs when individuals comply with what the influencing agent wants them to do as a way of achieving a desired response from the agent. In our case, the influencing agent is anonymous reviewers who cannot impose any meaningful reward or punishment on other consumers. A consumer makes an online purchase decision independently and voluntarily and does not need to comply with

**Table 1**
Recent IS Studies on Social Influence Themes.

| Reference | Theory Used | Major Findings |
|---|---|---|
| [42] | SIT | eWOM is a collective signal of reputation. |
| [43] | SIT | Informational and normative determinants have positive effects on knowledge adoption. |
| [44] | ELM | A consumer's perceived eWOM credibility positively influences his or her adoption of eWOM. Source credibility, eWOM quantity, and eWOM quality significantly affect a consumer's perceived eWOM credibility. |
| [45] | SIT | Review valence and consistency alter the emotional process during trial attitude formation but do not affect the cognitive process. |
| [46] | SIT | Positive social influence reinforces the relationship between beliefs about and attitude toward online shopping and the relationship between attitude and intention to shop. |
| [47] | ELM, SIT | Source credibility impacts social influence and affective and cognitive response. Argument quality impacts social influence and cognitive response. Social influence moderates the impacts of cognitive response on behavior intention. |
| [48] | ELM | Recommendation source credibility moderates the impact of recommendation persuasiveness and completeness on recommendation credibility. Source credibility also moderates the relationship between recommendation credibility and adoption. |
| [49] | TAM, SCT, SPT, FT | Social presence conveyed through the website affected perceived enjoyment and perceived usefulness. Enjoyment perceived by the users affected behavioral intention. |
| [50] | SET | The intention to engage in online group buying is predicted collectively by consumer satisfaction, trust, and seller creativity. Consumer satisfaction with online group buying is predicted primarily by trust, followed by consumer reciprocity. |
| [51] | TSR | Online social presence is an antecedent of trust toward a retail website |
| [52] | TRA | Cognitive trust affects emotional trust, which further leads to purchase intention. Emotional trust affects purchase intention more in the inconsistent review context. The moderating effect of inconsistent reviews is stronger for female consumers. |
| [53] | SIT | Social identity and group norm have significant effects on user participation. Group norm affects social identity. |

Legend: SIT = Social Influence Theory; SET = Social Exchange Theory; TRA = Theory of Reasoned Action; ELM = Elaboration Likelihood Model; TSR = Theory of Social response; SCT = Social Comparison Theory; FT = Flow Theory; SPT = Social Presence Theory.

online reviewers. These reviewers also do not know and cannot react to the individual's purchase decision, thus causing no normative influence on the individual.

SIT identifies three antecedents of social influence: (1) the basis for the importance of the induction; (2) source of power of the influencing agent; and (3) manner of achieving prepotency of the induced response [20]: p. 67). The first antecedent examines the individual's own motivation and the last one examines the individual's alternative comparison approach. To understand how online reviews affect consumers' decision-making by exerting social influence, our model is developed based on the second antecedent focusing on the external influencing agent. While reviewers are anonymous, their attractiveness and credibility can be manifested by the reviews they have written. Furthermore, the consumer typically reads multiple reviews from a group of reviewers; thus, perceived consistency of opinions from a group of reviewers matters in determining their influencing power. Importantly, review consistency differs from review quality. High-quality reviews do not need to be similar to each other as long as reviewers on different sides provide convincing and valuable comments. In addition, consistent reviews can be of either high or low quality. For example, reviewers might share similar points of views on a mediocre product, but they could leave a low-quality review because they do not have much to say about it. Both review quality and consistency have been identified as important factors affecting the credibility of online reviews [54]. In addition, online reviews are conveyed by the underlying IT system, whose social presence affects the consumer's emotive reaction [55]. Therefore, the consumer's perceptions of review quality, review consistency, and social presence are three potential sources of power of the influencing agent, or reviewers, and are modeled as determinants of social influence.

It is noteworthy that we model the consumer's *perceptions* rather than use more "objective" measures of these determinants. Given that the unit of analysis for our research model is the individual consumer, we believe that in order to model the influences experienced by each individual, we must probe what the individual actually feels. It may have been possible to use a quantitative approach to measure review quality "objectively" across all the available reviews for a product. However, the review quality that an individual reading a subset of those review experiences is unlikely to equal such an "objective" score. Furthermore, two individuals could even read the same exact reviews and yet perceive quality differently. In other words, regardless of the "objective" measurement, if the reviews that the consumers happen to read seem to be of high quality *in their eyes*, that is the experience that the consumers will carry with them influencing their later decisions and perceptions.

As a result of the occurrence of social influence, consumers may change their opinions. According to SIT [28], the performance of induced response from value-expressive influence and informational influence can be assessed by the relationship to the influencing agent and the relevance of values to issues. Because the influencing agent is an integral part of the system, we use *perceived usefulness* to assess the consumers' evaluation of the system. The issue examined here is making an online shopping decision, and we use *perceived decision quality* to capture consumers' evaluation of the related issue. The TAM model uses the "behavioral intention to use" Venkatesh et al. [32] as the dependent variable because it wants to identify factors motivating individuals' system adoption and use. In our case, we are interested in social influence from online reviews. We include both positive and negative reviews, and consequently consumers' induced response can be either positive (i.e., intend to buy) or negative (i.e., intend not to buy). Therefore, we choose to use perceived decision quality rather than purchase intention to evaluate the performance of induced response.

Individual differences play a role in social influence [56]. Therefore, we incorporate two relevant individual characteristics as moderators in our model: *prior product expertise* and *self-monitoring*. We expect the former to affect the formation of informational influence and the latter to influence the formation of value-expressive influence. The research model is summarized in Fig. 1.

### 3.1. Determinants of informational influence: the internalization process

#### 3.1.1. Informational influence

Informational influence reflects the process of internalizing a group's judgment to form veridical beliefs about reality [57]. It is defined as *the extent to which individuals are influenced by reviewers in enhancing their knowledge of a product for making a purchase decision* [29,5].

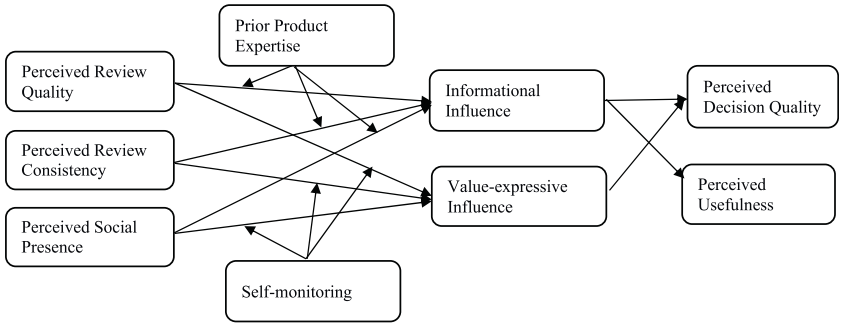


**Fig. 1.** The Research Model.

*3.1.2. Perceived review quality*

The first determinant of informational influence is perceived review quality, referring to *a person's evaluation of the system's performance in providing reviews based on his or her experience of using the system* [58,59]. The role of quality has been well documented as a strong predictor of informational influence in IT acceptance [60,61]. Zimmer et al. [62] pointed out that individuals are more likely to use high-quality information because it requires minimal clarification and refinement. High-quality reviews enable consumers to understand and evaluate the product more effectively. They can reduce the search cost and uncertainty associated with a purchase [63,16]. Quality reviews enhance consumers' ability to match the product functions with their own situations [64]. In their comparative study, Bickart and Schindler [65] found that user-generated reviews that are perceived as more credible, useful, and relevant are preferred. Quality reviews also receive more precedence and weight in judgment and choice processes, leading to greater persuasive power of the reviews [66]. Thus, we hypothesize

***H1a:*** *Perceived review quality is positively associated with informational influence from user reviews.*

*3.1.3. Perceived review consistency*

Perceived review consistency is defined as *the perceived extent to which there is convergence among a group of reviewers in terms of their opinions of the product* [67,68]. Research on group influence has indicated its strong impact on individual judgments. Mannes [57] found that people relied more on groups than individuals to update their beliefs. As the size of a group increases, group opinions will be perceived as more accurate in terms of objectivity and representativeness [63]. Similarly, Zhang et al. [69] argued that a majority is formed when group members hold consistent opinions or attitudes. According to the convergence theory, the majority facilitates convergence of attention, thoughts, and alternatives [67]. The theory posits that "*judgments made in the public presence of the majority will be subject to majority influence*" as people perceive the majority as offering social reality [70].

When consumers read user reviews for a particular product, they are exposed to a group of people who express their personal opinions of the product. Consumers' evaluation of a product is typically based on a group of reviewers rather than a single reviewer. On the basis of the group influence research and the convergence theory, we argue that perceived review consistency will impact the development of informational influence. When the majority of reviewers have similar opinions, the consumer will give more weight to the opinion because the opinion is perceived as more correct and reliable [57]. Consistent reviews indicate the convergence of reviewers' opinions, and thus, a consumer's knowledge of a product will be enhanced and confirmed by a group of people instead of a single person. According to SIT, high-review consistency makes it easier for a consumer to assimilate and internalize others' opinions into his personal value system of product knowledge. Hence, we hypothesize

***H1b:*** *Perceived review consistency is positively associated with informational influence from user reviews.*

*3.1.4. Perceived social presence*

Online consumer behaviors can be viewed as having two distinct dimensions: transactional orientation and social orientation [71]. The transactional orientation focuses on the utilitarian nature of the relationship between a customer and a website. The social orientation of IT usage examines the affect and emotion of IT usage as complementary to cognitive beliefs of IT usage [72,73,114]. It focuses on the personal feelings of intimacy and warmth based on users' experience of the website. Social presence has been widely adopted as a proxy to evaluate the emotive reaction of IT usage [55]. It refers to *the degree to which a medium allows a user to experience others as being psychologically present* [74].

Media may differ in its ability to communicate between the sender and the receiver in terms of sociability, warmth, and sensitivity [74]. Social presence captures such perceived capability of a website to convey rich information through various information cues that allow consumers to feel connected with others from the same website. Social presence is particularly salient in the online recommendation systems where credible and meaningful relationships are lacking [15]. Although a website in its simplest and barest form is information-lean, perceived social presence will be enhanced when a retail website provides consumers multiple sources to evaluate reviews and helps consumers to take advantage of reviews. For example, Amazon and Epinions.com post a short biographical sketch of each reviewer and list their past contributions in the community. In addition, Amazon acknowledges a reviewer with a badge (e.g., Top Reviewer) to indicate his or her dedication to offering reviews and allow consumers to rate the review. By doing so, consumers would perceive that the website cares about their needs for valuable reviews, may feel interpersonal involvement from other reviewers, and are more likely to trust reviewers from the website [55,18]. Consequently, it is much easier for consumers to decide to accept others' opinions [15] to enhance their personal knowledge. Hence, we hypothesize

***H1c:*** *Perceived social presence is positively associated with informational influence from user reviews.*

### 3.2. Determinants of value-expressive influence: the identification process

#### 3.2.1. Value-expressive influence

The other type of social influence we focus on is *value-expressive influence*, which is formed through identification. With value-expressive influence, individuals are motivated to enhance their self-concept by associating themselves with positive referents and/or dissociating themselves from negative referents [3,29]. Bock et al. [75] agreed that when value-expressive influence is present, individuals seek to believe and act in a manner similar to those referents. When reading reviews, consumers are interested in knowing how others like the product and use others' opinions and attitudes as a benchmark to form their own preferences. In our research context, value-expressive influence is defined as *the extent to which an individual is influenced by a group of reviewers as the reference group to enhance his or her self-concept for making a purchase decision* [29]. Reviewers who provide online comments may not be known to the online shopper. However, they can still exert value-expressive influence through noninteractive online persuasion [76]. Their decisions and opinions are observed by the online shopper, providing social validation for shopping [30]. Online shoppers can decide whether those reviewers are a desirable reference group. If so, the online shopper can associate with them by buying the very same product.

#### 3.2.2. Perceived review quality

Value-expressive influence reflects the need for psychological association with a group. Before complying with the preference of others, an individual needs the opportunity to socially interact with the reference group. In the online shopping context, reviewers as the reference group are unknown to consumers. Consumers observe decisions, opinions, or behavior of the reference group through reading online reviews written by those reviewers. High-quality reviews increase reviewers' credibility perceived by consumers. Because information from a trustworthy source can lead to greater persuasiveness [77], consumers tend to associate and identify themselves with those who write high-quality reviews. They are more likely to have a positive feeling for reviewers who provide high-quality comments.

***H2a:*** *Perceived review quality is positively associated with value-expressive influence from user reviews.*

#### 3.2.3. Perceived review consistency

According to the majority influence research, when a majority endorses a particular viewpoint as the correct opinion, people tend to identify with and are influenced by that majority [70]. If most reviewers have similar opinions on a product, it would be easier for a consumer to adopt values of those reviewers [30,34]. Otherwise, fitting in a group with diverging views is quite challenging. Furthermore, a perception of consistent reviews will enhance consumers' desire to be like a group of others because it is easy to follow a majority that holds nonconflicting opinions.

***H2b:*** *Perceived review consistency is positively associated with value-expressive influence from user reviews.*

#### 3.2.4. Perceived social presence

Social presence represents users' experiences with the website. Dellarocas [4] suggested that the website exercise quality control mechanisms to increase the value and influence of user reviews to consumers. When consumers perceive that the website cares about their needs for good reviews (e.g., multiple system features to help consumer evaluate reviews and reviewers), social presence is expected to be high. High social presence can develop trust toward the reviewers hosted by the website [72]. Hence, with high social presence enabled by the website, consumers will be more willing to identify themselves with reviewers from that website. In this regard, we expect

***H2c:*** *Perceived social presence is positively associated with value-expressive influence from user reviews.*

### 3.3. Impacts of social influence

#### 3.3.1. Perceived decision quality

Perceived decision quality has been widely examined to capture the effectiveness of software-based agents that provide product recommendations [78] and users' performance in e-commerce [79]. It refers to *the degree of a consumer's confidence in his or her purchase decision-making* [78,80].

Research has indicated that use of software-based recommendation agents improves decision quality [78,80]. Less attention is paid to the role of user-generated recommendations in decision quality. When consumers receive informational influence from user reviews, their knowledge about the product will be enhanced by internalizing reviewers' comments into their own value system. With personal knowledge accumulated, informational influence can increase the efficiency of the online search process [15] and reduce consumers' uncertainty about a product [16]. Informational influence makes consumers feel more confident in making purchase decisions as user reviews enhance their knowledge internally.

When consumers receive value-expressive influence from online reviews, they are influenced by a group of people who have experiences with the product. According to SIT, consumers can anchor their decisions with the group opinion to identify themselves within the social environment. When consumers associate themselves with a group of reviewers, they can make decisions more easily by following the reference group. Following what others are doing may make consumers feel comfortable about their decisions, and we hypothesize

***H3a:*** *Informational influence is positively associated with perceived decision quality.*

***H3b:*** *Value-expressive influence is positively associated with perceived decision quality.*

#### 3.3.2. Perceived usefulness

When a retail website provides valuable user reviews that facilitate consumers' decision-making on product selection, consumers will have positive evaluations of the usefulness of the website itself [18]. Perceived usefulness is a well-validated salient belief about system performance in IS adoption research Venkatesh and Davis [31]. It refers to *the extent to which an individual perceives a website to be useful in evaluating a product and making a purchase decision* [72,18]. When consumers are influenced by user reviews that help them better understand the product, they will perceive that the website is helpful in providing valuable information and facilitating purchase decisions. When consumers want to be like a group of reviewers from a website, they will perceive that the website accelerates their decision-making process and increases the decision-making efficiency. Consequently, we hypothesize

***H4a:*** *Informational influence is positively associated with perceived usefulness of the website.*

***H4b:*** *Value-expressive influence is positively associated with perceived usefulness of the website.*

### 3.4. Moderating effects of consumer characteristics

#### 3.4.1. Prior product expertise

Prior product expertise refers to *the degree to which a user is knowledgeable about or familiar with the intended product* [80].

Consumers use own-based or other-based strategies to make purchase decisions [81]. In the own-based strategy, consumers rely on themselves to search for information and evaluate the product, while in the other-based strategy, consumers subcontract parts or all of their decision-making process [80]. Expert consumers are more likely to adopt the own-based strategy as they have the ability to process information and make decisions; in contrast, novice consumers are more likely to adopt the other-based strategy [82].

Consumers have different information-processing capabilities due to different levels of expertise. Chen and Xie [83] agreed that seller-created product information may be more useful to more sophisticated consumers, while user-generated product information may be more helpful to less-sophisticated consumers. Similarly, Pereira [84] found that in software-based recommendation agents, individuals who have low product knowledge tend to have lower satisfaction with the decision process and lower confidence in the decision because they are less equipped to process product information on their own. We argue that prior product expertise is expected to moderate the formation of informational influence. When consumers are very knowledgeable about a product, they will use their own knowledge with limited help from others. When consumers have low product knowledge before reading reviews, they will rely on others' opinions to develop their own knowledge of the product. In other words, less knowledgeable consumers will receive more informational influence from online reviews than knowledgeable consumers. Thus, we hypothesize

***H5**: Prior product expertise weakens the relationship between (a) perceived review quality, (b) perceived review consistency, and (c) perceived social presence and informational influence from user reviews.*

#### 3.4.2. Self-monitoring

Self-monitoring is introduced to understand the extent to which individuals can regulate behaviors and self-presentation in social contexts [85]. Individuals with high self-monitoring are sensitive to social cues that indicate socially desirable or appropriate behavior and use such cues to modify their own behavior. They regulate their behavioral choices on the basis of situational information. In contrast, individuals with low self-monitoring are relatively insensitive to social cues and tend to maintain a consistent self-presentation across different situations. Low monitors are less responsive to situational and interpersonal specifications of behavioral appropriateness. Compared with high monitors, their behaviors exhibit more substantial cross-situational consistency and temporal stability.

Marketing research has applied the concept of self-monitoring to understand consumer behaviors. Shavitt [86] found that for social identity products, high self-monitors explained their attitudes in more social terms and in less utilitarian terms than did low self-monitors. In addition, when advertising function products, high self-monitors preferred social arguments, while low self-monitors preferred utilitarian arguments. Browne and Kaldenberg [87] showed that high self-monitors experience more product involvement than low self-monitors and are more likely to buy a branded product to achieve a sense of belonging.

As self-monitoring focuses on aligning individuals' behaviors with socially desirable behaviors, we expect that self-monitoring moderates the formation of value-expressive influence. That is, a consumer with high self-monitoring will tend to be influenced by a group of others and follow them. As a majority of other consumers hold consistent opinions on a product, consumers with high self-monitoring would perceive others' behavior as socially desirable and thus appropriate to themselves. Consumers with high self-monitoring tend to identify themselves more easily with others than their counterparts. As a result, we expect

***H6**: Self-monitoring strengthens the relationship between (a) perceived review quality, (b) perceived review consistency, and (c) perceived social presence and value-expressive influence from user reviews.*

## 4. Research methodology

### 4.1. Research site and product selection

We conducted a survey in a controlled laboratory environment to validate the research model. The controlled environment ensures that participants answered the survey right after reading user reviews. In the survey, we did not ask participants to reveal any identifying information. Anonymity and confidentiality of our data collection procedure help attenuate social desirability bias [88]. A pilot study was conducted to ensure that survey procedures were properly set and survey items could be understood correctly.

Survey respondents read user reviews provided by Amazon.com for a selected product and were then asked in the questionnaire whether they would be interested in buying this product. Amazon.com is an ideal site because it provides excellent support for online communities and has a large user base to provide reviews [18]. As a number of IS research studies considered user reviews in Amazon.com [18,19], we can compare our results with theirs.

We chose digital camera as the product for this study. The digital camera has been ranked as one of the most popular products in the Consumer Electronics Association's annual ownership study [89]. Furthermore, the Internet has been the key channel for consumers to buy digital cameras [90]. Eighteen cameras released in Amazon.com at a price of around $200 were selected. We selected digital cameras to capture variations in user reviews in terms of star ratings (1–5), the number of user reviews (high vs. low), and review consistency (high vs. low; assessed by star rating variance).

### 4.2. Instrument development

The survey adopted existing items whenever possible and used a five-point Likert scale (1-strongly disagree, 5-strongly agree). From the information quality literature and relevant marketing literature on user reviews [58,59,7], we developed eight first-order reflective constructs for perceived review quality. As each quality dimension represents a portion of the overall quality, perceived review quality is modeled as a second-order formative construct [91]. For perceived review consistency, because of the lack of existing perceptual items, we developed three new items on the basis of relevant literature [67–70]. For perceived social presence, we adopted well-validated items based on the e-commerce literature (Qiu and Benbasat, 2009) [18,55]. The items for informational influence and value-expressive influence were adopted from the social influence research [92,29,93]. The items for decision quality and perceived usefulness were adopted from existing scales on the research of e-commerce recommendation systems and system performance, respectively [72,79,18]. We also used previously validated items for product expertise and self-monitoring [94,95,84,96]. Table 2 provides the definitions and supporting literature for the constructs used in this study. The detailed survey items are available in the Appendix.

### 4.3. Survey procedures

We recruited undergraduate students in a major southeast university to participate in the survey. To encourage participation,

**Table 2**
Instrument Development.

| Construct | Definition | # of Items and Type | Supporting Literature |
|---|---|---|---|
| Perceived Review Quality | A person's evaluation of the system's performance in providing user reviews based on his experience of using the system | 19<br>Formative<br>second-order | [97]<br>[98]<br>[99]<br>[58]<br>[59]<br>[7] |
| Perceived Review Consistency | The perceived extent to which there is a convergence among a group of reviewers in terms of their opinions of the product | 3<br>Reflective | [67]<br>[68]<br>[70]<br>[69] |
| Perceived Social Presence | The perceived extent to which a medium allows a user to experience others as being psychologically present | 3<br>Reflective | [18]<br>[55]<br>Qui & Benbast, 2009 |
| Informational Influence | The extent to which an individual is influenced by reviewers as enhancing his knowledge of a product | 4<br>Reflective | [92]<br>[29]<br>[93] |
| Value-expressive Influence | The extent to which an individual is influenced by a group of reviewers as the reference group to enhance his self-concept | 7<br>Reflective | [92]<br>[29]<br>[93] |
| Perceived Decision Quality | The degree of a consumer's confidence in making a purchase decision | 4<br>Reflective | [79]<br>[18]<br>[80] |
| Perceived Usefulness | The extent to which an individual perceives a website to be useful in evaluating a product | 3<br>Reflective | [72]<br>[18] |
| Product Expertise | The user's knowledge about or familiarity with the intended product | 6<br>Reflective | [84]<br>[96]<br>[80] |
| Self-monitoring | The extent to which people regulate their self-presentation by tailoring their actions in accordance with immediate situational cues or social cues. | 10<br>Reflective<br>second-order | [85]<br>[94]<br>[100]<br>[95] |

20 Amazon.com gift cards (of $20 each) were given away based on a random raffle drawing. The survey was conducted in a computer laboratory. When a participant came to the laboratory, he or she was randomly assigned to a computer displaying the webpage of Amazon user reviews of a digital camera. Participants were presented the same set of Amazon reviews if they were assigned to the same product. At the beginning of the survey, we distributed and read the instructions to the participants and demonstrated features of Amazon.com user reviews. Then, the participants were instructed to read user reviews for a given product within 20 min. They were allowed to click on the pages that contained user reviews and the reviewers' profiles. When they finished reading reviews, they were asked to complete a survey.

## 5. Data analysis and results

The final sample size was 270, and Table 3 presents participant demographics. We used SPSS to prescreen the dataset and did not find univariate normality, linearity, or multicollinearity problems. However, as the dataset violated the assumption of multivariate normality and the model contains a formative construct (perceived review quality), the PLS-based SEM technique was used to validate the model [101,102].

**Table 3**
Participant Demographics.

| Gender | | Age | | Education | |
|---|---|---|---|---|---|
| Male | 51.2% | 18–30 | 91.7% | High school or equivalent | 4.8% |
| Female | 48.8% | 31–40 | 3.6% | Some college | 41.7% |
| | | 41–60 | 4.7% | Bachelor's degree | 51.2% |
| | | >60 | – | Master's or higher degree | 2.4% |

### 5.1. Measurement validation

#### 5.1.1. Confirmatory factor analyses

SmartPLS 2.0 was used to assess construct reliability, convergent validity, and discriminant validity. Reliability is evaluated by computing average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha [103]. The generally acceptable cut-off values are 0.50 for AVE and 0.70 for both CR and Cronbach's alpha [104]. Table 4 demonstrates that the values of internal consistency are all above the cut-off values, except the understandability dimension of perceived review quality (0.66). Considering that its AVE and CR are good and Cronbach's alpha is only marginally lower than 0.7, the understandability construct was kept in the model. Convergent validity reflects the extent to which the items for each construct are measuring the same construct. If the factor loading of an item on its designated construct is 0.60 or more, convergent validity is established [105,106]. Table 4 shows that all the items meet this requirement and are significant at the 1% level. Discriminant validity is confirmed (Table 5) because all the square roots of AVEs on the main diagonal are greater than the pair-wise correlations between constructs on the off diagonal [101].

### 5.2. Nomological validity of second-order constructs

Review quality is a second-order formative construct, and Table 6 shows the weights of its first-order constructs. All the weights are significant at the 1% level. Self-monitoring is a second-order reflective construct, and Table 7 shows the loadings of its first-order constructs. All the loadings are significant at the 1% level. The proposed relationships between first- and second-order constructs are verified. Our constructs also exhibit nomological validity based on various criteria [107]. Both second-order constructs are strongly correlated with one or more antecedents

**Table 4**
Internal Consistency, Reliability and Convergent Validity.

| Construct | | AVE | Composite Reliability | Cronbach's Alpha | Items | Loading | T value |
|---|---|---|---|---|---|---|---|
| Perceived Review Quality (PRQ) | Adequacy (Adeq) | 0.66 | 0.86 | 0.75 | Adeq1 | 0.77*** | 20.32 |
| | | | | | Adeq2 | 0.81*** | 28.87 |
| | | | | | Adeq3 | 0.86*** | 45.28 |
| | Depth (Dept) | 0.65 | 0.85 | 0.73 | Dept1 | 0.79*** | 23.92 |
| | | | | | Dept2 | 0.78*** | 17.82 |
| | | | | | Dept3 | 0.86*** | 40.48 |
| | Reliability (Reli) | 0.64 | 0.87 | 0.81 | Reli1 | 0.80*** | 28.84 |
| | | | | | Reli2 | 0.82*** | 25.6 |
| | | | | | Reli3 | 0.80*** | 25.97 |
| | | | | | Reli4 | 0.77*** | 22.64 |
| | Relevancy (Rele) | 0.68 | 0.86 | 0.76 | Rele1 | 0.83*** | 27.43 |
| | | | | | Rele2 | 0.80*** | 15.35 |
| | | | | | Rele3 | 0.84*** | 29.39 |
| | Understandability(Unde) | 0.6 | 0.81 | 0.66 | Unde1 | 0.81*** | 22.55 |
| | | | | | Unde2 | 0.61*** | 6.5 |
| | | | | | Unde3 | 0.88*** | 49.21 |
| | Conciseness (Conc) | 0.65 | 0.85 | 0.74 | Conc1 | 0.78*** | 15.79 |
| | | | | | Conc2 | 0.81*** | 29 |
| | | | | | Conc3 | 0.83*** | 28.8 |
| Perceived Review Consistency (PRC) | | 0.63 | 0.83 | 0.7 | PRC1 | 0.87*** | 26.12 |
| | | | | | PRC2 | 0.84*** | 19.33 |
| | | | | | PRC3 | 0.64*** | 5.26 |
| Perceived Social Presence (PSP) | | 0.63 | 0.89 | 0.85 | PSP1 | 0.76*** | 17.44 |
| | | | | | PSP2 | 0.78*** | 24.85 |
| | | | | | PSP3 | 0.73*** | 21.37 |
| | | | | | PSP4 | 0.85*** | 47.84 |
| | | | | | PSP5 | 0.85*** | 44.79 |
| Informational Influence (II) | | 0.66 | 0.89 | 0.83 | II1 | 0.88*** | 40.42 |
| | | | | | II2 | 0.89*** | 60.04 |
| | | | | | II3 | 0.70*** | 11.31 |
| | | | | | II4 | 0.77*** | 18.14 |
| Value-expressive Influence (VI) | | 0.58 | 0.91 | 0.88 | VI1 | 0.67*** | 17.66 |
| | | | | | VI2 | 0.67*** | 16.19 |
| | | | | | VI3 | 0.69*** | 16.79 |
| | | | | | VI4 | 0.81*** | 32.22 |
| | | | | | VI5 | 0.86*** | 52.64 |
| | | | | | VI6 | 0.79*** | 25.35 |
| | | | | | VI7 | 0.81*** | 29.06 |
| Perceived Decision Quality (PDQ) | | 0.78 | 0.93 | 0.9 | PDQ1 | 0.91*** | 38.35 |
| | | | | | PDQ2 | 0.89*** | 35.37 |
| | | | | | PDQ3 | 0.84*** | 25.79 |
| | | | | | PDQ4 | 0.88*** | 35.58 |
| Perceived Usefulness (PU) | | 0.63 | 0.91 | 0.88 | PU1 | 0.76*** | 22.59 |
| | | | | | PU2 | 0.83*** | 28.61 |
| | | | | | PU3 | 0.75*** | 18.67 |
| | | | | | PU4 | 0.82*** | 30.34 |
| | | | | | PU5 | 0.80*** | 25.2 |
| | | | | | PU6 | 0.80*** | 24.75 |
| Prior Product Expertise (PPE) | | 0.72 | 0.93 | 0.9 | PPE1 | 0.77*** | 6.25 |
| | | | | | PPE2 | 0.88*** | 7.52 |
| | | | | | PPE3 | 0.85*** | 8.97 |
| | | | | | PPE4 | 0.87*** | 7.18 |
| | | | | | PPE5 | 0.86*** | 6.88 |
| Self-monitoring (SM) | Ability to modify self-presentation (SP) | 0.57 | 0.87 | 0.81 | SMSP1 | 0.79*** | 30.4 |
| | | | | | SMSP2 | 0.76*** | 19.22 |
| | | | | | SMSP3 | 0.75*** | 23.21 |
| | | | | | SMSP4 | 0.74*** | 20.14 |
| | | | | | SMSP5 | 0.72*** | 13.95 |
| | Sensitivity to expressive behavior of others (EB) | 0.57 | 0.87 | 0.81 | SMEB1 | 0.73*** | 13.02 |
| | | | | | SMEB2 | 0.76*** | 24.41 |
| | | | | | SMEB3 | 0.78*** | 23.9 |
| | | | | | SMEB4 | 0.82*** | 35.44 |
| | | | | | SMEB5 | 0.66*** | 12.9 |

*** Significant at the 0.1% level of significance.

or consequent constructs in the nomological network. In addition, we followed Liu et al. [107] to measure predictive and mediating efficiencies for the second-order constructs, and indices are all above 80%.

### 5.3. Common method variance

Common method variance (CMV) refers to "variance that is attributable to the measurement method rather than to the construct of interest" [91]: pp. 879). CMV may exist because of the single survey method, so we checked CMV using three techniques.

**Table 5**
Assessment of Discriminant Validity and Correlation Matrix.

| | Mean | S.D. | AVE | Adeq | Age | Conc | Dept | Educ | Fami | Gend | II | PDQ | PU | Phot | PPE | Rele | Reli | PRC | SMEB | SMSP | PSP | Unde | VI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adequacy | 3.76 | 0.66 | 0.66 | 0.81 | | | | | | | | | | | | | | | | | | | |
| Age | 1.15 | 0.47 | 1 | −0.12 | 1 | | | | | | | | | | | | | | | | | | |
| Conciseness | 3.66 | 0.6 | 0.65 | 0.29** | 0.02 | 0.81 | | | | | | | | | | | | | | | | | |
| Depth | 3.77 | 0.69 | 0.65 | 0.65** | −0.14* | 0.36** | 0.81 | | | | | | | | | | | | | | | | |
| Education | 3.51 | 0.68 | 1 | 0.03 | 0.08 | 0 | 0.03 | 1 | | | | | | | | | | | | | | | |
| Familiarity | 3.27 | 1.23 | 1 | 0.01 | −0.1 | 0.03 | −0.01 | 0.05 | 1 | | | | | | | | | | | | | | |
| Gender | 0.43 | 0.5 | 1 | 0.04 | −0.04 | -0.03 | 0.17** | −0.11 | −0.22* | 1 | | | | | | | | | | | | | |
| Informational Influence | 4.02 | 0.66 | 0.66 | 0.53** | −0.15* | 0.23** | 0.43** | −0.04 | 0.02 | 0.02 | 0.81 | | | | | | | | | | | | |
| Perceived Decision Quality | 4.01 | 0.83 | 0.78 | 0.07 | 0.01 | 0.11 | 0.03 | 0.17** | 0.06 | -0.03 | 0.09 | 0.88 | | | | | | | | | | | |
| Perceived Usefulness | 4.01 | 0.63 | 0.63 | 0.54** | −0.03 | 0.28** | 0.51** | 0.14* | 0.14* | -0.03 | 0.46** | 0.24** | 0.79 | | | | | | | | | | |
| Photography | 2.76 | 0.97 | 1 | 0.02 | 0 | 0.05 | −0.06 | −0.01 | 0.06 | 0.23** | 0.04 | −0.05 | −0.07 | 1 | | | | | | | | | |
| Prior Product Expertise | 3.82 | 0.72 | 0.72 | 0.07 | −0.07 | 0.07 | 0.05 | −0.01 | 0.17** | 0.08 | 0.12* | 0.13* | 0.01 | 0.29** | 0.85 | | | | | | | | |
| Relevancy | 3.92 | 0.58 | 0.68 | 0.72** | −0.11 | 0.4** | 0.67** | 0.03 | 0.03 | 0.06 | 0.61** | 0.08 | 0.62** | 0.02 | 0.11 | 0.82 | | | | | | | |
| Reliability | 3.44 | 0.56 | 0.64 | 0.6** | 0.02 | 0.44** | 0.55** | 0.01 | −0.04 | 0.1 | 0.49** | 0.06 | 0.45** | 0.05 | 0.02 | 0.6** | 0.8 | | | | | | |
| Perceived Review Consistency | 3.23 | 0.78 | 0.63 | 0.34** | 0.01 | 0.36** | 0.41** | −0.04 | −0.05 | 0.05 | 0.19** | 0.04 | 0.26** | -0.08 | -0.07 | 0.32** | 0.33** | 0.79 | | | | | |
| SMEB | 3.92 | 0.52 | 0.57 | 0.09 | −0.03 | 0.12* | 0.15* | 0.02 | 0 | 0.11 | 0.11 | 0.11 | 0.14* | -0.03 | 0.02 | 0.14* | 0.04 | 0.12* | 0.75 | | | | |
| SMSP | 3.85 | 0.55 | 0.57 | 0.27** | −0.08 | 0.29** | 0.24** | 0.02 | 0.06 | −0.03 | 0.29** | 0.04 | 0.29** | -0.02 | −0.03 | 0.33** | 0.33** | 0.21** | 0.4** | 0.75 | | | |
| Perceived Social Presence | 3.43 | 0.69 | 0.63 | 0.24** | −0.17* | 0.2** | 0.31** | −0.02 | 0.05 | 0.06 | 0.22** | -0.02 | 0.25** | 0.08 | 0.11 | 0.29** | 0.25** | 0.17** | 0.09 | 0.15* | 0.79 | | |
| Understandability | 4.02 | 0.51 | 0.6 | 0.44** | −0.08 | 0.53** | 0.5** | 0.03 | −0.01 | 0.06 | 0.4** | 0.19** | 0.37** | 0.01 | 0.12 | 0.53** | 0.49** | 0.31** | 0.11 | 0.3** | 0.2** | 0.77 | |
| Value-expressive Influence | 2.65 | 0.78 | 0.58 | 0.32** | −0.11 | 0.21** | 0.37** | −0.01 | 0 | −0.04 | 0.19** | −0.08 | 0.18** | 0.06 | -0.05 | 0.26** | 0.33** | 0.3** | −0.05 | 0.17** | 0.57** | 0.11 | 0.76 |

* Significant at the 5% level of significance.
** Significant at the 1% level of significance.

First, the Harman's one-factor test indicated that there was more than one factor that accounted for the majority of covariance (Petter et al., 2007). In the partial correlation procedures, the structural model was shown not to be affected greatly with a slightly increased R2 after a general factor was added into the model [108]. Finally, the marker-variable technique indicated a low percentage of changes, 0.68%, to variable correlations with significance when adjusted for CMV [109]. The analysis showed that CMV is not a big concern in this study.

## 6. Results

The structural model and hypotheses were tested using SmartPLS 2.0, and Table 8 summarizes the results. A bootstrapping procedure with 500 iterations was performed to examine the statistical significance of the weights and loadings of first-order constructs and the path coefficients [101].

Informational influence is formed primarily through perceived review quality ($\beta = 0.62$, $p < 0.01$), and H1a is supported. The impacts of perceived review consistency ($\beta = -0.01$, $p > 0.1$) and perceived social presence ($\beta = 0.05$, $p > 0.1$) on informational influence are not significant, and H1b and H1c are rejected. In contrast, value-expressive influence is jointly affected by perceived review quality ($\beta = 0.14$, $p < 0.1$), perceived review consistency ($\beta = 0.16$, $p < 0.05$), and perceived social presence ($\beta = 0.47$, $p < 0.01$), which account for 38.4% of the total variance. Therefore, H2a, H2b, and H2c are supported. In terms of the impacts of social influence, informational influence marginally impacts consumers' perceived decision quality ($\beta = 0.11$, $p < 0.1$) but value-expressive influence does not ($\beta = -0.1$, $p > 0.1$). Thus, H3a is supported but H3b is not. As expected, perceived usefulness of the website is significantly affected by both informational ($\beta = 0.44$, $p < 0.01$) and value-expressive influence ($\beta = 0.13$, $p < 0.05$), and both H4a and H4b are supported. Surprisingly, none of the moderating relationships are significant as hypothesized. Among the control variables, education is positively related to perceived decision quality and perceived usefulness. A consumer's interest in photography is negatively related to perceived usefulness. When a consumer is more familiar with the website, he is more likely to perceive it useful in helping him make a purchase decision.

In addition to the path coefficients and significance level, R-squares also suggest the overall model fitness [101]. Informational influence ($R^2 = 0.372$), value-expressive influence ($R^2 = 0.384$), and perceived usefulness ($R^2 = 0.308$) have reasonable R-squares. While the R-square for perceived decision quality ($R^2 = 0.051$) is low, it still provides useful and theoretically interesting insights. In addition, "the effect size $f^2$ is calculated as the increase in $R^2$ relative to the proportion of variance of the endogenous latent variable that remains unexplained" [110], pp. 304). From the $f^2$ values, the model has a large effect size for informational influence, value-expressive influence, and perceived usefulness and a small effect size for perceived decision quality.

We followed mediation analysis procedures [111,112] to test the mediating variables: informational influence and value-expressive influence. We tested alternative models where the direct relationship between antecedents and consequences of social influence was added. We found that informational influence and value-expressive influence fully mediated the relationship between perceived review quality, perceived review consistency, perceived social presence, and perceived decision quality, while informational influence and value-expressive influence partially mediated the relationship between perceived review quality, perceived review consistency, perceived social presence, and perceived usefulness.

**Table 6**
Assessment of a Second-order Formative Construct.

| Second-order Construct | First-order Construct | Weights | T-Value |
|---|---|---|---|
| Perceived Review Quality | Adequacy | 0.23*** | 16.46 |
| | Depth | 0.21*** | 15.86 |
| | Reliability | 0.29*** | 16.41 |
| | Relevancy | 0.24*** | 13.84 |
| | Understandability | 0.16*** | 9.60 |
| | Conciseness | 0.14*** | 8.22 |

*** Significant at the 1% level of significance.

## 7. Discussion

### 7.1. The formation of social influence from online reviews

The model indicates that user reviews do help form social influence. However, the mechanisms for developing the two types of social influence are different.

According to the results, informational influence is primarily developed through the perception of high-quality reviews. High-quality reviews allow consumers to better know a product, evaluate it more effectively, and make informed decisions. When consumers perceive that reviews are of high-quality, they are more likely to absorb the information, leading to stronger informational influence.

Interestingly, perceived review consistency does not significantly contribute to the formation of informational influence. When reviews are perceived to be consistent, they can be quickly aggregated into a simple clue. Consumers may be less likely to obtain additional information into their internal knowledge base from consistent reviews. Similarly, perceived social presence has limited impact on developing informational influence. Social presence represents the extent to which the website allows a consumer to experience others as being psychologically present. Such feeling is not necessarily helpful in enhancing consumers' knowledge about the product.

In contrast, development of value-expressive influence is jointly determined by perceptions of review quality, review consistency, and social presence. Our results suggest that consumers utilize multiple information cues to know others' overall attitudes toward a product to identify with them. It is easy for consumers to identify with and like reviewers who wrote high-quality reviews as perceived high quality increases the trustworthiness of reviewers. When reviewers express similar opinions of liking or disliking a product, consumers consider their opinions as a group opinion and use this group opinion as a social anchorage of behavior. High social presence facilitates the development of trust among strangers in the virtual world. With multiple information cues, consumers can identify themselves with reviewers whom they can trust and know more about and are more willing to follow.

**Table 7**
Assessment of a Second-order Reflective Construct.

| Second-order Construct | First-order Constructs | Loadings | T-Value |
|---|---|---|---|
| Self-monitoring | Ability to modify self-presentation | 0.84*** | 33.85 |
| | Sensitivity to expressive behavior of others | 0.83*** | 30.87 |

*** Significant at the 1% level of significance.

**Table 8**
Results of the Structural Model Analyses.

| | Informational Influence | Value-Expressive Influence | Perceived Decision Quality | Perceived Usefulness | Hypotheses |
|---|---|---|---|---|---|
| $R^2$ | 37.2% | 38.4% | 5.1% | 27.9% | |
| Perceived Review Quality | 0.62*** | 0.14* | | | H1a supported |
| | | | | | H2a supported |
| Perceived Review Consistency | −0.01 | 0.16** | | | H1b rejected |
| | | | | | H2b supported |
| Perceived Social Presence | 0.05 | 0.47*** | | | H1c rejected |
| | | | | | H2c supported |
| Informational Influence | | | 0.11* | 0.44*** | H3a supported |
| | | | | | H4a supported |
| Value-expressive influence | | | −0.10 | 0.13** | H3b rejected |
| | | | | | H4b supported |
| Prior Product Expertise | 0.08 | | | | |
| Self-Monitoring | | −0.12 | | | |
| *The Moderating Effect of Prior Product Expertise* | | | | | |
| PRQ*PPE | −0.02 | | | | H5a rejected |
| PRC*PPE | −0.04 | | | | H5b rejected |
| PSP*PPE | 0.02 | | | | H5c rejected |
| *The Moderating Effect of Self-Monitoring* | | | | | |
| PRQ*SM | | 0.04 | | | H6a rejected |
| PRC*SM | | 0.03 | | | H6b rejected |
| PSP*SM | | 0.06 | | | H6c rejected |
| *Control Variables* | | | | | |
| Age | | | 0.01 | 0.05 | |
| Gender | | | 0.04 | 0.04 | |
| Education | | | 0.17*** | 0.12* | |
| Website Familiarity | | | 0.05 | 0.14*** | |
| Photography Interest | | | −0.05 | −0.11* | |

*** Significant at the 1% level of significance.
** Significant at the 5% level of significance.
*Significant at the 10% level of significance.

### 7.2. The impacts of social influence

It is interesting to find out that social influence has limited impact on consumers' confidence in making purchase decisions. Specifically, informational influence is marginally associated with perceived decision quality, while value-expressive influence is not.

When consumers are influenced by reviewers as a result of knowledge acquisition, they have a better understanding of the product and make a more confident purchase decision. Although significant, consumers get marginal influence from external knowledge to make their purchase decisions. There are a couple of possible explanations. First, in this research, the product selected is a digital camera. As digital cameras are search products, product specifications such as color, weight, pixels, and optical zoom are very important dimensions for consumers to consider. These technical details are factual information typically provided on the website. Consumers do not need to rely on experience-based user reviews for those specifications. Thus, informational influence from others' opinions may not be the dominant factor in increasing consumers' confidence in making purchase decisions. Second, in this controlled laboratory environment, participants were asked to make a purchase decision on a single digital camera. It may be that participants would feel more confident if they were given multiple cameras to compare before making the decision.

Value-expressive influence has no significant impact on perceived decision quality. This implies that although consumers tend to identify themselves with a group of people and would like to be like others, they do not necessarily feel confident in decision-making. Consumers' confidence does not simply come from being like others without knowing anything.

Similar to prior research conducted through the Amazon platform (Kumar and Benbasat 2006), we confirm that user reviews increase the usefulness of the website. Moreover, our results suggest that social influence mediates the link between user reviews and perceived usefulness of the website. If online reviews persuade consumers by providing information and by being a reference group, they can increase consumers' evaluation toward the hosting website.

### 7.3. The moderating effect of prior product expertise

In the system-generated recommendation systems, products are recommended to consumers based on consumers' preferences and a certain algorithm. Researchers have shown that novice consumers are more likely to rely on the systems to make purchase decisions as the system increases their confidence in the decision-making process [80].

In our study, products are recommended to consumers depending on others' real experiences of using them. The results indicate that there are no significant differences between knowledgeable and less knowledgeable consumers in relying on others' opinions to develop informational influence. One possible explanation is that prior product expertise and user reviews are complementary in helping consumers evaluate the product. User reviews are mostly about personal experiences of the product and provide case-by-case customized knowledge. They facilitate better understanding of the product performance from various perspectives, so even knowledgeable consumers are open to others' opinions.

### 7.4. The moderating effect of self-monitoring

This study also tested the moderating role of self-monitoring on the relation between social influence and its antecedents and found no significant effect. Self-monitoring captures an individual's sensitivity to others' attitudes by tailoring the individual's actions in accordance with socially desirable behaviors. Typically, an individual's self-monitoring is measured by his or her responses to others through face-to-face interactions and observations of facial expression, motives, and emotions. The scenario changes when self-monitoring is used to predict online consumer behaviors. First, there are few personal interactions between consumers and reviewers. The interaction is mostly limited to the writing–reading relationship. Even with the help of a variety of system features to know reviewers, consumers are not familiar with reviewers as much as in the offline setting. As a result, sensitivity to reviewers' attitudes may be difficult to form and detect based on currently available IT artifacts. Second, it is reasonable to argue that sensitivity in the real world may not carry over into the virtual world. For example, in the virtual world, especially when a virtual community is made up of strangers, more efforts are needed to build trust and sense of belonging among strangers than in the face-to-face context. Depending on the system features or mechanisms through which a community is managed, an individual could behave differently from his or her offline setting, becoming more or less sensitive to others' actions and tailor own behavior accordingly. Therefore, the role of this construct may indeed be different in an online context.

### 7.5. Managerial implications

This study provides useful insights on product promotion for commercial websites and product development for manufacturers. The primary goal is to maximize the business value of user reviews and leverage their potential social influence to enhance consumers' confidence in their decisions and in the website, ultimately increasing sales and customer loyalty [113].

Given that perceived review quality plays a critical role in developing informational and value-expressive influence, the website needs to consider about how to motivate reviewers to post high-quality reviews. The website could increase the visibility of reviewers in the community or give discounts to those reviewers whose reviews are helpful to consumers. These incentive mechanisms could enhance reviewers' loyalty and sense of belonging to the website, thus encouraging more active involvement in the review activities. In addition, the website could implement quality control mechanisms to ensure review quality. For example, the website could introduce a moderator to centrally manage reviews.

As the model indicates, perceived review consistency is positively related to value-expressive influence. The more inconsistent reviews are perceived, the more difficulty consumers may have in assessing the relative value of opinions. In that case, the social influence from user reviews will be limited. Hence, to minimize the confusion, the website might introduce an expert/professional reviewer. This may clear some of the concerns raised by consumers in the presence of inconsistent reviews.

Websites could also make design changes that leverage IT artifacts to increase the exposure of reviewers to consumers and thus facilitate trust building among both parties. With a closer relationship, reviewers could be more influential to consumers, and reviews could be perceived more valuable and appreciated by consumers.

Because user reviews do help form strong social influence, websites could benefit by encouraging consumers to post reviews after purchase. Amazon.com, for example, sends an email to consumers soliciting product reviews in about 2 weeks after purchase. To encourage more reviews to be posted, websites may set up incentives to consumers, such as offering free expedited shipping for the next purchase or adding additional points in the user account for redemption. Websites could also manage the

system to make posting reviews easier and efficient. By linking user reviews with consumers' purchase benefits and improving usage experiences, websites could expect more reviews from consumers.

Given the potential influence of user reviews, manufacturers may consider user reviews as a superior information platform to have a better idea about what consumers consider about their products. User reviews can help manufacturers know how to improve the product and address potential problems in terms of functionality, aesthetic design, and so on, to adapt to consumers' changing needs and maintain their market share in such a competitive environment. User reviews can also be used as a marketing tool to launch product campaigns as they are perceived as more influential and persuasive than marketer-generated ads or editorial reviews. For example, a banner could be placed online or in TV ads, stating that the average rating of product X is 4.5 stars and ranks in the top 10 bestselling in its category.

### 7.6. Theoretical contributions

This study contributes to the IS research in the following ways. First, SIT has been applied to the IS field to understand how social influence affects system adoption and usage. In this research stream, sources of social influence come mainly from supervisors, peers, and friends with whom individuals are familiar [39]. This study takes a different angle to investigate social influence from anonymous reviewers and extends the use of SIT in the IS literature. Our findings suggest that anonymity does not prevent the formation of social influence. Consumers can be affected by unknown reviewers through asynchronous text-based communication. Because of the lack of direct interpersonal interactions, consumers rely on multiple information cues, such as review quality and consistency, to learn from and identify with strangers who provide online reviews. In addition, system design matters as perceived social presence contributes to the formation of value-expressive influence. Well-designed websites should facilitate among their users an awareness of others, leading to better system evaluation.

Second, to explore the development of social influence from user reviews, this is one of the first IS studies that recognizes and differentiates types of social influence and simultaneously examines their antecedents and impacts. By doing so, this study advances our knowledge about the different mechanisms through which social influence is developed.

Third, this study incorporates individual characteristics to better understand the formation of two types of social influence. Our empirical results suggest that neither prior own knowledge nor self-monitoring affect the formation of social influence from online reviews.

Last but not least, this is one of the few IS studies that empirically validated the measurement items for two types of social influence and for self-monitoring in the online setting. These scales have received heated debate and validation in the sociology and marketing literature but are less understood in the IS literature, particularly in the context of e-commerce.

### 7.7. Limitations and future research

There are several limitations worthy of further investigation. First, as the unit of analysis is the individual product, participants were asked to evaluate the product based on their overall perceptions on a set of user reviews rather than perceptions on individual reviews. Our approach is a realistic depiction of how a typical consumer uses online reviews. However, to find out how to provide more influencing reviews, future research could explore the impact of individual reviews. Second, as we used the digital camera to validate the model, we did not investigate how social influence varies across product categories. Social influence and consumer decision-making might be different in the case of search vs. experience products and ordinary product vs. luxury products. Therefore, future studies including more products from a variety of categories could be helpful to enhance the generalizability of our findings. Third, we conducted the survey in a controlled laboratory environment. To better simulate a natural setting to establish how reviews are used, future research can apply other methods, such as field experiments, with support and collaboration from industry practitioners.

### 7.8. Concluding remarks

This study investigates an emerging research topic on the value of user reviews in e-commerce. The model indicates that user reviews can form strong social influence that impacts consumers' decision-making in online shopping. However, antecedents and consequences are different between the two types of social influence, i.e., informational influence and value-expressive influence. We highlight the business value of user reviews and shed light into how commercial websites and manufacturers can improve system design to manage and leverage user reviews to offer better products and services to consumers.

## Appendix A.

**Survey Items** (5-point Likert scale: 1-stronly disagree, 5-strongly agree)

Demographics

- Gender: A. Male B. Female
- Age: 1. 18–30 2. 31–40 3. 41–60 4. >60
- What is the highest level of education you have completed? A. High school or equivalent B. Vocational/technical school (2 year) C. Some College D. Bachelor's degree E. Master's or higher degree F. Others
- Are you interested in photography? A. Yes B. No
- I am familiar with user reviewers on Amazon.com

**Perceived Review Quality**
**Adequacy**
Adeq1: User reviews are adequate.
Adeq2: The amount of information in the reviews matches my needs.
Adeq3: User reviews are sufficient for my needs. (R)
**Depth**
Dept1: User reviews for the given product are in-depth.
Dept2: User reviews provide me with comprehensive information.
Dept3: User reviews provide me with all the detailed information I need.
**Reliability**
Reli1: User reviews are trustworthy.
Reli2: User reviews are reliable.
Reli3: User reviews are credible.
Reli4: User reviews come from reputable sources.
**Relevancy**
Rele1: User reviews are informative for my needs.
Rele2: User reviews are valuable for my needs.
Rele3: User reviews are relevant to my needs.
**Understandability**
Unde1: User reviews are clear in meaning.
Unde2: User reviews are easy to read.
Unde3: User reviews are understandable.
**Conciseness**
Conc1: User reviews are formatted compactly.
Conc2: User reviews are presented concisely.
Conc3: User reviews are presented in a compact form.
**Perceived Review Consistency**
RC1: User reviews are consistent.
RC2: Reviewers' opinions are similar.
RC3: User reviews are not contradictory.
**Perceived Social Presence**
PSP1: There is a sense of human contact in the website.
PSP2: There is a sense of personalness in the website.
PSP3: There is a sense of sociability in the website.

(*Continued*)

| Demographics |
|---|
| PSP4: There is a sense of human warmth in the website. |
| PSP5: There is a sense of human sensitivity in the website. |
| **Informational Influence** |
| II1: My purchase decision has been influenced by reviews I have read. |
| II2: My observation of what reviewers think of the product influenced my purchase decision. |
| II3: I obtained information from reviewers before making my purchase decision. |
| II4: To make sure I buy the right product, I have observed what reviewers think of the product. |
| **Value-expressive Influence** |
| VI1: I feel that these reviewers possess the characteristics that I would like to have. |
| VI2: I feel that it would be nice to be like these reviewers. |
| VI3: I feel that these reviewers are admired or respected by others. |
| VI4: It is important that the reviewers have the same feeling about the product as I do. |
| VI5: I have achieved a sense of belonging by following reviewers' recommendations. |
| VI6: I have followed the reviewers' recommendations because I want to be like them. |
| VI7: I am willing to identify with reviewers by making the purchase decision based on their recommendations. |
| **Perceived Decision Quality** |
| PDQ1: I am confident that my purchase decision suits my needs. |
| PDQ2: I am confident that my purchase decision matches my pReferences |
| PDQ3: I would make the same purchase decision if I had to make the decision again. |
| PDQ4: This is clearly the right purchase decision for my needs. |
| **Perceived Usefulness** |
| PU1: The website is useful in shopping for XXX. |
| PU2: The website improves my performance in shopping for XXX. |
| PU3: The website enables me to shop for XXX. |
| PU4: The website enhances my effectiveness in XXX shopping. |
| PU5: The website makes it easier to shop for XXX. |
| PU6: The website increases my productivity in shopping for XXX. |
| **Prior Product Expertise** |
| PPE1: I'm knowledgeable about the product. |
| PPE2: I'm experienced with the product. |
| PPE3: I'm competent with the product. |
| PPE4: I'm familiar with the product. |
| PPE5: I understand the features of the product well enough to evaluate. |
| **Self-monitoring** |
| **Ability to modify self-presentation (SP)** |
| SMSP1: In social situations, I have the ability to alter my behavior if I feel that something else is called for. |
| SMSP2: I have the ability to control the way I come across to people, depending on the impression I wish to give them. |
| SMSP3: When I feel that the image I am portraying isn't working, I can readily change it to something that does. |
| SMSP4: I have found that I can adjust my behavior to meet the requirements of any situation in which I find myself. |
| SMSP5: Once I know what a situation calls for, it's easy for me to regulate my actions accordingly. |
| **Sensitivity to expressive behavior of others (EB)** |
| SMEB1: I am often able to read people's true emotions correctly (through their eyes). |
| SMEB2: My powers of intuition are quite good when it comes to understanding the emotions and motives of others. |
| SMEB3: I can usually tell when others consider a joke to be in bad taste, even though they may laugh convincingly. |
| SMEB4: I can usually tell when I've said something inappropriate by reading it in the listener's eyes. |
| SMEB5: If someone is lying to me, I usually know it at once from that person's manner of expression. |

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