Investigating the Influence of Product Reviews on Perceived Uncertainty in Online Transactions

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Investigating the Influence of Product Reviews on Perceived Uncertainty in Online Transactions

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ABSTRACT

Customers’ concerns about the potential risks in online transactions hinder the development of e-commerce. Researchers have devoted a lot of effort to looking for a way to alleviate the uncertainty pertaining to these risks. Online customer reviews designed to deliver information in addition to a manufacturer’s product description, have attracted researchers’ attention. In this study, we assume that the risks in an online transaction originate specifically from sellers’ hidden information and hidden actions. With the aid of customer reviews of products, we want to measure how this uncertainty and these risks can be alleviated. In addition, we measure the effects of customer reviews with different argument qualities and different star ratings.

KEYWORDS

Product reviews, informativeness, normativeness, information asymmetry, seller opportunism, uncertainty

INTRODUCTION

Different from the conventional market, the e-market is characterized by spatial and temporal separation between sellers and customers. This nature of the e-market engenders uncertainty in online transactions, and eventually hinders further development of the e-market. Basically, this uncertainty in e-commerce arises from the possibility that the transaction may not be finished for reasons such as fraud, counterfeit products, breaking of agreements and so on (Pavlou, Huigang, & Yajiong, 2007). Because uncertainty may arouse customers’ fear of risk, high-perceived uncertainty may end up as high-perceived risk and weaken customers’ intention to buy products (Pavlou, et al., 2007). To avoid this problem, it is important for researchers to clearly understand the factors influencing this uncertainty.

There has been a long history of study on customer reviews mainly in the marketing discipline. Before the internet prevailed, customer reviews were simply called “Word of Mouth.” The influence of word-of-mouth from the view of advertising, manufacturer reputation, or retailer reputation, has been discussed (Purohit & Srivastava, 2001). Different from traditional word-of-mouth, online customer reviews do not rely on personal social networks but on virtual social networks, and have a stronger ability to influence people with different backgrounds. In the past decade, much effort in the IS discipline has been devoted to the study of online customer review systems.

To date, IS research on online customer reviews can be summarized into the following three streams. The first stream consists of content analysis of customer reviews using techniques such as text mining of linguistic cues. For example, Pavlou and Dimoka (2006) classify reviews into five categories based on the trust belief embedded in the reviews, and find that high trust can lead to a high price premium (Pavlou & Dimoka, 2006). The second stream consists of quantitative approaches. For instance, resorting to a Tobit regression model, Mudambi and Schuff conclude that perceived helpfulness of reviews is mathematically associated with review extremity and review depth and is moderated by product type (Mudambi & Schuff, 2010). The third stream of studies uses behavioral research techniques to explore the impact of customer reviews on customers’ behavior in e-commerce. For instance, Awad and Ragowsky measured the moderating effect of gender in online shopping and found that customer reviews could affect customers’ perception of trust by shifting their attitude to sharing opinions and responding to others (Awad & Ragowsky, 2008).

Among the three research streams, the first two, especially the second stream, are more prevalent in IS research. Researchers have been more inclined to construct quantitative models to quantify the influence of customer reviews on factors such as price premium, sales, or perceived helpfulness and so on (Awad & Ragowsky, 2008; Mudambi & Schuff, 2010). However,
this type of study generally exaggerates the ability of mathematical functions to explain customers’ activity. These models are a kind of post hoc analysis, established based on the pre-existing data. They are excellent for predicting outcomes, but fail to explain in a logical way why these customer reviews work the way they do. The third stream, behavioral studies, can compensate for the drawbacks of the first two streams. However, these studies are still at an early stage. Researchers have studied the adoption of single reviews, the trust feeling engendered by reviews, or how reviews alter customers’ purchase intention. But this research lacks a comprehensive understanding of the function of customer reviews in purchase decisions. Many questions associated with customer reviews remain unanswered.

Uncertainty, as an important component of online transactions, influences customers’ decisions to purchase. It results from customers’ perception of risk in online transactions. The platform of online customer review networks provided by sellers work to reduce this perception of risk and, therefore, uncertainty. However, customer reviews themselves are very complicated, impacted by many factors, such as star rating, argument quality, format, sources of information and so on. It is unclear how customer reviews work and what types of reviews work. The objective of this study is twofold. First, we want to investigate whether customer reviews can really reduce customers’ worries about risk and uncertainty in online transactions. Second, we also want to explore different types of reviews to see how they actually work.

In the rest of this paper, we introduce the theoretical background of this study by reviewing both related theories and constructs in the model. Second, we explain the model proposed in this study and the related hypotheses. Third, we present and analyze experiment design and results. Fourth with the post hoc analysis, we explore the function of different reviews in the decision-making process. The paper ends with a discussion of the conclusions of the study and future research.

THEORETICAL BACKGROUND
Elaboration Likelihood Theory (ELM)
The Elaboration Likelihood Model (Petty & Cacioppo, 1984) has been used to explain how arguments alter people’s attitude. ELM posits two distinct routes of persuasion processing: a central route and a peripheral route. The central route refers to the approach to attitude change caused by a person’s careful consideration of the information (Petty & Cacioppo, 1984). The quality and quantity of information in the arguments can alter people’s perception of persuasion. The peripheral route is an issue-irrelevant cognitive activity (Petty & Cacioppo, 1984). People who take the peripheral route to process information lack the motivations to think about the information in the argument. Instead, they make judgments based on cues such as mental shortcuts, credibility, and appearance.

ELM fits our study for the following reasons. First, the purpose of the study is to investigate the uncertainty about products and sellers in online transactions. It is about an attitude toward the purchasing of products online, reflecting the responders’ impression of the product and the seller. Second, the characteristics of customer reviews determine the fit of ELM. Customer reviews as persuasive messages affect viewers’ attitudes toward the product through their argument quality and positiveness (affirmation). Argument quality is determined by the information quality and format of the reviews. A review with high quality has sufficient reasons, and be clearly stated and persuasive. A low quality review is one that lacks details to support its standpoint and is full of emotional words. With a group of reviews, a normative attitude toward the product is formed and alters recipients’ attitudes. For example, a product with 90% positive reviews is definitely more favored than a product with 10% positive reviews. Third, past research has adopted ELM to study customer reviews. ELM has been employed to explain the influence of perceived informativeness (the informant role), popularity (the recommender role)(Park & Lee, 2008), quality, and quantity of reviews (Park, Lee, & Han, 2007) on purchasing intention, and the influence of consumers’ prior knowledge on message processing of e-WOM (Park & Kim, 2008). To sum, we believe ELM is an appropriate theory to use in the study, and we use informativeness and normativeness to denote the two routes.

Risks in Online Transactions
Because of their spatial and temporal separation, customers worry about sellers’ hidden information and hidden actions in the buyer-seller relationship. Hidden information means that sellers may intentionally hide information about the product and transaction. Hidden action means that sellers may break their promise by sending low quality or counterfeit products to customers. There are other risks in online transactions, such as the risks pertaining to information security or privacy. They are not related to the reviews being discussed in this study and are not considered here. In order to reduce uncertainty due to hidden information and actions, sellers have taken many measures, such as improving the design of their website or cooperating with a well-known third party. Customer reviews as one of those measures are used to help customers know more about the product and to reduce their uncertainty about the transaction with sellers. Based on this logic, we developed a nomological network to study the role of customer reviews. Figure 1 illustrates the conceptual model related to risks. We assume that the uncertainty is engendered by the perception of risks, and that the stimuli created by sellers can reduce
customers’ perceived risks and uncertainty. In this study, we integrate ELM with this nomological network to study the role of customer reviews.

![Figure 1. The conceptual model related to risks](image)

**RESEARCH MODEL AND HYPOTHESES**

**Perceived Informativeness of Reviews**

“Informativeness” refers to the amount of information conveyed by product reviews. Theoretically, the more information customers read about the product, the more uncertainty about either the product or the seller can be alleviated. Park and Lee find that attribute-value reviews are more informative than simple-recommendation reviews (Park & Lee, 2008). Furthermore, the relationship between customer reviews and customers’ information cognition has been found to be moderated by customers’ expertise (Park & Kim, 2008). When the expertise is high, attribute-centric reviews have a stronger influence on information cognition than do benefit-centric reviews. This relationship is reversed when the expertise is low. Based on these findings, we assume that the type of review can affect the informativeness, and the information in customer reviews can reduce customers’ concern about hidden information and hidden actions. We formally hypothesize:

**H1:** Perceived informativeness of reviews has a negative influence on perceived information asymmetry.

**H2:** Perceived informativeness of reviews has a negative influence on the fear of seller opportunism.

**H3:** Perceived informativeness of reviews has a negative influence on the perception of uncertainty.

**Perceived Normativeness of Reviews**

The “normativeness” of reviews refers to the general attitude of the reviewers toward the product, and measures whether most of the reviewers favor the product or not. For a single review, Cheung et al. find that the normative factors such as recommendation consistency and recommendation rating can positively influence the perceived credibility of that review (Cheung, Luo, Sia, & Chen, 2009). Etzion and Awad find that the effect of volume on demand depends on whether consumers perceive a product’s valence in a positive or a negative way (Etzion & Awad, 2007). To simulate a real purchasing process, it is unrealistic to present only either positive or negative reviews to customers. These two types of reviews are normally mixed together. The proportion of positive reviews to negative reviews can be different across products. The normativeness of reviews is used to capture the attitude toward the product engendered by this difference. For example, if 9 out of 10 reviews are positive, in general the product is favored by most of the reviewers, although one person may dislike it. Obviously, this normativeness is related to the star rating of each single review. The star rating of a review reflects whether the review is positive or negative, and the product is favored or not. Basically, we assume that the normativeness of reviews can alleviate customers’ concern about hidden information and hidden actions. We formally hypothesize:

**H4:** Perceived normativeness of reviews has a negative influence on perceived information asymmetry.

**H5:** Perceived normativeness of reviews has a negative influence on the fear of seller opportunism.

**H6:** Perceived normativeness of reviews has a negative influence on the perception of uncertainty.
Perceived Information Asymmetry and Fear of Seller Opportunism

Customers’ perception of risk is rooted in the possibility of hidden actions and hidden information. Hidden action are the activities by which sellers reduce the quality of the promised product after it is purchased, while hidden information refers to the misrepresentation of sellers’ characteristics and product quality (Pavlou, et al., 2007). High-quality sellers are reliable and deliver products of good quality in a timely manner, while low-quality sellers hide information about either themselves or the product (Pavlou, et al., 2007). Pavlou et al. proposed that there are four types of perceived risks in online transactions: perceived information asymmetry, fear of seller opportunism, information privacy concerns, and information security concerns. Information privacy and security concerns are more related to the environment provided by web portals. Here we isolate the influence of customer reviews from that of web portals by not providing any information about web portals in the experiment. Thus, information privacy and security concerns are outside our consideration. On the other hand, information asymmetry is assumed to correspond to hidden information (Pavlou, et al., 2007), which is caused by the asymmetrical distribution of information between buyer and seller. Seller opportunism is assumed to correspond to hidden actions (Pavlou, et al., 2007), such as quality cheating, contract default, or failure to acknowledge a return or provide refund, etc. These two types of risks are more related to our scenario of interest. Thus, we will focus on information asymmetry and seller opportunism to measure perceived risk in online shopping. We formally hypothesize:

**H7:** Perceived information asymmetry has a positive influence on consumers’ perceived uncertainty in online transactions.

**H8:** Fear of seller opportunism has a positive influence on consumers’ perceived uncertainty in online transactions.

**Perceived Uncertainty**

Uncertainty refers to the state related to unpredictability, indeterminacy, or indefiniteness. In the context of e-commerce, perceived uncertainty is defined as “the degree to which the outcome of a transaction cannot be accurately predicted by the buyer due to seller and product related factors” (p.107) (Pavlou, et al., 2007). Uncertainty has been viewed as a barrier to e-commerce adoption (Pavlou & Fygenson, 2006). Many studies have investigated ways to reduce the uncertainty in e-commerce. For example, Gefen argues that familiarity is a prerequisite of trust and that trust is an important factor in economic transactions; both of familiarity and trust can help reduce the uncertainty and simplify the buyer-seller relationship in transactions (Gefen, 2000). By comparing two Ebay businesses, Gregg claims that increasing the quality of e-image can reduce both the uncertainty and perceived risks surrounding the online transaction. However, most research only treats uncertainty as a background concept without directly measuring it. Uncertainty engenders customers’ reluctance to engage in the online transaction. Logically, less uncertainty will lead to more intention to transact online. So we believe the perception of uncertainty to some extent can reflect customers’ purchase intention. Figure 2 illustrates the proposed research model in this study.

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EXPERIMENT DESIGN

Measurement Development

All measurement items for the study were adopted and adapted from previous research. To empirically test the nature of perceived uncertainty in online transactions, we selected the purchasing of an Internet media player (Archos 5) as the context in the experiment. We chose it for the following reasons. First, because it is quite normal for people to buy electronic products online, the purchasing of an Internet media player could be a good representative of online shopping behavior. Second, product type has been argued as an influential factor in online transactions (Mudambi & Schuff, 2010). Products such as MP3 players, music CDs, and PC video games, are classified as experience products (Mudambi & Schuff, 2010). It is difficult to assess the quality of experience product prior to interacting with them; and in most cases, the quality of the products relies on an individual’s senses. On the other hand, products such as cell phones, digital cameras, and Laser printers, are classified as search products (Mudambi & Schuff, 2010). Compared to experience products, the quality of search products is easier to evaluate objectively. It is possible to assess the quality of products through obtained information prior to interaction with the products.

Survey Administration

An online survey created on Qualtrics.com was emailed to around 450 undergraduate students in the business school of a mid-western university in the US. Qualtrics is a web-based Survey Software that enables users to develop and collect responses to surveys. All the instruments used in the survey were assessed on a five-point scale anchored at 1=strongly disagree, 3=neutral and 5=strongly agree. As discussed earlier, to manipulate the influence of product reviews, we categorized the reviews into several subgroups based on the quality and positiveness (star rating) of reviews. Table 1 illustrates the reviews used in the study.

<table>
<thead>
<tr>
<th>Datasets</th>
<th>Number of responses</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version 1</td>
<td>19</td>
<td>4 high quality positive reviews</td>
</tr>
<tr>
<td>Version 2</td>
<td>24</td>
<td>4 low quality positive reviews</td>
</tr>
<tr>
<td>Version 3</td>
<td>32</td>
<td>4 high quality negative reviews</td>
</tr>
<tr>
<td>Version 4</td>
<td>26</td>
<td>4 low quality negative reviews</td>
</tr>
<tr>
<td>Version 5</td>
<td>21</td>
<td>2 high quality positive reviews + 2 high quality negative reviews</td>
</tr>
<tr>
<td>Version 6</td>
<td>23</td>
<td>2 high quality positive reviews + 2 low quality negative reviews</td>
</tr>
<tr>
<td>Version 7</td>
<td>29</td>
<td>2 high quality negative reviews + 2 low quality positive reviews</td>
</tr>
<tr>
<td>Version 8</td>
<td>24</td>
<td>2 low quality positive reviews + 2 low quality negative reviews</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 1. The description of the datasets collected in the study

DATA ANALYSIS

Description Statistics

Initially we received 373 responses to the survey. After deleting incomplete responses, in which less than 20% of the questions were answered, 364 responses were left. The participants in this experiment were from different classes in the business school, and students may have been enrolled in more than one of these classes. To avoid repeated responses, we placed a question at the end of the survey to check whether it is their first response to the survey. Based on the question, we deleted 9 non-first responses. In the surveys, we intentionally asked our participants to choose “strongly agree” or “strongly disagree” to check the quality of their responses. Based on these validating questions, we had 215 responses. Finally, we deleted the responses with missing values and reversed the answers for Q1, 2, and 4 on security concerns. After these operations, we had 198 valid responses in the database: 43.4% of them are females. Although the respondents are mostly young and high educated, compared to other online shopping research, the difference is not significant. In the experiment, 93.9% of the participants had more than one online shopping experience in the previous year, and 13.6% of them had shopped more than 20 times. Because of their shopping experience, we believe our subjects have sufficient experience and can understand our material in the experiment very well.
Manipulation Check

As discussed earlier, the argument quality and the positiveness of product reviews can influence customers’ attitude toward the product. To check this relationship, several questions about argument quality were intentionally put in the survey. They are used only for manipulation checks, not in the structural model. All the analyses are conducted via ANOVA. Among the eight versions of reviews, the first four versions incorporate only negative or positive reviews, while the last four versions contain mixed reviews. To clearly understand the relationship, in this part we only used the first four versions in the analysis. Hence the valid responses total 101 instead of 198. Based on the outcome of ANOVA, there is a significant difference between high quality and low quality reviews; however the positiveness of reviews has no influence on their argument quality. These results are consistent with our assumptions. However, the mean of each question is around 4 regardless of the quality of the review, suggesting that for customers all reviews are informative, convincing, valuable, and persuasive, although the degree of this agreement is statistically different for reviews of different quality. This finding is consistent with that of informativeness. At p<0.05, the informativeness of reviews is statistically influenced by the quality but not by the positiveness (star rating) of the reviews. However, similar to argument quality, the means of the questions on informativeness are around 4, suggesting a high level of informativeness regardless of the quality of the reviews. Finally, the analysis shows that the perceived uncertainty is statistically influenced by both the quality and positiveness of reviews. Further analysis shows an interaction effect between quality and positiveness. Positive and high quality reviews engender the lowest uncertainty, while negative and low quality reviews engender the highest uncertainty. We also assume that customers’ perception of the normativeness of reviews is affected by the quality and positiveness of the reviews. Based on the result of ANCOVA, both the main effects and the interactive effect of the quality and positiveness are significant. Specifically, the low quality reviews have low normativeness, and the negative reviews also have low normativeness, which is consistent with our previous assumption. For brevity, we do not put the statistical outcomes of this analysis in the paper.

Measurement Validation

We used SmartPLS2 for measurement validation and testing the structural model. The descriptive statistics for the study are shown in Table 2. Reliability represents composite reliability. Composite reliabilities of all principal constructs are considered adequate since they exceed 0.90. Convergent and discriminant validity are tested as follows: 1) all AVEs in Table 2 are greater than 0.50, suggesting that the variances explained by the constructs are much higher than the error variance; 2) the square roots of the AVEs are larger than the cross-correlations of the constructs; 3) all the cross-correlations of the constructs are lower than 0.90, which means the constructs are distinct from each other. Also an excellent cross-loading matrix (shown in Table 3) indicates adequate convergent and discriminant validity.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Standardized Mean (STD)</th>
<th>Reliability</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familiarity</td>
<td>0.90(0.14)</td>
<td>0.96</td>
<td>0.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fear_Seller_Opportunism</td>
<td>0.92(0.03)</td>
<td>0.92</td>
<td>-0.13</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Normativeness</td>
<td>0.98(0.01)</td>
<td>0.99</td>
<td>0.00</td>
<td>-0.44</td>
<td>0.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Perceived_Uncertainty</td>
<td>0.92(0.02)</td>
<td>0.95</td>
<td>-0.16</td>
<td>0.53</td>
<td>-0.40</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Information_Asymmetry</td>
<td>0.84(0.14)</td>
<td>0.91</td>
<td>-0.09</td>
<td>0.12</td>
<td>0.06</td>
<td>0.15</td>
<td>0.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Prod_Intro_Informativeness</td>
<td>0.78(0.21)</td>
<td>0.91</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.13</td>
<td>-0.15</td>
<td>-0.03</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>7. Review_Informativeness</td>
<td>0.85(0.09)</td>
<td>0.93</td>
<td>-0.12</td>
<td>0.12</td>
<td>-0.08</td>
<td>0.15</td>
<td>0.10</td>
<td>0.12</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Note: all the values on the diagonal of correlation matrix represent AVE (Average Variance Extracted).

Table 2. Descriptive statistics, correlations and AVE

---

The standardized path coefficients for testing the structural model are shown in Figure 3. Contrary to our expectation, only the path of perceived normativeness to fear of seller opportunism to perceived uncertainty is statistically significant. The upper part of the model is not significant, which suggests that the effect of review informativeness and perceived information asymmetry are not significant in the model. Based on this outcome, it seems the only risk of concern in online transactions is seller opportunism (hidden actions). Information asymmetry (hidden information) is not considered in the context of customer reviews.

### Table 3. Cross Loading Matrix

<table>
<thead>
<tr>
<th>Fam</th>
<th>Sel_Opp</th>
<th>Nor</th>
<th>Uce</th>
<th>Inf_Asy</th>
<th>Pro_Info</th>
<th>Rev_Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asy_1</td>
<td>-0.08</td>
<td>0.07</td>
<td>0.11</td>
<td>0.13</td>
<td>0.81</td>
<td>-0.04</td>
</tr>
<tr>
<td>Asy_2</td>
<td>-0.11</td>
<td>0.10</td>
<td>0.06</td>
<td>0.13</td>
<td>0.92</td>
<td>-0.03</td>
</tr>
<tr>
<td>Asy_3</td>
<td>-0.04</td>
<td>0.15</td>
<td>0.00</td>
<td>0.15</td>
<td>0.90</td>
<td>-0.03</td>
</tr>
<tr>
<td>Fam_1</td>
<td>0.92</td>
<td>-0.13</td>
<td>-0.01</td>
<td>-0.15</td>
<td>-0.10</td>
<td>0.07</td>
</tr>
<tr>
<td>Fam_2</td>
<td>0.95</td>
<td>-0.12</td>
<td>0.01</td>
<td>0.15</td>
<td>-0.09</td>
<td>0.02</td>
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<tr>
<td>Fam_3</td>
<td>0.88</td>
<td>-0.07</td>
<td>0.00</td>
<td>0.13</td>
<td>-0.07</td>
<td>-0.01</td>
</tr>
<tr>
<td>Fam_4</td>
<td>0.97</td>
<td>-0.14</td>
<td>0.01</td>
<td>0.16</td>
<td>-0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>Nor_1</td>
<td>0.02</td>
<td>-0.45</td>
<td>0.98</td>
<td>-0.39</td>
<td>0.03</td>
<td>0.14</td>
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<tr>
<td>Nor_2</td>
<td>0.00</td>
<td>-0.42</td>
<td>0.98</td>
<td>-0.39</td>
<td>0.06</td>
<td>0.12</td>
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<tr>
<td>Nor_3</td>
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<td>-0.43</td>
<td>0.98</td>
<td>-0.40</td>
<td>0.08</td>
<td>0.11</td>
</tr>
<tr>
<td>Opp_2</td>
<td>-0.14</td>
<td>0.94</td>
<td>-0.46</td>
<td>0.51</td>
<td>0.10</td>
<td>0.02</td>
</tr>
<tr>
<td>Opp_3</td>
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<td>0.90</td>
<td>-0.34</td>
<td>0.46</td>
<td>0.13</td>
<td>-0.06</td>
</tr>
<tr>
<td>Pro_Inf_1</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.16</td>
<td>-0.12</td>
<td>0.00</td>
<td>0.86</td>
</tr>
<tr>
<td>Pro_Inf_2</td>
<td>0.08</td>
<td>0.00</td>
<td>0.09</td>
<td>-0.11</td>
<td>-0.03</td>
<td>0.87</td>
</tr>
<tr>
<td>Pro_Inf_4</td>
<td>-0.02</td>
<td>0.02</td>
<td>0.09</td>
<td>0.16</td>
<td>-0.05</td>
<td>0.92</td>
</tr>
<tr>
<td>Rev_Inf_2</td>
<td>-0.12</td>
<td>0.08</td>
<td>-0.10</td>
<td>0.15</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>Rev_Inf_3</td>
<td>-0.11</td>
<td>0.14</td>
<td>-0.02</td>
<td>0.13</td>
<td>0.09</td>
<td>0.19</td>
</tr>
<tr>
<td>Rev_Inf_4</td>
<td>-0.09</td>
<td>0.11</td>
<td>-0.02</td>
<td>0.12</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>Unc_1</td>
<td>-0.18</td>
<td>0.45</td>
<td>-0.33</td>
<td>0.93</td>
<td>0.12</td>
<td>-0.13</td>
</tr>
<tr>
<td>Unc_2</td>
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<td>0.47</td>
<td>-0.34</td>
<td>0.95</td>
<td>0.15</td>
<td>-0.14</td>
</tr>
<tr>
<td>Unc_3</td>
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<td>0.55</td>
<td>-0.34</td>
<td>0.88</td>
<td>0.16</td>
<td>-0.15</td>
</tr>
</tbody>
</table>
Conclusions

Based on the analysis above, in general, the findings can be summarized as follows. Review informativeness is only influenced by the quality of the review. Both the quality and star rating of reviews have an impact on the normativeness of reviews. Similarly, customers’ perceptions of uncertainty can be affected by both the quality and the star rating of reviews. However, in most cases, this uncertainty is formed by customers’ concerns about seller opportunism. The influence of information asymmetry is only significant when the reviews are mixed regardless of either quality or star rating, or are low quality regardless of star rating.

Review informativeness reflects the quality of the argument in the reviews. It represents the content of the reviews. According to previous analysis, the content of reviews, different from our hypothesis, causes customers to worry about the transaction. In most cases, the high normativeness helps to reduce customers’ perception of risk, except in two special cases. When high quality positive reviews are mixed with high quality negative reviews, the corresponding low normativeness increases customers’ perception of risks. When high quality positive reviews are mixed with low quality negative reviews, they have no impact on the perception of risks.

DISCUSSION

Our study confirmed that normativeness of reviews can reduce the perception of risks related to seller opportunism, and the concern about seller opportunism constitutes the uncertainty. However, some effects were not significant, such as those related to informativeness of reviews and the fear of information asymmetry. One reason might be that the subjects did not have sufficient knowledge about Archos 5. More than 95% of the subjects indicated that they have no idea about the performance, functionality, or even appearance of the Archos 5. The technical nature of the content of the reviews reduced their helpfulness. When the reviews are of low quality and negative, or high quality negative reviews are mixed with positive reviews regardless of quality, reading more reviews increased the recipients’ perception of the uncertainty in the transaction.

The findings discussed above are consistent with the findings in past research. First, ELM proposes that when the subjects have low involvement and prior knowledge, they pay attention to the normativeness of arguments more than to the informativeness of these arguments (Petty & Cacioppo, 1984). In our experiment, purchasing the product was not central to their life, suggesting low purchase involvement. Also, their prior knowledge about the product is low. It is not surprising that only the normativeness of the reviews have an effect. Second, in previous studies, researchers have found negative reviews to be more helpful (Mudambi & Schuff, 2010). From the standpoint of risks and uncertainty, the negative reviews engender
more concern about the product and the transactions. Sometimes they can cancel out the influence of positive reviews. A positive attitude toward both the product and the transaction, in general, is influenced by the positive reviews.

One limitation of the study is the limited product information that was provided. At the end of the survey, the subjects had an opportunity to comment on the survey. Some of them said that they were interested in the product; however, there was insufficient information. They needed to read more about the product. So in general, most of the subjects agreed with the questions on uncertainty in the questionnaire. Also in a real environment, many other factors affect the perception of uncertainty, such as information other than customer reviews, the web portal reputation, the layout of the webpage etc. In this study, we attempted to isolate the effect of customer reviews from the other factors, and control for the influence of product description. The conclusion of this paper is limited to the scenario defined by the study. In an information rich environment, the degree of influence engendered by customer reviews could be different. There might also be an interactive relationship among those factors. These can be the topics for future research.
REFERENCES