The Impact of Product Heterogeneity on Online Consumer Behavior in Korea*

Kim, Misuk** · Yoo, Chul Woo*** · Choe, Young Chan****

ABSTRACT

Even though there is an impressive sales growth in B2C e-commerce market, the sales of agro-products traded online occupies a very small proportion of total trades made in Korea. Agro-products are high heterogeneous products (HHP), generating a higher level of uncertainty during the online transaction than low heterogeneous products (LHP) such as books and CDs. Thereby it is hypothesized that the degree of product heterogeneity influences consumers shopping behavior as a moderator.

To investigate this hypothesis, we adopt shopping value, e-loyalty, interactivity and trust, the key factors in the e-commerce context, proposing a structural equation model. Data was collected from two consumer groups (N. of LHP group : 135, N. of HHP group : 142) and PLS was applied to assess the research model. The results show that the relationships between interactivity and trust, trust and utilitarian shopping value, and interactivity and hedonic shopping value are significantly influenced by product heterogeneity. Based on these findings, useful implications are discussed.

Key Words : Interactivity, Trust, Shopping value, e-Loyalty, Product Heterogeneity, Moderator

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<ABSTRACT>

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I. Introduction

Purchasing through the Internet is one of the most rapidly growing forms of shopping, with sales growth rates outpacing traditional retailing sales growth (Levy and Weitz, 2001). Business-to-consumer Internet sales in Korea grew by over 371% between 2001 and 2007, to stand at levels of approximately 15,766 billion Korean Won (₩)\(^1\).

Despite these impressive sales growth figures, there is compelling evidence to suggest that many consumers remain reluctant to engage in an online exchange of heterogeneous products, such as groceries and fresh products, as compared to homogeneous products like MP3 players, CDs, books, and electronics. The proportion of agro-products traded in the e-commerce environment decreased from 5.1% in 2002 to 2.5% in 2007, occupying a very small proportion of total trades made in Korea.

Why has the growth in online sales of groceries not matched that of online sales of other product categories? To answer this question, the relationship between product attributes and consumer behavior needs to be properly understood. Products have different attributes and different levels of the same attributes. One important dimension to consider is the ability of consumers to identify product quality in cyberspace.

Homogeneous products (commodity products), like MP3 players, CDs, books, and electronics have easily discernible quality levels, whereas the perception of quality of heterogeneous products like groceries and used cars differs from consumer to consumer and between different products.

With hampered quality information access levels in cyberspace, consumers face product quality uncertainty (Chung et al., 2006). That is, if the quality of a certain product is homogeneous and therefore easy to determine, the perceived risks involved in the purchase thereof are relatively low. However, in contrast, a consumer's perceived uncertainty will increase if the product quality is heterogeneous and difficult to assess. Therefore, consumers develop decision strategies and ways of reducing these perceived risks, such as increasing information search costs and effort (De Figueiredo, 2000; Chung et al., 2006; Choe et al., 2007).

In the meantime, the importance of interactivity and trust has been emphasized in IS scholarly and industry literature. This is due to their mutual functions and their impact on e-commerce (McKnight and Chervany, 2002; Wu and Chang, 2005), as well as their role in reducing perceived risk in online exchanges (Pavlou and Gefen, 2004; Pavlou et al., 2007). Researchers have found that interactivity and trust are quite likely the key drivers of online consumers' re-purchase intentions and purchasing

\(^1\) [http://www.oee.go.kr](http://www.oee.go.kr)
behavior. Furthermore, there have been some trials conducted to examine these two factors in an e-commerce context at the same time (e.g., Merrilees and Fry, 2003; Wu and Chang, 2005). However, few research projects have been conducted on how these materials would be associated with e-loyalty in an integrated model of interactivity to e-loyalty that considers the impact of product attributes in the virtual environment of the Internet.

Subsequently, we propose a model that tests the relationships between interactivity, trust, and e-loyalty, by incorporating product heterogeneity as a moderator. We also introduce the concept of shopping value, which connects the two key players in an exchange and e-loyalty by adopting goal and action identification theories from social psychology and decision-making research. These theories posit that consumer actions are guided or determined by the underlying goals that consumers possess. In this study, we present shopping value as a perceived goal playing a role as a connector between interactivity, trust and e-loyalty.

The main objective of this study is to investigate the differences between online consumer behavior at e-commerce sites dealing with commodities like CDs and books and those at e-commerce sites selling agro-products. Finally, we review the recent theoretical background and then suggest a research model with hypotheses development. Next, the methodology used in this study will be described, followed by data analysis using data collected from two consumer groups purchasing different levels of heterogeneous products. Finally, we will provide some useful suggestions that may be derived from the major findings of this research.

II. Theoretical Background

1. Product Heterogeneity

If a product has a normalized quality, and attributes between products are practically equal, sufficient product quality assessment is available from the information provided on an e-commerce site and there is a relatively low level of perceived risk (Rosen and Howard, 2000). On the other hand, if a product is difficult to identify and consumers prefer to touch or see it through direct contact, a high level of perceived risk will be involved with online purchasing.

On the grounds of this difference in consumer perception, information asymmetry between consumers and online vendors arises. This asymmetry is considered as the consumers' level of perceived risk,
meaning consumers will develop their own decision strategies to reduce perceived uncertainty and risk (Chung et al., 2006). That is, the level of perceived risk and consumers' consequent behavior differ according to product category (De Figueiredo, 2000; Chung et al., 2006; Choe, 2007).

![The Dot-Com Retail Continuum](image)

**Figure 1** Heterogeneous Level of Products on the Web (De Figueiredo, 2000)

De Figueiredo (2000) categorized products based on product quality heterogeneity level as illustrated in Table 1. Products of low heterogeneity levels can be easily identified by individuals and quality is easy to determine from the product descriptions. Commodities such as paper and paper clips are included in this category—identical in nature to the category of search goods.

On the other hand, products of high heterogeneity levels are perceived differently by different individuals. The characteristics of these products differ in terms of many dimensions, including quality, look, feel, and reliability. Accordingly, consumers prefer to see, touch, and feel these products by hand, similar to experience products. Used cars, works of art, and fresh agro-products belong to this category.

Therefore, the quality and reliability of heterogeneous products are difficult to assess and describe given the restrictions of the web environment, driving consumers' perceived risk higher than in the offline market. Consequently, consumers develop their own risk reduction strategies and exhibit different shopping behavior depending on the degree of heterogeneity of the products they are attempting to purchase online.

Based on the theoretical difference on product heterogeneity, we will explore extensive research on how different product types influence the interaction between variables such as interactivity, trust, and behavioral intention conducted in IS literature, as well as in the marketing and social studies fields (Grabner-Kräuter, 2002; Koufaris et al., 2001-2002; Choe et al., 2007; Jeong et al. 2007).
2. Interactivity

Interactivity refers to the interaction between a site and a consumer and goes to the core of a computer-mediated communication environment (Hoffman and Novak, 1996). Interactivity provides facilitated communications, customized information presentation, image manipulation, and entertainment for users of a website which has the restrictions of space, time, and relationships (Rafaeli and Sudweeks, 1997; More et al. 2005; Thomson and Rodgers, 2006). Therefore, the significance of interactivity in e-commerce has been greatly emphasized in scholarly and industry literature (Shim et al., 2001; Srinivasan et al., 2002; Merriliees and Pry, 2003).

Furthermore, due to the essential characteristics of interactivity, online marketers have recognized the factor as a valuable attraction for consumers when visiting online shopping malls, purchasing online, and feeling sufficiently satisfied to become a repeat visitor or customer (Li et al., 2001; Mathwick, 2002; Wu and Chang, 2005).

In particular, Merriliees (2001) presented several features of interactivity. First, interactivity is primarily communication based and occurs due to mutual functions (Hoffman and Novak, 1996; Rafaeli and Sudweeks, 1997). Second, interactivity is a function of two-way communication. This refers to communication between two parties, for example, a consumer and a website, a consumer and a seller, or a consumer and another consumer (Ha and James 1998; Wu and Chang, 2005). Third, Internet interactivity facilitates the function of personalizing a situation for an individual (Johnson et al., 2006).

Based on its characteristics, approaches taken to explain interactivity can be divided mainly into two categories. One stems from an interpersonal communication perspective, which regards interactivity as the extent to which messages are related (Rafaeli 1998). It is also defined as the extent to which the communicator and the audience respond to each other's communication needs (Ha and James 1998, Wu and Chang, 2005; Johnson et al., 2006).

The other approach is a mechanical perspective, explaining interactivity as the extent to which the form and content of a mediated environment are modified by participating users (Hoffman and Novak 1996; Johnson et al., 2006).

From the perspective of machine-interactivity, many researchers have found empirical evidence of the importance of interactivity in influencing consumer purchase processes. Attributes of technology such as comparison shopping, assurance mechanisms, web page loading speed, value-added search mechanisms, shopping carts, feedback mechanisms, and chat channels were found to significantly influence both the intention to shop and actual purchase behavior (Limayem et al., 2000; Koufaris et al., 2001-2002; Johnson et al., 2006).
In the meantime, the features of the Web as an interactive media platform have encouraged a great deal of researches on consumer behavior according to product types (Kourfari, 2001-2002; Choe et al., 2006; Jeung et al., 2007). Interactivity is determined by the context in which information is presented, and by the degree of interaction between the consumer and the media (Hoffman and Novak, 1996; Klein, 1996).

Consequently, the perceived costs, value, and benefits of information searching behavior undertaken by online consumers are all controlled by the degree of interactivity, and may differ according to product types. This claim has been empirically examined by several researchers (Kourfari, 2001-2002; Jeung et al., 2007).

Categorizing a product according to complexity, Jeung et al. (2007) found that richer interactions between consumers and products and consumers and sellers are not required in all contexts, and the impact thereof will vary in accordance with product types. If consumers purchase products of high complexity, they will seek a greater level of interaction with sellers and the product, mediated by computer. On the other hand, in purchases of low complex products, high interaction is not required and does not play a critical role in supporting consumer decision-making.

3. Trust

Recent literature has highlighted trust as a key driver in an e-commerce environment where buyers routinely engage with businesses and sellers with whom they have had little or no prior interaction; making trust one of the most critical issues involved in Internet-based purchasing (Pavlou and Gefen, 2004, Kim and Ahn 2007).

In fact, the concept of trust has long been studied by scholars spanning numerous fields, such as the social sciences, economics, and business studies, because trust works as a critical factor in reducing complexity and perceived risk in social and economic interactions. However, in general, trust reflects specific beliefs held by consumers in the online sellers’ integrity, benevolence, ability, and predictability (Donen and Caveron, 1997; Jarvis et al. 2000; McKnight et al. 2002; Gefen et al., 2003).

From the perspective that sees trust as an interpersonal determinant of consumer behavior, research has been conducted on the associations between interactivity and trust (Merrilees and Fry, 2002; Bungon et al., 2003; Merrilees and Fry, 2003; Wu and Chang, 2005). The research found that e-vendors who want to be trusted by consumers should ensure their site has a higher level of interactivity with sellers as well as consumers. The findings suggest this is critical in the formation of favorable attitudes toward a site. In terms of the way in which interactivity and trust combine, it is
considered likely that trust plays a role of reducing the level of uncertainty, through interactive communication and activities (Merrilees, 2001; Merrilees and Pry, 2003).

Moreover, Grabner-Kreutz (2002) addressed the importance of trust in the purchasing processes according to product heterogeneity, establishing a theoretical foundation to support her hypothesis. She claimed that trust can complement or partly replace other strategies to reduce uncertainty and complexity, and that it plays a more important role in transactions involving products of high heterogeneity than products of low heterogeneity, because trust can reduce energy and effort levels required in the direct search for more information during buying processes.

This idea is supported by the study of Pavlou et al. (2007), which conducted an empirical test showing that trust had an influence on confidence of differing significance levels when buying a book (a low involvement product) and when buying prescription drugs (a high involvement product).

4. Goal and Action Identification Theories—Shopping Value and E-Loyalty

The research of Srivasthvala et al. (2002) provides a structural background of this current study. They introduced goal and action identification theories as a framework of their study to identify the mechanism of the trust-loyalty relationship, discussing the importance of the consumer goal to consumer action. These theories theorize that consumer actions are guided or determined by the underlying goals consumers possess (Valecker and Weger, 1987; Bagot and Dholakia, 1999).

Since they have multiple and conflicting goals, consumers regulate their actions to ensure the achievement of their highest-level goals. In the present study, we posit the consumer goal in an online exchange is to maximize their shopping value, leading to online consumers' e-loyalty, using the perspective of goal and action identity theories.

Shopping value refers to an aspect that influences the evaluation or consideration conducted in the context of purchase behavior by consumers. Consumers can realize value by achieving the purposes of the task of a particular shopping trip, in addition to enjoying leisure time and gaining entertainment (Hirschman and Holbrook, 1982; Hirschman and Solomon, 1994; Babin et al., 1994; Hammond et al., 1998). Shopping value has multi-dimensional influences on those shopping aspects that consumers emphasize, their degree of satisfaction obtained during and after a purchase, as well as future behavior such as re-patronage and word of mouth (Babin et al., 1994; Babin and Babin 2001).

Many researchers divide shopping value into utilitarian and hedonic aspects. Utilitarian aspects are regarded as goal-oriented and relate to usefulness, value, and cleverness of the behavior as perceived by the consumer. On the other hand, the hedonic aspects of shopping result from aesthetic/emotional
feelings and relate to pleasure, fun, or playfulness experienced or anticipated from the behavior (Holtbrook and Hirschman, 1982; Hirschman and Solomon 1984). Both the utilitarian and hedonic aspects are bipolar in nature and vary in magnitude.

In the meantime, e-loyalty refers to customer loyalty in an online market (Richter and Scheifele, 2000). Because internet shopping malls have unique features, such as the absence of the human element and non-existent facilities (Sohn and Lee, 2000), the concept of customer loyalty in an internet market is also different from that which is traditionally understood. Generally, customer loyalty represents a customer's attitude toward and preference for a particular company and/or product, resulting in repeat visiting and buying behavior.

In this study, therefore, we have adapted e-loyalty as revisiting intention, word of mouth, and sentiment on other's purchase behavior (Chou et al., 2002; Srinivasan et al. 2002; Anderson and Srinivasan 2003). The following descriptions are intended to identify the associations between interactivity and shopping value, trust and shopping value, and shopping value and e-loyalty.

5. Interactivity and shopping value

Utilitarian value (time saving, control, better product information) and hedonic value (enjoyment) elicited by the interaction between the user and the store lead to the willingness to purchase a product and return to the site or store (Koufaris et al., 2001-2002). Particularly, many researchers have suggested several benefits from the association of interactivity and utilitarian shopping value (Tao et al. 1999; Heijden 2003; De Wulf et al., 2006). Interactivity alone does not deliver information, but it has, however, been identified as helping users effectively find and make use of relevant information by filtering out irrelevant information (Hoffman and Novak, 1996; Tao et al. 1999).

Furthermore, interactive features, such as search engines and online dialogue facilities reduce the time and effort required to find what consumers want from the online shopping, and enrich the levels of information combined with the ease of access and convenience of the Internet (Li et al. 2001).

However, it is also claimed that sites that greatly stimulate consumers' enjoyment and entertainment are more likely to engage the users in two-way communication and dialogue with the retailer (Merrilees and Fry 2003). Hoffman and Novak (1996) and Li et al. (2001) also found that consumers enjoyed interacting with virtual products through human-computer interactivity, and that the use of advanced forms of interactivity tools led to enjoyment and a positive experience and attitude.
6. Trust and shopping value

Trust is also related to shopping values. A high level of trust can reduce the overall cost and time of navigating online shopping sites by decreasing the degree of exchange uncertainty (Shirdeshmukh et al. 2002). On the other hand, if consumers perceive a higher level of risk, they will not only carry out a higher stage of shopping processes, but also spend more time and effort searching for information. That is, the willingness to reduce uncertainty and increase efficiency and rationality in decision-making is related to utilitarian consumer behavior (Hoffman and Novak 1996; Gefen et al., 2003).

In addition, Jarvenpaa et al. (2000) suggested that individual consumers try to avoid engaging in situations that result in more pain than pleasure. That is, consumers who perceive less uncertainty are willing to engage in more enjoyable and positive activities during shopping activities (Holtbrook and Hirschman 1982; Belkin et al. 1994; Heijden et al. 2000). Therefore, consumers will enjoy more positive and pleasant emotions during shopping activities when they can better perceive the circumstances they face.

7. Shopping value and e-loyalty

Finally, studies in cognition and decision-making show that when consumers are faced with a choice of tasks, they search for reasons and arguments to justify their choices and intend to have a higher probability of future success in acquiring a particular product (Dhar and Wertenbroch, 2000; O’Curry and Strahilevitz, 2001). As a result, utilitarian value is likely to be strongly related to shopping outcomes such as re-purchase intentions and positive word of mouth.

Also many researchers suggest that hedonic shopping value influences consumer purchase behavior. For example, Dawson et al. (1990) claim that hedonic value significantly influences repurchase intention in the context of offline markets. Therefore, it is inferred that hedonic shopping value has a positive relationship to e-loyalty (Novak et al., 2003).

In summary, shopping value and e-loyalty as a goal and the outcome of the goal play a core function in online shoppers’ shopping processes (Bagoozzi and Dholakia, 1999; Shirdeshmukh et al., 2002; Choe et al., 2006). Therefore, product heterogeneity will also influence the relationships between shopping value and the key factors; interactivity, trust, and e-loyalty.

This claim is supported by an empirical study of Choe et al. (2007) that investigated the idea that product heterogeneity had a strong influence on online consumer shopping behavior through utilitarian/hedonic shopping motives and emotion. Through an empirical research, they found that utilitarian motives were found to be more influential to buyers when it came to commodities, but hedonic motives as well as utilitarian motives were found to be important during the purchase of agro-products.
III. Research Model

Based on the literature review, we developed a structural model to examine the moderating effect of product heterogeneity, as well as the causal relationships between the constructs with respect to interactivity, trust, shopping value, and e-loyalty, as shown in Figure 2. Seven hypotheses were established as per the following:

H1 - Product heterogeneity (PH) will influence the relationship between interactivity and trust.
H2 - PH will influence the relationship between interactivity and utilitarian shopping value.
H3 - PH will influence the relationship between interactivity and hedonic shopping value.
H4 - PH will influence the relationship between trust and utilitarian shopping value.
H5 - PH will influence the relationship between trust and hedonic shopping value.
H6 - PH will influence the relationship between utilitarian shopping value and e-loyalty.
H7 - PH will influence the relationship between hedonic shopping value and e-loyalty.

Through the proposed structural model illustrated in Figure 2, we examined product heterogeneity has a moderating effect on the relationship between constructs; interactivity, trust, shopping value, and e-loyalty in the model. This model includes the seven hypotheses outlined above.

![Diagram of Research Model and Moderating Effects]

[Figure 2] Research Model and Moderating Effects
In this study, data was collected through surveys to verify the study model hypotheses proposed in Table 1. In order to draw up adequate survey questions, we conducted a literature review and constructed the survey questions as listed in Table 1. Each question is measured based on a 7-point Likert type scale. Respondents were asked to answer every question pertaining to a certain online shopping site. To maximize the response rate, respondents were given a gift worth $5 for completing the questionnaire.

### Table 1: Questionnaire Design

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Description</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactivity</td>
<td>ITR1</td>
<td>Thready response</td>
<td>Johnson et al. (2006)</td>
</tr>
<tr>
<td></td>
<td>ITR2</td>
<td>Base of communication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITR3</td>
<td>Relevant Informtion provision</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ITR4</td>
<td>Nonverbal format provision like images</td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>TR1</td>
<td>Truthfulness of site</td>
<td>Ghefen et al. (2003)</td>
</tr>
<tr>
<td></td>
<td>TR2</td>
<td>Concern for customers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TR3</td>
<td>Provision of good products and services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TR4</td>
<td>Trust of the site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UV2</td>
<td>Shopping convenience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UV3</td>
<td>Time-saving</td>
<td></td>
</tr>
<tr>
<td>Hedonic Shopping Value</td>
<td>HV1</td>
<td>Enjoyable shopping</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HV2</td>
<td>New and varied experience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HV3</td>
<td>See-and-feel entertainment</td>
<td></td>
</tr>
<tr>
<td>e-Loyalty</td>
<td>EL1</td>
<td>Revisit intention</td>
<td>Stanton et al. (2002), Chou et al. (2002)</td>
</tr>
<tr>
<td></td>
<td>EL2</td>
<td>Word of mouth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EL3</td>
<td>Aware on other’s purchase</td>
<td></td>
</tr>
</tbody>
</table>

Data was collected through using paper-based surveys from March 2008 to April 2008. The respondents were asked to refer to a preferred on-line shopping mall to answer the following questionnaire in advance. We targeted two consumer groups: one was those who have had a shopping experience at an online shopping mall selling commodities, especially books and CDs; the other group have had an online shopping experience with agro-products. 135 and 142 usable responses, 2) low heterogeneous products
respectively, were collected from each group. A total of 277 responses were utilized for the analysis undertaken in the present study.

Of the respondents among the first consumer group, 55.6% were male (75 people) and 44.4% were female (60 people). The average age of the respondents was 25.4, with most of them having graduated from high school and undergraduate university levels. The annual rate of purchase of agro-products through the particular online shopping site was as follows: 1 - 5 times (31.1%), 6 - 10 times (27.4%), 11 - 15 times (17.0%), 16 - 20 times (11.1%), and over 21 times (13.3%).

Of the respondents from the second consumer group, 38.3% were male (54 people) and 61.7% were female (88 people). Their average age was 38.3, and most were high school and undergraduate university graduates. The annual rate of purchase of agro-products through the particular online shopping site was as follows: 1 - 5 times (18.5%), 6 - 10 times (16.7%), 11 - 15 times (12.3%), 16 - 20 times (15.4%), and over 21 times (37.0%).

IV. Analysis Result

1. Reliability and Validity Test

We performed a reliability test by examining the Cronbach alpha coefficients. Table 2 outlines the results. The alpha coefficients were >0.6, which is normally regarded as evidence that the internal consistency of the multi-item scale is feasible (Nunnally, 1978).

3) high heterogeneous products
Composite Reliability (CR)\(^4\) was conducted to verify convergent validity and discriminant validity. All the CR values in Table 2 are over 0.7, implying that the construct retained both its internal consistency and convergent validity (Werts et al., 1974). The average variance extracted (AVE)\(^5\) was also calculated. The AVE measures the amount of variance that a construct captures from its indicators relative to the variance contained in measurement error. The criteria for an acceptable level of convergent validity is an individual item factor loading greater than 0.6 and an AVE value greater than 0.5 (Gefen et al., 2000).

A summary of CR and AVE of the group is presented in Table 2. To prove the discriminant validity of the measurements of this study, the correlations of the latent variables and the square root

\[\text{CR} = \frac{\sum \lambda^2}{\sum \lambda^2 + \sum \text{var}(\epsilon)}\]

\[\text{AVE} = \frac{\sum \lambda^2}{\sum \lambda^2 + \sum \text{var}(\epsilon)}\] Where \(\lambda\) is the component loading to an indicator and \(\text{var}(\epsilon) = 1 - \lambda^2\)
of the AVE were measured. If the AVE square root value is higher than the other correlations of vertica and horizontals, as shown in Table 3, a reasonable degree of discriminant validity among all the constructs is feasible.

\( \text{Table 3} \) Correlations of the Latent Variables and the Square Root of the AVE

<table>
<thead>
<tr>
<th></th>
<th>ITR</th>
<th>TR</th>
<th>UV</th>
<th>HV</th>
<th>EL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITR</td>
<td>0.738</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>0.571</td>
<td>0.876</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UV</td>
<td>0.439</td>
<td>0.551</td>
<td>0.744</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HV</td>
<td>0.294</td>
<td>0.268</td>
<td>0.394</td>
<td>0.832</td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td>0.376</td>
<td>0.569</td>
<td>0.379</td>
<td>0.295</td>
<td>0.985</td>
</tr>
</tbody>
</table>

LHP

<table>
<thead>
<tr>
<th></th>
<th>ITR</th>
<th>TR</th>
<th>UV</th>
<th>HV</th>
<th>BL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITR</td>
<td>0.857</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR</td>
<td>0.699</td>
<td>0.925</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UV</td>
<td>0.505</td>
<td>0.504</td>
<td>0.857</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HV</td>
<td>0.610</td>
<td>0.505</td>
<td>0.396</td>
<td>0.852</td>
<td></td>
</tr>
<tr>
<td>BL</td>
<td>0.589</td>
<td>0.489</td>
<td>0.502</td>
<td>0.981</td>
<td></td>
</tr>
</tbody>
</table>

HHP

*The number in shadow is the square root of AVE.

Prior to the step of structural model assessment, a test of mean difference between the two consumer groups was conducted through t-test analyses. As outlined in the results of Table 4, except for one variable utilitarian shopping value the mean values of the latent variables of the consumer group purchasing high heterogeneity products were greater than those of the low heterogeneity products at a confidence level of 0.01 (for e-loyalty, a confidence level of 0.1).

The results offer several interesting suggestions. Firstly, they suggest that consumers shopping for highly heterogeneous products, in general, have stronger hedonic shopping value and e-loyalty levels than those of low heterogeneous products. Secondly, consumers shopping for highly heterogeneous products had stronger interactivity and trust levels. This suggests that once consumers have an
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experience of the online acquisition of high heterogeneity products associated with product driven uncertainty, factors such as interactivity and trust play an important role in driving further purchases of these products online.

The findings that consumers shopping for highly heterogeneous products had greater levels of hedonic shopping value presumably suggests that, as consumers confront the psychological assessment of products that cannot be fully identified, they are willing to enjoy the shopping experience itself and engage in a degree of playfulness in such risky and uncertain situations. Finally, the findings show that consumer utilitarian shopping values does not differ with regard to product heterogeneity. This implies that consumer willingness to pursue efficiency and rationality in online shopping processes is true irrespective of product type.

$\textbf{Table 4}$ Mean Difference between Two Consumer Groups

<table>
<thead>
<tr>
<th></th>
<th>LHP mean</th>
<th>S.D.</th>
<th>HHP mean</th>
<th>S.D.</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITR</td>
<td>4.65</td>
<td>0.96</td>
<td>5.08</td>
<td>0.92</td>
<td>3.89**</td>
</tr>
<tr>
<td>TR</td>
<td>5.02</td>
<td>1.00</td>
<td>5.62</td>
<td>0.93</td>
<td>5.35**</td>
</tr>
<tr>
<td>UV</td>
<td>5.44</td>
<td>0.97</td>
<td>5.54</td>
<td>0.92</td>
<td>0.95</td>
</tr>
<tr>
<td>HV</td>
<td>3.72</td>
<td>1.31</td>
<td>4.86</td>
<td>1.01</td>
<td>8.47**</td>
</tr>
<tr>
<td>HL</td>
<td>5.33</td>
<td>1.28</td>
<td>5.58</td>
<td>0.95</td>
<td>1.89*</td>
</tr>
</tbody>
</table>

* p<0.1, ** p<0.01

2. Assessment of Research Model

This research was performed to examine the hypotheses that product heterogeneity plays a moderating role in online purchasing decisions, identifying the significant relationships among interactivity, trust, shopping value, and e-loyalty. The structural equation model proposed for this study was accessed using PLS bootstrap procedures. Figure 3 shows the results of the analysis on low heterogeneous products (e.g. commodities like CDs and books, LHP) and highly heterogeneous products (e.g. agro-products and groceries, HHP).

Overall, the research model better explains consumer behavior in the case of the consumer group purchasing HHP, wherein, except for one path between trust and utilitarian shopping value, all
relationships between variables are significant at a confidence level of 0.01 and variables describe each construct with a high R² of over or around 30%.

[Figure 3] Data Analysis Results of The Model

Describing the results in detail, firstly, interactivity was found to have a strong impact on trust in both cases, causing the construct of 32.5% in the case of LHP and 48.9% for HHP. This is significant at a confidence level of 0.01. Secondly, interactivity influenced two shopping values significantly in the case of HHP, whereas, in the case of LHP, it only affected utilitarian shopping value levels at a confidence level of 0.05. Thirdly, trust was found to have a significant effect on utilitarian shopping value in both groups at a confidence level of 0.01, but no association with hedonic value. Finally, e-loyalty was found to be positively influenced by utilitarian shopping value in both groups at a confidence level of 0.01, but by hedonic shopping value at a confidence level of 0.05 in the case of LHP and at 0.01 in the case of HHP.

In summary, for the consumer group purchasing LHP, interactivity had a significant impact on trust and utilitarian shopping value at a confidence level of 0.01 and 0.05, respectively, and no impact on hedonic shopping value. Trust only significantly influenced utilitarian value (0.01), whereas e-loyalty was more significantly associated with utilitarian value, at a confidence level of 0.01, than hedonic shopping value, at 0.05. However, because interactivity and trust did not prove to offer substantial explanations for the perceptions of hedonic value (10.2%), other factors are required to be found to explain hedonic shopping value more fully.

From these results, it is suggested that the main path in the model of LHP is from interactivity to
e-loyalty, via trust and utilitarian shopping value. For the consumer group purchasing HHP, contrary to the case of LHP consumers, interactivity was strongly associated with not only trust and utilitarian shopping value, but also hedonic shopping value.

The path coefficient between two variables roughly doubled that between interactivity and utilitarian shopping value. This suggests that, as interactivity increases, consumers’ hedonic shopping value responds more sensitively than does their utilitarian value. Also, hedonic shopping value was highly correlated with e-loyalty. This finding suggests that hedonic shopping value plays a critical role in the shopping process of a consumer group purchasing HHP.

Based on this analysis, there are primarily three significant paths in the stream of interactivity to e-loyalty: one is via trust and utilitarian shopping value, another is via only utilitarian shopping value, and the other is via hedonic shopping value without the trust construct. There are, therefore, various significant paths in the stream of interactivity to e-loyalty.

Table 5: Path Coefficient between Two Models

<table>
<thead>
<tr>
<th>Path</th>
<th>LHP</th>
<th>HHP</th>
<th>t-value</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactivity → Trust</td>
<td>0.571</td>
<td>0.699</td>
<td>2.015*</td>
<td>Support</td>
</tr>
<tr>
<td>Interactivity → Utilitarian</td>
<td>0.185</td>
<td>0.399</td>
<td>0.833</td>
<td>Reject</td>
</tr>
<tr>
<td>Interactivity → Hedonic</td>
<td>0.210</td>
<td>0.502</td>
<td>2.040*</td>
<td>Support</td>
</tr>
<tr>
<td>Trust → Utilitarian</td>
<td>0.445</td>
<td>0.395</td>
<td>-2.363*</td>
<td>Support</td>
</tr>
<tr>
<td>Trust → Hedonic</td>
<td>0.148</td>
<td>0.154</td>
<td>0.045</td>
<td>Reject</td>
</tr>
<tr>
<td>Utilitarian → e-Loyalty</td>
<td>0.338</td>
<td>0.335</td>
<td>0.051</td>
<td>Reject</td>
</tr>
<tr>
<td>Hedonic → e-Loyalty</td>
<td>0.218</td>
<td>0.369</td>
<td>1.319</td>
<td>Reject</td>
</tr>
</tbody>
</table>

* p<0.05

\[ t = \frac{b_i - b_y}{\sqrt{S_i^2 + S_y^2}} \]  

(\(b_i\): path coefficient of group i, \(s_i\): standard error of group i)

In order to verify the hypotheses relating to the moderating effects of product heterogeneity, the Smith-Satterthwait t-test was applied. The test was conducted to compare the significance of the
differences in the path coefficients for the two groups—consumers purchasing LHP and those purchasing HHP, as shown in Figure 3. This test was feasible, as the variance for the two kinds of samples were assumed to be different. In order to compare path coefficients, t-values of each pair of path coefficients were calculated using Formula (1), (with m+n-2 degrees of freedom).

The results of the path coefficient comparisons between the two groups are shown in Table 5. It is revealed that three out of seven results exhibit significant differences at a confidence level of 0.05, supporting H1, 3, and 4. The main findings of this data are followed. Firstly, interactivity had greater impact on trust and hedonic shopping value when the products consumers purchased online were heterogeneous. Secondly, product heterogeneity weakened the sensitivity of trust to utilitarian shopping value, unlike the values of path coefficients, among other variables. Finally, there was no significant difference between e-loyalty and shopping value emphasizing by consumers according to product types.

Overall, the results imply that consumers operate different kinds of psychological mechanisms according to the products they purchase online in order to reduce complexity and the uncertainty deriving from products so as to generate a psychologically reliable and confident shopping experience.

V. Discussion and Conclusion

We investigated whether product heterogeneity has a moderating effect on the flow toward e-loyalty from interactivity and trust, which are considered the key factors in an e-commerce context. For this research, we developed a research model and empirically tested it by collecting data from two consumer groups that purchase or have purchased low heterogeneous products (LHP) and highly heterogeneous products (HHP), respectively.

We found several interesting results. Firstly, while interactivity was found to remain significantly influential on trust, and on utilitarian and hedonic shopping value levels in the case of HHP, it did not influence hedonic shopping value levels in the case of LHP. Moreover, the results of the t-test showed that interactivity impacted on trust and hedonic shopping value more as product heterogeneity increased.

This finding suggests that when consumers are exposed to a high level of product-originating uncertainty, they rely on the (perceived) interaction with sellers during their shopping activities in order to obtain higher degrees of trust and generate greater shopping pleasure.

Secondly, regardless of product heterogeneity, trust was found to influence utilitarian shopping value. Moreover, as shown in the t-test (Table 6) results, trust was found to be more influential to utilitarian
shopping in the case of LHP values that HHP. On the other hand, trust does not have any significant association with hedonic shopping value. These findings suggest trust stimulates online consumers’ utilitarian shopping value, but has little influence on hedonic shopping value.

The fact that the degree of the association between trust and utilitarian shopping value increases in the case of purchasing commodities supports this point. That is, well-established trust may enhance consumers’ perceived ability to maximize utility and enhance their intention to focus on the dimensions of efficient and purpose-driven shopping activities. Moreover, when there are low levels of uncertainty and complexity in product assessment and selection, the boosting power of trust will increase.

Thirdly, utilitarian shopping value was revealed to be influenced by interactivity and trust, irrespective of the level of product heterogeneity. At first glance, interactivity had a significant impact on utilitarian shopping value at a relatively low confidence level of 0.05 in the case of LHP. However, interactivity and trust have a significant influence on trust and utilitarian shopping value, respectively, at a confidence level of 0.01. Therefore, it is inferred that interactivity has a direct effect on utilitarian shopping value through trust. (without trust, the path coefficient between interactivity and utilitarian shopping value was 0.44 and the t-value, 7.8) (Baron and Kenny, 1986).

In summary, both interactivity and trust significantly influence utilitarian shopping value regardless of product heterogeneity levels. Considering that utilitarian shopping value impacts on e-loyalty, we can imply that interactivity and trust will play fundamental roles in boosting online consumers’ utilitarian shopping value.

Finally, it was found that hedonic shopping value was more important in determining consumers’ e-loyalty when buying HHP than LHP. Although the difference of path coefficients was insignificant, it is proposed that shopping value emphasized by consumers differs according to product heterogeneity. The t-test results also support this claim (Table 5). In general, qualities of HHP are not fixed, and actual quality might differ from that perceived virtually, resulting in higher levels of uncertainty in shopping outcomes.

However, this uncertainty may create a higher level of positive expectancy on the results of their decisions to the contrary and, consequently, consumers might tend to enjoy more risky and playful shopping environments where generated outcomes are revealed differently in every purchase event.

After all, intended repeat consumers likely enjoy emotional and hedonic states, such as arousal through meeting the challenges posed by uncertainty and risk, ultimately driving a higher intention to commit to e-loyalty. Considered in the overall view from interactivity to e-loyalty in the process of purchasing HHP, hedonic shopping value is also highlighted as same as utilitarian shopping value. That is, as interactivity increases, not only consumers’ desire for proper and effective information search is
satisfied but also consumers will gain enjoyment and pleasure, which also influences their intentions on repeated transactions (Hoffman and Novak, 1996; Kourfitsis, 2002).

1. Implications

The main theoretical contribution of this study is firstly that we empirically substantiated that product heterogeneity plays a moderating role in the relationship between interactivity, trust, shopping value and e-loyalty. By introducing a concept of product heterogeneity and observing the effect of the concept to the suggested behavioral model, we extended existing researches related to the relationship between interactivity and trust (Burgoo et al., 2003; Merrilees and Pry, 2003; Wu and Chang, 2005), trust and shopping value (Shrivesamukh et al., 2002; Dejen et al., 2003) and shopping value and e-loyalty (O’Curry and Strahilevitz, 2001; Novak et al., 2003). In addition, we provided more insights on consumers’ decision making processes according to product heterogeneity of which the concept has been ignored by the e-commerce literature.

Secondly, we attempted an integrated and systematic approach by identifying the main path of the shopping process flow from interactivity to e-loyalty, according to product heterogeneity. In the case of LHP, there was one main route identified where interactivity is strongly associated with trust, which impacts on utilitarian shopping value and ultimately leads to e-loyalty.

On the other hand, there are three main flows between interactivity and e-loyalty; (1) via trust and utilitarian shopping value, as in the case of LHP, (2) through only utilitarian shopping value and (3) through hedonic shopping value. These findings corroborate that consumers’ behavior (e-loyalty) are dependable to their goals (shopping value) as researchers suggested (Bagusaz and Dholakia, 1999), and further widen the research of Shrivesamukh et al. (2002) by introducing the concept of interactivity and product heterogeneity as a moderator.

Suggestions in the practical dimension are as follows. Firstly, we now know that trust is developed by increasing the shopping mall’s interactivity levels. This relationship becomes stronger when product uncertainty increases. Therefore, e-retailers should try to establish effective and interactive sites, and the design of those sites should facilitate consumer trust building. That is, online practitioners should make the best use of communication tools such as a feedback mechanism and chat channels so as to indirectly elicit the sellers’ benevolence and integrity.

Also, increasing the web page loading speed and utilizing value-added search mechanisms as well as providing appropriate and timely information all go to help consumers to perceive a higher level of seller competence. For those dealing with HHP such as agro-products, furthermore, these strategic
alternatives will be even more helpful in attracting online consumers.

Secondly, utilitarian shopping value, enhanced by interactivity and trust, plays a key role in developing e-loyalty, regardless of the level of product heterogeneity. Therefore, e-commerce operators should provide product information in a timely and efficient manner for consumers to complete their own tasks, (i.e. information seeking and product/service acquisition). At the same time, it is important to learn about consumer desires, satisfy their needs, and respond to their questions in an interactive and timely way, so as to enhance perceived reliability and confidence during shopping activities. In their promotional activities, website managers should focus on offering a higher level of information and increasing efficiency and rationality in the online purchasing process. Furthermore, if there are limits in resources and if interactive features are too expensive, commodity-product providers would rather focus more on the tactics used to trigger the utilitarian dimensions in which consumers are involved.

Thirdly, when consumers purchase highly heterogeneous products, such as agro-products and groceries, they emphasize not only utilitarian shopping value but also hedonic shopping value in their decision-making. That is, the consumer-website interaction is viewed as playing an important role in enhancing pleasure, and consequently building e-loyalty. Therefore, website administrators dealing with those goods should also try to stimulate consumers' hedonic shopping value by making the best use of interactive machinery or tools so as to boost consumers' perceived interactivity.

It is suggested that creating more enjoyable online shopping contexts through images, color, humor, animation, and other interactive features would help site operators differentiate their online shopping sites. Also, various chat channels, where consumers share opinions and express praise or complaints in free and active manners, can be utilized as a route for consumers to obtain pleasant and positive experiences.

Finally, we could apply these results to building strategies of international online marketplace since same kind of product could have different level of heterogeneity according to countries. For instance, heterogeneity of apple from China is higher than that of apple from Japan because Japan has more rigid rules about food safety and management. Therefore, we can infer that manager of online shopping site in China should pay more attention to securing trust of customers than that of online shopping site in Japan. Furthermore, the role of interactivity of shopping site could be emphasized in building trust, especially in the case of heterogeneous products.

2. Limitation and Future Study

This research, however, has some limitations. The average age of the two groups was different. The
consumer group shopping for LHP averaged 25.4 years of age, and that shopping for HHP was 38.3. There likely exists a generation gap, meaning the output of the data may reflect these differences.

Furthermore, the products we targeted may not adequately indicate the polar points of product heterogeneity. According to research by De Pinafredo (2000), agro-products reflect the highest product heterogeneity levels, and the lowest heterogeneity levels are exhibited by oil and paper. However, given the difficulties identifying and surveying online purchasers of oil and paper, we decided to target books and CDs as representative LHPs.

Based on these specific limitations, future research that compares data accessed using a web-based survey system installed on sites dealing with LHP (i.e. stationery goods) and HHP (i.e. agro-products) to reduce the age gap between subject groups and to reveal distinct differences in outcomes between groups is required. Furthermore, it would also be worthwhile to test an integrating model that incorporates other important variables identified in e-commerce literature, such as flow (Koufaris et al., 2001-2002; Wu and Chang, 2005) and e-quality (Kim et al. 2005).
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국문초록

상품의 이질성이 온라인 구매행동에 미치는 영향 분석

김미숙 · 유철우 · 최영찬

한국에서 B2C 전자상거래 시장이 발달함에 있어서 본 성장세를 보이고 있지만, 농산물의 전자상거래 비중은 여전히 매우 적은 부분을 차지하고 있다. 농산물은 높은 이질성을 가진 상품(high heterogeneous products)의 특성을 가지며, 이 높은 이질성의 상품은 전자상거래 발생 시 이질성이 낮은 상품(low heterogeneous products), 예컨대 책, CD와 같은 상품보다 온라인 거래가 이루어질 때 구매자들에게 거래에 대한 불확실성을 더 많이 발생시킨다. 따라서 상품의 이질성의 정도가 구매자의 소비행태에 매개효과를 보일 수 있다는 것을 수용할 수 있다.

이 가설을 조사해보기 위해 본 연구에서는 소매가치와 온라인 쇼핑몰에 대한 총성도뿐만 아니라 상호작용성과 온라인 쇼핑몰에 대한 신뢰를 사용하여 구조모형을 제안하였다. 설문조사를 위한 이질성이 높은 농산물을 추출 가능한 구매자와 이질성이 낮은 상품을 구매하는 구매자를 대상으로 설문조사를 실시하였다. 분석에는 총 277명의 설문지가 사용되었으며, 분석에는 PLS가 사용되었다. 매개효과를 검증하기 위해 이질성이 높은 상품을 구매하는 구매자 그룹과 이질성이 낮은 상품을 구매하는 구매자 그룹을 나누어 분석하였다 (N. of LHP group : 135, N. of NHHP group : 142).

결과적으로 상품의 이질성 정도는 상호작용성과 신뢰, 신뢰와 효용적 소비가치, 상호작용성과 예측적 소비가치의 관계에 유의한 영향을 미치는 것으로 나타났다. 즉, 농산물을 주로 구매하는 구매자들은 공신성이 강한 이질성이 낮은 상품을 구매하는 구매자들보다 인터넷 소비자들의 상호작용성의 영향을 더욱 크게 받는 것으로 나타났다. 본 연구에서는 이러한 설문분석 결과를 바탕으로 몇 가지 시사점과 한계점을 제시하였다.

주제어 : 상호작용성, 신뢰, 소비가치, 총성도, 상품 이질성, 매개효과