
Identifying key factors affecting consumer purchase behavior in an online shopping context

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Keywords

Electronic commerce, Information, Retailing, Consumer behaviour, Loyalty, Korea

Abstract

While interactions in the real world shopping are mainly based on face-to-face activities between consumers and service personnels, interactions in electronic commerce take place mainly through the retailer's Web site. This study investigated the relationship between various characteristics of online shopping and consumer purchase behavior. Results of the online survey with 602 Korean customers of online bookstores indicate that information quality, user interface quality, and security perceptions affect information satisfaction and relational benefit, that, in turn, are significantly related to each consumer's site commitment and actual purchase behavior.

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1. Introduction

The Internet-based electronic commerce environment enables consumers to search for information and purchase products or services through direct interaction with the online store. That is, consumer-purchases are mainly based on the cyberspace appearance such as pictures, images, quality information, and video clips of the product, not on the actual experience (Lohse and Spiller, 1998; Kolesar and Galbraith, 2000). Shopping at an online store is like shopping through a paper catalog because both involve mail delivery of the purchases and in both cases customers cannot touch or smell the items (Spiller and Lohse, 1997). So the promise of electronic commerce and online shopping depends, to a great extent, on user interfaces and how people interact with computers (Hoque and Lohse, 1999; Griffith *et al.*, 2001). Moreover, the characteristics of information presentation, navigation, order fulfillment in an interactive shopping medium is considered a more important factor in building electronic commerce trust than in the traditional retailing (Alba *et al.*, 1997; Reynolds, 2000).

In the literature on electronic commerce, there have been active research on consumers' shopping experience and their evaluation based on perceptions about the online shopping Web sites (Jarvenpaa and Todd, 1997; Szymanski and Hise, 2000; Griffith *et al.*, 2001). This line of research considers consumers' information processing style, shopping patterns, storefront preferences, and related areas for insights into developing more attractive, user friendly, and successful Internet stores. However, few studies provide empirical validation of the relationship among factors affecting consumers' response and shopping behavior.

This study provides empirical validation of consumer behaviors in the Web-based online shopping context. We adapt the theory of user information satisfaction and consumer purchase behavior to explain the consumers' response to online shopping services. We investigated how the content and presentation of product and service information affect consumers' willingness to patronize an online store. Finally, we identify and discuss several factors affecting consumers' purchase behavior as well as their perception and satisfaction.



2. Literature review

2.1 Online store attributes

Many studies have looked into the online shopping service attributes (Jarvenpaa and Todd, 1997; Lohse and Spiller, 1998; Szymanski and Hise, 2000; Liu and Arnett, 2000). These studies have classified the attributes of online stores into four categories: merchandise, customer service and promotions, navigation and convenience, and security.

Merchandising includes product-related characteristics such as assortment, variety, and product information (Jarvenpaa and Todd, 1997). Rich product assortment can increase the probability that consumer-needs will be met and satisfied. But not all products available in the merchant's catalog or real store are available online (Szymanski and Hise, 2000). According to Lohse and Spiller's study (1998), big online stores are less effective than small stores at converting site traffic into sales because consumers have difficulty in finding the products they seek. It is argued that since a primary role of an online store is to provide price-related information and product information to help reduce consumers' search cost (Bakos, 1997), more extensive and higher quality information available online leads to better buying decisions and higher levels of consumer satisfaction (Peterson *et al.*, 1997). Online shopping stores can offer hyperlinks to more extensive product information such as price comparison, product testimonials (e.g. book reviews at an online book store), and product demonstrations (e.g. software downloads).

The second attribute category for the online store is customer service and promotion. Customers want careful, continuous, useful communication, across geographic barriers (Lohse and Spiller, 1998). These attributes are frequently identified as a salient dimension to determine the store choice behavior in both online and off-line stores (Jarvenpaa and Todd, 1997; Kolesar and Galbraith, 2000). Customer service includes sales clerk service for merchandise selection, answers to frequently asked questions, and credit, return, and payment policies. Customers want help with product selection, gift services, contact information for sales representatives, a FAQ section for speedy answers, and information about shipping and handling costs. Promotions involve

advertising and sales events that attract customers such as frequent buyer schemes, lottery games, and product-related tips.

The third attribute category is navigation and convenience. This is related to the user interface of an online store (Szymanski and Hise, 2000). Store layout, organization features, as well as ease of use are considered in this category. Since user interface of an online store influences the experience of consumers interacting with a retailer's product or service offering (Griffith, 2001), a well-designed user interface system may reduce consumers' cost of searching and the time required for information processing. That is, it will minimize the effort needed to perform choice and purchasing tasks (Hoque and Lohse, 1999). Online shopping is thought to be pleasurable and satisfying to consumers when the retailer sites are fast, uncluttered, and easy-to-navigate. Uncluttered and easy-to-navigate sites economize shopping time and the cognitive effort consumers expend figuring out how to shop effectively online (Szymanski and Hise, 2000). Moreover, general help functions might assist users to find a particular topic in the documentation. Help functions also include information about navigating the store or the use of ordering features like a shopping cart function. Most online shopping stores provide a product search engine, site map, and navigation sequence guidance function to help consumers' searching and purchasing.

Finally, security of online transactions continues to dominate the discussions on electronic commerce (Elliot and Fowell, 2000; Szymanski and Hise, 2000; Liao and Cheung, 2001). Consumers are concerned about disclosing their private and financial information. While most online shopping sites provide personal information privacy protection policy and guarantee for transaction security, they do not offer detailed information on how transaction and personal data are secured (Elliot and Fowell, 2000).

2.2 Consumer relational behavior in online shopping context

Consumers tend to engage in relational behaviors to achieve greater efficiency in their decision making, to reduce information processing, to achieve more cognitive consistency in their decisions, and to reduce the perceived risks associated with future

choices (Sheth and Parvatiyar, 1995). After a few successful transactions, a consumer starts to feel safe with the service provider or supplier (Ravald and Grönroos, 1996). When consumers trust a company, they know that this company is able to fulfill their needs and wants and eventually, they become committed to the company.

The online shopping environment enables consumers to reduce their decision-making efforts by providing vast selection, information screening, reliability, and product comparison (Alba *et al.*, 1997). Since the Internet provides screened and comparison information for alternatives, consumers may reduce the cost of information search and the effort in making purchasing decisions. However, since online shoppers mainly interact with the Web-based computer system and cannot physically touch or feel actual products, they make decisions mainly with information provided electronically by the online store.

Thus, the discussion about the critical factors in consumer purchase behavior in an electronic commerce environment needs to be focused on the availability of information (Wolfenbarger and Gilly, 2001). The availability of information considers not only product or service information but also convenience and personalization for retaining customers. It depends on the degree to which information can be employed by consumers to predict their probable satisfaction with subsequent purchases. Consequently, the success of online stores will be determined by the ability to tailor their information to meet the consumers' needs. But, several factors determine the predictive value of the information with no one type of information to be uniformly valued by all consumers (Kolesar and Galbraith, 2000).

The basic requirement for inducing a consumer to become a customer of an online store and increasing his/her switching cost is to reduce the cost of information search and to maximize the predictability of product quality by providing tailored information to consumers (Bakos, 1991, 1997). Although the consumer may receive a tangible good at the end of the online transaction, the benefits to the consumer are not in the purchased good, which could have been obtained through alternative channels (Kolesar and Galbraith, 2000). Instead, the unique benefits to the consumer are in the performance of the

online shopping transaction itself such as saved time, increased convenience and reduced risk of dissatisfaction (Wolfenbarger and Gilly, 2001). Thus customer service and promotion are also critical in designing an online store (Jarvenpaa and Todd, 1997; Lohse and Spiller, 1998).

3. Research model and hypotheses

We developed a research model for the consumers' relational purchasing behavior in an online shopping context (see Figure 1). This model consists of the online store attributes that influence consumers' perception of an online store. For the key mediating factors affecting the consumers' shopping behavior, we examine two constructs: information satisfaction and relational benefit.

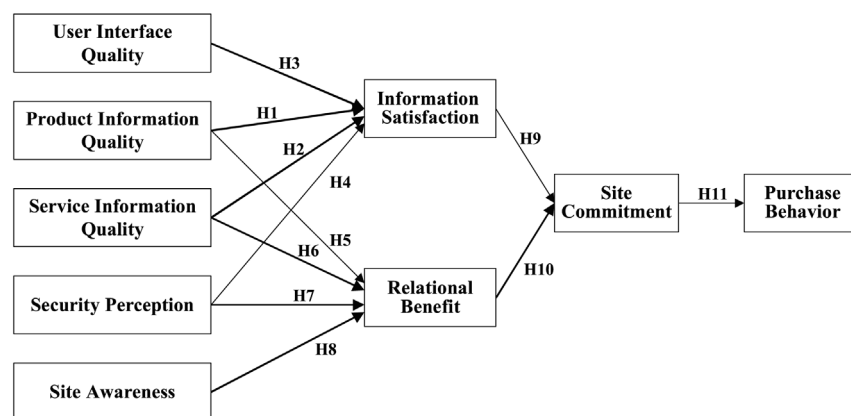
3.1 Information satisfaction

Information satisfaction refers to consumers' dis/satisfaction with an overall information service encounter (Crosby and Stephens, 1987) – which means navigating through Web pages and contents in an online service context. It is different from the overall satisfaction that refers to the consumers' overall evaluation of an organization based on all encounters and experiences with that particular organization (Jones and Suh, 2000). In this study, we have conceptualized information satisfaction as “an emotional reaction to the experience provided by the overall information service” (adapted from Westbrook, 1983).

According to the information systems literature, information quality and user interface quality are believed to affect user information satisfaction (DeLone and McLean, 1992; Wang and Strong, 1996). Information provided by the online store is divided into product information and service information. Product information includes product attribute information, consumer recommendations, evaluation reports, etc. Service information that most online stores provide includes membership information, FAQs, ordering and delivery information, and promotion.

To evaluate the product and service information, we adopted six components of information quality from the user information satisfaction research. They are relevancy,

Figure 1 Research model



recency, sufficiency, playfulness, consistency, and understandability (DeLone and McLean, 1992; Wang and Strong, 1996; Moon and Kim, 2001). Information presented by online stores should support customer service and product search. Such information should be helpful and relevant in predicting the quality and utility of a product or service (Wolfenbarger and Gilly, 2001). To satisfy consumers' information needs, such information should be up-to-date in presenting products and services, sufficient to help consumers make a choice, consistent in representing and formatting the content, and easy to understand (Wang and Strong, 1996; Zhang *et al.*, 2000). Enjoyment, entertainment, and humor are important dimensions of forming one's attitude and behavioral intention toward a site (Agarwal and Karahanna, 2000; Moon and Kim, 2001). Therefore, playfulness is a salient factor in the Web-based information presentation.

H1. There is a positive relationship between information satisfaction and product information quality.

H2. There is a positive relationship between information satisfaction and service information quality.

User interface quality is related to system layout, navigation sequence, and convenience to search for a product or information, or simply to browse (Spiller and Lohse, 1997; Szymanski and Hise, 2000). Since purchasing transaction can be adversely influenced by the poor online store design, it is essential to understand the effects of different layouts, and organizational, browsing, and navigation features on consumers' purchase behavior

(Lohse and Spiller, 1998). Online stores facilitate consumers' navigation by providing features such as search functions, guided navigation, and site maps. So in this research, we developed items corresponding to ease of navigation, convenience of searching for and ordering products as user interface quality measures.

H3. There is a positive relationship between information satisfaction and user interface quality.

Another important factor affecting information satisfaction in the Web environment is security. Consumers are concerned about online payment security, reliability, and privacy policy of the online store (Gefen, 2000). So, security is a critical factor in acquiring and retaining consumers as online shopping service users. Basically, security concerns in electronic commerce can be divided into concerns about user authentication and concerns about data and transaction security (Rowley, 1996; Ratnasingham, 1998). According to the prior research (Elliot and Fowell, 2000; Szymanski and Hise, 2000), as perception of security risk decreases, satisfaction with the information service of online stores is expected to increase.

H4. There is a positive relationship between information satisfaction and security perception.

3.2 Relational benefit

In a commercial service relationship, prior research has shown that relational benefit is an antecedent to building a long-term relationship (Ravald and Grönroos, 1996; Gwinner *et al.*, 1998; Patterson and Smith, 2001). According to Gwinner *et al.* (1998),

relational benefit is defined as “the benefit customers receive from long-term relationships above and beyond the core service performance”. The literature suggests that an important part of relational benefit is the sense of reduced anxiety, trust, and confidence that customers experience. Trust is a key-mediating variable in relational exchanges (Morgan and Hunt, 1994; Garbarino and Johnson, 1999) and risk reduction is a key outcome of the service relationships (Berry, 1995). Although this sense of confidence and trust may be inextricably tied to the quality of the core service, it is perceived as the independent benefit of a long-term relationship (Ravald and Grönroos, 1996).

Based on the previous discussion of relational benefit, we focused on the role of risk reduction, minimization of information search and transaction cost, and cognitive consistency as part of the relational benefit in an online shopping context. Since consumer decision-making efficiency improves when the information processing task is simplified and bounded (Sheth and Parvaytiyar, 1995), one would expect that consumers intend to maintain a relationship with the marketer to improve his/her future decision-making. Consumers may be able to reduce information search and transaction cost by maintaining a relationship with a credible online store that satisfies their information needs.

H5. There is a positive relationship between the product information quality and relational benefit.

H6. There is a positive relationship between the service information quality and relational benefit.

Besides affecting consumers' evaluation of overall information service, as discussed earlier, assurance of security also plays an important role in trust forming by reducing the consumers' concerns about personal data abuse and vulnerability of transaction data (Jarvenpaa and Todd, 1997; Ratnasingham, 1998). Consumers want detailed information on how their private and transaction data are secured (Elliot and Fowell, 2000). So, if the perceived level of security assurance meets consumer's expectations, a consumer may be willing to disclose his/her personal information and try to purchase with comfort.

H7. There is a positive relationship between security perception and relational benefit.

In the service marketing literature, an external source of information about a company, corporate image, reputation, and awareness were identified as important factors in the overall evaluation of the firm and its service (Zeithaml and Bitner, 1997). Apart from corporate image as a function of accumulated purchasing/consumption experience over time, most companies also provide external informational events (e.g. advertising or public relations) to attract new customers and keep existing customers (Andreassen and Lindestad, 1998).

We introduce site awareness as perception by consumers about an online shopping store that is based on external information events like advertising and word-of-mouth communication. It is defined as the “ability of a buyer to recognize or recall that a site is a member of a certain service category” (adapted from Aaker, 1991). This construct indicates consumers' perception of extrinsic information cues about an online store and is assumed to have an impact on customers' choice of a company when service attributes are difficult to evaluate.

H8. There is a positive relationship between site awareness and relational benefit.

As summarized, we expect consumers to perceive the relational benefits of an online store (i.e. on risk reduction, information searching, and transaction cost minimization), as a result of their evaluation of the information features of that online store.

3.3 Site commitment and purchase behavior

Commitment is an essential ingredient for a successful long-term relationship (Dwyer *et al.*, 1987; Morgan and Hunt, 1994). Commitment has been defined as “an enduring desire to maintain a valued relationship” (Moorman *et al.*, 1992) or “a tendency to resist change” (Pritchard *et al.*, 1999). It plays a key-mediating role in formation of consumers' loyalty and future behavioral intention (Garbarino and Johnson, 1999; Morgan and Hunt, 1994; Pritchard *et al.*, 1999).

In the service marketing literature, service quality, perceived value, and satisfaction are considered as antecedents of commitment (Grönroos, 1990; Hocutt, 1998; Shemwell *et al.*, 1998). That is, consumers' emotional and judgmental reaction to products or services is a key influential factor for consumers' commitment. The psychological benefit and trust are also essential ingredients for enhancing commitment (Grönroos, 1990). They are validated to be more important than special treatment or social benefits in consumer relationships with service firms (Gwinner *et al.*, 1998).

Based on the prior research, we expect information satisfaction and relational benefit to play a key role in forming consumers' site commitment to an online store. Information satisfaction indicates the consumer's overall evaluation of the online store's information service and relational benefit represents a cumulative psychological perception about the store.

H9. There is a positive relationship between relational benefit and site commitment.

H10. There is a positive relationship between information satisfaction and site commitment.

As mentioned above, a committed consumer has an intention to maintain a relationship with a particular store – that is, he/she will revisit and purchase repeatedly in the future. Many researchers have investigated the relationship between commitment and future interaction (Garbarino and Johnson, 1999; Hocutt, 1998; Pritchard, 1999). They argue that commitment is a predictive construct of future intention and loyalty. By applying the results of prior research to the online shopping context, the relationship between site commitment and purchasing behavior may be hypothesized as follows:

H11. There is a positive relationship between site commitment and purchasing behavior.

4. Research methodology

4.1 Subjects and data collection

The unit of analysis in this study is the individual consumer who has experience with purchasing products at online stores. In

Korea, the number of Internet users was estimated to be about 24,380 in 2001. The electronic commerce and Internet business market has grown rapidly accompanying the increase in the number of Internet users. According to a recent survey, there are 2,372 online retail stores and total sales volume in 2001 is about US\$20 billion. Major product categories the online stores provide are electronic devices, computers, clothes, travel and leisure, books and CDs (KNSO, 2001).

In deciding on the target online stores, we applied control to the several factors. Since the interest of this study is focused on investigating the relationship between information characteristics and consumer behavior, although price advantage and product quality are also important factors affecting consumer purchase behavior in online shopping, we decided to select the online bookstores that have a fixed price policy. It is documented that consumers do interact more online than off-line with this product category in Korea (KNSO, 2001). For the study, we selected three online bookstores in Korea with the highest sales volume. At these stores, price policy (e.g. no discount policy), delivery service, and payment process were similar.

To collect the consumer perception data, we built an online survey Web site that was hyperlinked to each target online bookstore. The target subjects were Korean consumers who had memberships at the online bookstores. We asked for an ID number and password key-in at the beginning of the survey. We provided coupons or cyber money as a reward for the survey participation in the form of gift vouchers for books or bonus points at the online store. The survey period was from three to four weeks for each bookstore and the total number of participants was 771. We excluded the cases of missing data ($n = 68$) and no membership ID number ($n = 101$), and finally used 602 samples for our analysis. Descriptive statistics of the respondent profile is shown in Table I.

4.2 Measurement development

When we developed the questionnaire, the multiple-item method was used and each item was measured based on a five-point Likert scale from "strongly disagree" to "strongly agree". All operational definitions of the constructs and instrument items are shown in Appendices 1 and 2. When available,

Table I Descriptive statistics of the respondent profile

Measure	Items	Frequency	%
Gender	Female	360	59.6
	Male	235	39.1
	Missing	8	1.3
Age	≤ 19	52	8.7
	20-29	343	57
	30-39	176	29
	≥ 40	22	3.9
	Missing	9	1.4
Time to use Internet	≤ 1 hour per day	89	14.8
Internet	2-5	422	70
	6-9	51	8.5
	≤ 10	23	3.9
	Missing	17	2.8
Occupation of respondents	White-collar employee	128	21
	Student	260	43
	Professional	86	14
	Self-employed	16	2.7
	Housewife	20	3.3
	Teacher	16	2.7
	Technical person	20	3.3
	Retired	5	0.8
Missing	51	8.5	

constructs that have already been used and validated by other researchers have been adopted. Constructs that have not been used previously were evaluated and adapted from the relevant literature as to how they might be operationalized, and then were validated by pilot testing with 67 consumers with online book purchase experience.

4.3 Validity and reliability of measurement instrument

4.3.1 Content validity

Content validity defines how representative and comprehensive the items were in presenting the hypothesis. It is assessed by examining the process that was used in generating scale items (Straub, 1989). In this research, definitions of user interface quality, information quality, and security perception were developed based on the review of theory and research in information systems and other disciplines. Six items were selected for information quality, four items for user interface quality, and four items for security perception. For developing scales for site awareness, information satisfaction, relational benefit, and site commitment, we used the current marketing and service marketing literature. Four items were selected for site

awareness, three items for information satisfaction, four items for relational benefit, and four items for commitment.

4.3.2 Construct validity and reliability

In this study, we follow Straub's (1989) processes of validating instruments to test construct validity in terms of convergent and discriminant validity. Convergent validity is the degree to which multiple attempts to measure the same concept are in agreement. For testing convergent validity, we evaluated the item-to-total correlation; that is the correlation of each item to the sum of the remaining items. Items whose item-to-total correlation score was lower than 0.4 were dropped from further analysis.

Discriminant validity is the degree to which measures of different concepts are distinct. The discriminant validity of each construct was assessed by principal component factor analysis with VARIMAX rotation. As shown in Appendix 3, the confirmatory factor analysis for independent variables yielded five distinct factors: user interface quality, product information quality, service information quality, security perception, and site awareness. Factor loadings for all variables were greater than 0.54 with no cross-construct loadings, indicating good discriminant validity. Together, the five observed factors accounted for 61 percent of the total variance. To validate the appropriateness of the factor analysis, we applied several measures to the entire correlation matrix. Here, Bartlett's test of sphericity ($p = 0.000$) indicates the statistical probability that the correlation matrix has significant correlations among at least some of the variables, and the Kaiser-Meyer-Olkin measure of sampling adequacy (0.905) showed acceptable sampling adequacy (Hair *et al.*, 1998, p. 99).

Next, we conducted the second factor analysis to investigate the distinctions among the dependent variables: information satisfaction, relational benefit, and site commitment. As shown in Appendix 3, factor loadings for the three variables were greater than 0.60 with no cross-construct loadings, and the three observed factors accounted for 64 percent of the total variance.

Internal consistency reliability is a statement about the stability of individual measurement items across replications from the same source of information. The

Cronbach alpha coefficient was used to assess reliability of the measures (Straub, 1989). As shown in Appendix 3, reliability coefficients were acceptable for all constructs, ranging from 0.8687 for service information quality to 0.6712 for relational benefit. While all the reliability figures were higher than 0.6, the lowest acceptable limit for Cronbach's alpha suggested by Hair *et al.* (1998), variables with reliabilities lower than 0.8 deserve further refinement in future research.

4.4 Hypothesis testing

H1, H2, H3 and *H4* examine the factors affecting information satisfaction. They are user interface quality, product information quality, service information quality, and security perception. Entering the variables in a single block, as shown in Table II, we found that 39 percent of the variance in information satisfaction is explained by user interface quality, product information quality, service information quality, and security perception ($R^2 = 39$ percent, F -value = 95.227, $p < 0.001$). At the 0.001 significance level, user interface quality and product information quality were significantly related to information satisfaction, while service information quality and security perception were found to affect information satisfaction at the 0.05 significance level.

H5, H6, H7 and *H8* examine the factors affecting relational benefit. They are product information quality, service information quality, security perception, and site awareness. To investigate the hypotheses, entering the variables in a single block, we found that 31 percent of the variance for relational benefit is explained by product information quality, service information quality, security perception, and site awareness ($R^2 = 31$ percent, F -value = 66.939, $p < 0.001$). At the 0.001 significance level, product information quality, service information quality, and security perception were significantly related to relational benefit. Site awareness was also found to affect relational benefit at the 0.05 significance level.

H9 and *H10* examine the links between both information satisfaction and relational benefit and consumer's site commitment. The result in Table II shows that information satisfaction and relational benefit explain 35 percent of the variance in site commitment ($R^2 = 35$ percent, F -value = 164.863, $p < 0.001$). At the 0.001 significance level, information satisfaction and relational benefit were significantly related to site commitment.

H11 examines the effect of site commitment on actual purchasing behavior. As shown in Table II, while site commitment was found to

Table II Results of hypotheses tests

Model ^a	R ²	Adj. R ²	Std. B	t-value	VIF	Hypothesis result
(1) Information satisfaction (INFSAT)						
INFSAT = UIQ + PIQ + SIQ + SEC + ε	0.390	0.386				
UIQ			0.281	6.821 ^b	1.658	H1 was supported
PIQ			0.297	7.360 ^b	1.585	H2 was supported
SIQ			0.107	2.599 ^c	1.667	H3 was supported
SEC			0.093	2.506 ^c	1.336	H4 was supported
(2) Relational benefit (BENEF)						
BENEF = PIQ + SIQ + SEC + SA + ε	0.310	0.306				
PIQ			0.213	5.298 ^b	1.393	H5 was supported
SIQ			0.262	6.263 ^b	1.506	H6 was supported
SEC			0.162	0.162 ^b	1.364	H7 was supported
SA			0.107	0.107 ^c	1.153	H8 was supported
(3) Commitment (COMMIT)						
COMMIT = INFSAT + BENEF + ε	0.355	0.353				
INFSAT			0.448	12.469 ^b	1.199	H9 was supported
BENEF			0.251	6.975 ^b	1.199	H10 was supported
(4) Purchasing behavior (PB)						
PB = COMMIT + ε	0.046	0.044				
			0.214	5.231 ^b	–	H11 was supported

Notes: ^a INFSAT = information satisfaction; BENEF = relational benefit; COMMIT = site commitment; PB = purchasing behavior; UIQ = interface quality; PIQ = product information quality; SIQ = service information quality; SEC = security perception; SA = site awareness; ^b $p < 0.001$; ^c $p < 0.05$

influence consumers' purchasing behavior significantly (F -value = 27.364, $p < 0.001$), 4.6 percent of the variation in purchase behavior is explained by the site commitment ($R^2 = 4.6$ percent).

4.5 Tests on mediating effect

According to Kenny (2001), the following three conditions must hold to support the mediating effect of a construct (see also Baron and Kenny, 1986):

- (1) The independent variable must have a significant association with the dependent variable.
- (2) The independent variable must have a significant association with the mediator.
- (3) When both the independent variable and the mediator variable are included as predictors, the mediator must have a significant effect on the dependent variable.

Complete mediation is supported when the beta coefficient for the independent variable in condition 1 is significant, and the same coefficient in condition 3 is not. Otherwise (still assuming all three conditions hold), partial mediation is supported (Baron and Kenny, 1986; Kenny, 2001). In Table III, we report the results of the tests for mediation. The columns labeled (1), (2), (3) and (4) correspond to conditions 1-3. Mediation is indicated when all the beta coefficients, in column (1), (2) and (3) are significant and the beta coefficients of mediators in column (4) are also significant. To assess the strength of the mediation, column (4) reports the beta coefficients for the independent variables

when both they and the mediators are included.

The results shown in Table III clearly support the notion that information satisfaction and relational benefit variables mediate the effect of user interface quality, product and service information quality, site awareness, and security perception on site commitment.

5. Discussion

We found that a consumer's commitment to an online store is highly related to information satisfaction and relational benefit. At the same time, information satisfaction and relational benefit are significantly affected by product and service information quality, user interface quality, and security perception. These results imply that information of an online store is an important factor that affects each consumer's site loyalty and purchase behavior.

We investigated the differential effect of product information and service information on both information satisfaction and relational benefit. Information satisfaction is affected more strongly by product information quality ($\beta = 0.297$, $p < 0.001$) than by service information quality ($\beta = 0.107$, $p < 0.001$). Conversely, relational benefit is more strongly related to service information quality ($\beta = 0.262$, $p < 0.001$) than to product information quality ($\beta = 0.213$, $p < 0.001$).

These results may reflect the consumers' different perceptual weights to the information contents that online retailers

Table III Testing the mediation effect of information satisfaction and relational benefit

	(1)		(2)		(3)		(4)	
	IV → INFSAT		IV → BENEF		IV → COMMIT		IV → COMMIT (mediator included)	
	Std. B	t-value	Std. B	t-value	Std. B	t-value	Std. B	t-value
Independent variables^a (IV)								
UIQ	0.281	6.821 ^b	N/A	N/A	0.121	2.719 ^b	-0.019	-0.422
PIQ	0.297	7.360 ^b	0.213	5.298 ^b	0.111	2.549 ^b	-0.012	-0.290
SIQ	0.107	2.599 ^c	0.262	6.263 ^b	0.241	5.432 ^b	0.178	4.240 ^b
SEC	0.093	2.506 ^c	0.162	4.070 ^b	0.151	3.756 ^b	0.099	2.616 ^c
SA	N/A	N/A	0.107	2.915 ^c	0.129	3.477 ^b	0.087	2.500 ^c
Mediators^a								
INFSAT							0.363	8.832 ^b
BENEF							0.154	3.873 ^b

Notes: ^a INFSAT = information satisfaction; BENEF = relational benefit; COMMIT = site commitment; PB = purchasing behavior; UIQ = interface quality; PIQ = product information quality; SIQ = service information quality; SEC = security perception; SA = site awareness; ^b $p < 0.001$; ^c $p < 0.05$

provide. That is, in searching and purchasing, product information quality is a critical feature that affects the consumer. It is consistent with the prior discussion that the key benefit of electronic commerce is screened information, which enables consumers to reduce the costs of information search and processing (Bakos, 1991; Alba *et al.*, 1997). Besides, consumers seem to consider service information quality as a more important factor in assessing the relational benefit of electronic commerce in terms of reducing the transaction cost and risk.

The results show that information satisfaction and relational benefit are the significant factors affecting a consumer's site commitment in an online shopping context. This result is consistent with the prior research on commitment in the service context, which identifies satisfaction, trust, and relational benefits as antecedents of commitment (Garbarino and Johnson, 1999). Moreover, information satisfaction has a stronger effect on commitment, thus this result points out the important role of information satisfaction to building consumer commitment in an online shopping context relative to the real world service.

The result of the mediation testing shows that the perception of shopping store attributes has an indirect effect on site commitment, as mediated by information satisfaction and relational benefit. A consumer's perception of an online store's attributes leads differently to information specific evaluation and relationship oriented evaluation so that both play a significant role in enhancing each consumer's commitment to the online store.

6. Conclusion and limitations

We developed and empirically validated a model of consumers' relational purchasing behavior in an online shopping context. The key affecting factors of user interface quality, product and service information quality, security perception and site awareness were found to have significant effects on consumer's site commitment. Furthermore, we investigated whether information satisfaction and relational benefit play a significant mediating role on consumers' relationship purchasing behavior. In an online shopping context, the information feature of a

shopping site was validated to be an important factor determining consumers' site loyalty and decision-making in terms of whether or not they will shop at the store. This emphasizes the importance of product information quality and user interface design in the online shopping site development. Other attributes of an online store were also found to influence a consumer's perceived relational benefits from online shopping. Service information quality was found to be the most important factor among them.

Although our findings provide meaningful implications for online stores, our study has several limitations. First, the use of self-reported scales to measure both independent and dependent variables suggests the possibility of a common method bias for the results. Second, since, although our model considers online store attributes as factors affecting consumer purchase behavior, since other factors such as price and promotion (e.g. loyalty program, price discount rate) were not included, we cannot explain the effect of price sensitivity and loyalty program on consumer purchase behavior with our model. Third, although this study has been conducted at the individual level of analysis, our sample data was collected from the customer-base of only three companies. So we may not exclude the possibility that the lack of organizational variance may have affected our result.

For future research, it is worthwhile focusing on the differences in consumer behavior according to product diversification and breadth of service domain. Moreover it is also worthwhile to conduct a comparative research on the differences of consumer behavior between off-line stores and online stores. Further study should also be conducted on consumers' relational behavior, and the differential effect of trust, commitment, and information satisfaction on purchasing behavior between relationship-oriented customers and transaction-oriented customers in an online shopping context. According to Garbarino and Johnson's study (1999) of a nonprofit theater company, there are significant differences in trust and commitment for customers with relational behaviors, compared with customers with more transactional patterns of exchange. Since some differences exist between the real world and the online context, the differential and interaction effects of consumers'

evaluation – e.g. satisfaction, trust, and commitment – in the off-line service attributes may be applicable to explain the relational behavior in an online context.

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Further reading

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Appendix 1

Table A1 Definitions and references of key constructs

Constructs	Definition	References
User interface quality	Customer perception of degree to convenience and user friendliness in using a Web site system	Szymanski and Hise (2000) Griffith <i>et al.</i> (2001)
Product information quality	Customer perception of the quality of information about product that is provided by a Web site (relevancy, recency, sufficiency, understandability, consistency, playfulness)	Wang and Strong (1996) Delone and McLean (1992) Bailey and Pearson (1983)
Service information quality	Customer perception of the quality of information about service that is provided by the Web site (relevancy, recency, sufficiency, understandability, consistency, playfulness)	Wang and Strong (1996) Delone and McLean (1992) Bailey and Pearson (1983)
Security perception	Customer perceptions about the ability of an online store's controlling and safeguarding of transaction data from misappropriation or unauthorized alteration	Bailey and Pearson (1983)
Site awareness	The customer's ability to recognize or recall that a site is a member of a certain service category	Aaker (1991)
Information satisfaction	Emotional response to the experience provided by the overall information service	Westbrook (1983)
Relational benefit	Benefit customers receive from long-term relationships above and beyond core service performance	Gwinner <i>et al.</i> (1998)
Site commitment	An enduring desire to maintain a valued relationship with the site	Moorman <i>et al.</i> (1992)

Appendix 2

Table All Measurements of instrument of key constructs

Construct	Items (anchors: strongly disagree/strongly agree)	Cronbach alpha
<i>Independent variables</i>		
User interface quality	1. This site is convenient to search for a book 2. This site is convenient to order a book 3. This site is easy to navigate wanted pages 4. This site is user friendly	0.7306
Product information quality	1. This site provides up-to-date book information 2. This site provides sufficient book information 3. This site presents book information easy to understand 4. The book information is consistent 5. The book information is playful 6. The book information is relevant	0.8342
Service information quality	1. This site provides up-to-date service information 2. This site provides sufficient service information 3. This site presents service information easy to understand 4. The service information is consistent 5. The service information is playful 6. The service information is relevant	0.8687
Site awareness	1. Neighbors know this site very well 2. This site is very famous as an Internet bookstore 3. This site is known through the advertising media (TV, newspaper, Internet, etc.)	0.7049
Security perception	1. My private information is managed securely on this site 2. I am sure that payment information will be protected in this site 3. This site provides detailed information about security 4. I am afraid that my private information will be used in an unwanted manner (R)	0.7569
<i>Mediators and dependent variable</i>		
Information satisfaction	1. I am satisfied with the information service of this site compared to other shopping sites 2. Information service of this site satisfies my expectations 3. I am satisfied with the overall information service of this site	0.7952
Relational benefit	1. At this site, I am able to reduce the time to purchase wanted books 2. At this site, I am able to reduce efforts to purchase wanted books 3. At this site, I am able to purchase wanted books that are hard to purchase at other stores 4. I will receive credible customer service from this site	0.6712
Site commitment	1. I will not change my book shopping site in the future 2. I will continuously purchase books at this site in the future 3. I will recommend this site to other people 4. I will visit this site first when I want to buy books	0.8600
Purchasing behavior	Please mark the frequency of book purchase at this site in a year	N/A

Appendix 3

Table III Construct validity and reliability of measures

Construct	Item label	Eigenvalue	Factor loading	Item to total correlation	Cronbach alpha	Variance explained percentage	Cumulative percentage
<i>Independent variables</i>							
Interface quality	UIQ1	2.219	0.588	0.501	0.7306	10.1	10.1
	UIQ2		0.605	0.503			
	UIQ3		0.706	0.540			
	UIQ4		0.739	0.540			
Product information quality	PIQ1	3.455	0.541	0.458	0.8342	15.7	25.8
	PIQ2		0.804	0.711			
	PIQ3		0.723	0.673			
	PIQ4		0.668	0.630			
	PIQ5		0.655	0.553			
	PIQ6		0.712	0.623			
Service information quality	SIQ1	3.710	0.745	0.671	0.8687	16.9	42.7
	SIQ2		0.763	0.676			
	SIQ3		0.759	0.679			
	SIQ4		0.741	0.719			
	SIQ5		0.622	0.581			
	SIQ6		0.703	0.679			
Security perception	SEC1	2.124	0.760	0.616	0.7049	9.7	52.0
	SEC2		0.783	0.627			
	SEC3		0.752	0.534			
Site awareness	SP1	1.978	0.785	0.540	0.7569	9.0	61.0
	SP2		0.827	0.572			
	SP3		0.685	0.458			
<i>Mediators and dependent variable</i>							
Information satisfaction	INFSAT1	2.176	0.822	0.636	0.7952	19.8	19.8
	INFSAT2		0.754	0.659			
	INFSAT3		0.789	0.653			
Relational benefit	BENEF1	2.089	0.700	0.431	0.6712	26.1	45.9
	BENEF2		0.749	0.497			
	BENEF3		0.671	0.435			
	BENEF4		0.604	0.461			
Site commitment	COMMIT1	2.869	0.854	0.744	0.8600	19.0	63.9
	COMMIT2		0.823	0.727			
	COMMIT3		0.733	0.664			
	COMMIT4		0.748	0.700			

Notes: INFSAT = information satisfaction; BENEF = relational benefit; COMMIT = site commitment; PB = purchasing behavior; UIQ = interface quality; PIQ = product information quality; SIQ = service information quality; SEC = security perception; SA = site awareness