The Moderating Effect of On-line Experience on the Antecedents and Consequences of On-Line Satisfaction

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ABSTRACT

The purpose of the present study is to test the moderating effect of on-line experience on antecedents to on-line satisfaction and on the relationship between on-line satisfaction and loyalty. A survey (n = 836) was conducted to test the differences between high and low on-line experience respondents. The relationship between on-line satisfaction and on-line loyalty is stronger for consumers with more on-line experience than for consumers with less on-line experience. Another key finding is that antecedents to on-line satisfaction also differ between high and low on-line experience consumers. Implications indicate that organizations may develop and provide differentiated services to high- and low-experience consumers. © 2005 Wiley Periodicals, Inc.

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Keeping consumers satisfied is one of the most important missions for marketers because of the strong influence of customer satisfaction on brand loyalty, consumer retention, and repeat purchase (e.g., Fornell, Johnson, Anderson, Cha, & Bryant, 1996). The rapid increase in Internet usage and on-line shopping draws both business managers' and academic researchers' attention to consumer satisfaction and loyalty in the on-line environment. The importance placed on on-line satisfaction and loyalty has increased because of the competitive nature of the on-line market, fueled by the increase in the number of on-line retailers and service providers. Now, it is easier and less costly for consumers to search for more product information and to comparison shop to arrive at a purchase decision. The decreased consumer search cost and increased competition makes it more important for marketers to build and maintain consumer loyalty.

The recent growth of on-line services and on-line shopping raises some questions, such as:

1. Which factors affect on-line satisfaction?
2. What are the consequences of on-line satisfaction?

This study addresses these two questions by examining the antecedents and consequences of on-line satisfaction. This research especially focuses on the moderating role of the consumer on-line experience on on-line consumer satisfaction. It is proposed that the level of consumer experience with on-line service affects (a) the factors that determine on-line satisfaction and (b) strength of the relationship between on-line satisfaction and loyalty.

The next section reviews past literature on on-line satisfaction and loyalty, and presents hypotheses on the moderating effect of the on-line experience on on-line satisfaction and loyalty. Subsequently, the study predictions are tested by estimating structural-equation models for high- and low-experience consumers. Then the results are presented, followed by a discussion of this research.

THEORY AND HYPOTHESES

On-line Satisfaction and On-line Loyalty

Figure 1 presents a general model of on-line satisfaction and the hypotheses of this study. It represents the relationship among perceived quality, satisfaction, and loyalty. According to the model, three dimensions of perceived quality—system quality, information quality, and service quality—influence on-line satisfaction, which in turn affects on-line loyalty.

Antecedents to On-line Satisfaction. Following the definition of overall consumer satisfaction (e.g., Oliver, 1980), on-line satisfaction is defined as emotional reaction to an on-line service experience. The existing lit-

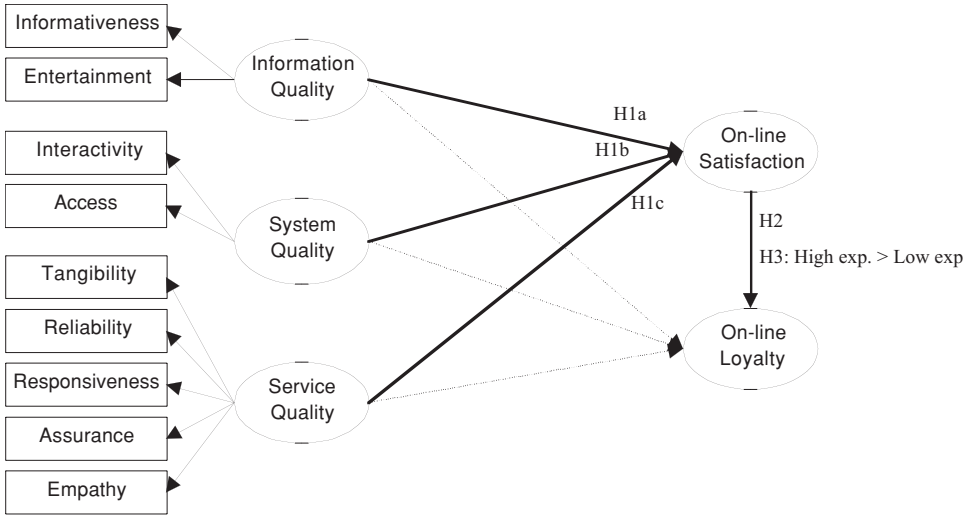

Figure 1. A general model of on-line satisfaction and loyalty.

erature suggests that several quality-perception dimensions influence on-line satisfaction.

DeLone and McLean (1992) proposed that an on-line service's system quality and information quality are antecedents to the end-user satisfaction. *System quality* refers to engineering performance of the on-line service. Its measure captures ease of access to and interaction with the computer system. *Information quality* represents quality of the information provided by the on-line service. Its measure includes dimensions such as timeliness, currency, convenience, and entertainment of the information. The DeLone and McLean model was supported by empirical studies (e.g., Rai, Lang, & Welker, 2002; Seddon, 1997). For example, Seddon (1997) found that both information quality and system quality are positively related to on-line satisfaction.

Pitt, Watson, and Kavan (1995) extended the DeLone and McLean model by adding *service quality* as an antecedent to on-line satisfaction. They proposed that the quality of service by the on-line service provider, in addition to system and information quality, affects on-line satisfaction. Typical service-quality measures include various dimensions of end-user service such as tangibility, reliability, responsiveness, assurance, and empathy (Parasuraman, Berry, & Zeithaml, 1991). In a Web-based interface, direct face-to-face interaction with an employee is replaced by the system's interface, and any trust and confidence established with the customer consequently would be based on the computer system. In a Web-based customer support system, service quality acts as an enabler or as an impediment for the customer support experience (Jiang, Klein, & Carr, 2002). Previous studies on on-line service quality found that service quality is strongly related to on-line satisfaction (e.g., Carr, 2002; Devaraj, Fan, & Kohli, 2002).

Based on the discussed models on the antecedents to on-line satisfaction, it is anticipated that all three dimensions of the quality perception are antecedents to on-line satisfaction:

H1(a): Perceived system quality is positively related to on-line satisfaction.

H1(b): Perceived information quality is positively related to on-line satisfaction.

H1(c): Perceived service quality is positively related to on-line satisfaction.

Antecedents to On-line Loyalty. Loyalty is defined as either a behavioral construct or an attitudinal construct. The behavioral dimension of loyalty is related to repeated product purchase or purchase intention (e.g., Kuehn, 1962). The attitudinal dimension of loyalty refers to a favorable attitude resulting in repeated brand purchase (e.g., Keller, 1993). Studies on the relationship between consumer satisfaction and loyalty consistently support that these two constructs are strongly related (Fornell et al., 1996). Similarly, studies on on-line satisfaction have found a positive relationship between on-line satisfaction and on-line loyalty (e.g., R. E. Anderson & Srinivasan, 2003).

H2: On-line satisfaction is positively related to on-line loyalty.

The Moderating Effect of On-line Experience on the Relationship between On-line Satisfaction and Loyalty

Customers' ability to understand and represent Web-based information is structured and constrained according to their existing domain experience (Moreau, Lehmann, & Markman, 2001). Consumer experience may include both direct experiences such as information search, evaluation, purchase, and consumption of products, and indirect experiences such as advertising exposure and the observation of others' consumption (Alba & Hutchinson, 1987). The consumer-experience domain is not only limited to a specific product category, but is also related to purchase/consumption contexts such as goals and usage situations (Suk & Mitchell, 2004). Consumer experience affects various decision-making processes and outcomes such as the decision making (e.g., Bettman & Park, 1980) and the organization of knowledge in memory (e.g., Hutchinson, 1983).

Considerable evidence suggests that consumer experience increases knowledge (e.g., Park, Mothersbaugh, & Feick, 1994), and thus some researchers measured experience as a proxy of consumer knowledge (e.g.,

Bettman & Park, 1980). Alba and Hutchinson (1987) propose that consumer knowledge consists of two dimensions—familiarity and expertise. The existing literature indicates that domain experience is closely related to both familiarity and expertise. Although consumer experience is considered a direct antecedent to familiarity (e.g., Alba & Hutchinson, 1987), research shows that experience is also a strong indicator of the consumer expertise (e.g., Mitchell & Dacin, 1996), which is defined as consumer decision-making ability.

Consequently, consumer experience is related to knowledge stored in memory and decision-making ability. The following discussion indicates how consumers' on-line experience may affect the on-line satisfaction and its relationship with on-line loyalty.

The Effect of Experience on the Satisfaction–Loyalty Relationship. The existing literature on consumer attitude indicates that consumer experience moderates the persistence of the attitude and the process by which the attitude is formed (e.g., Petty, Cacioppo, & Schumann, 1983; Ratneshwar & Chaiken, 1991). Because satisfaction is considered a form of postpurchase attitude (Oliver, 1996), it is expected that the satisfaction judgment and the strength of the judgment is influenced by the level of consumer experience.

There are psychological and consumer-behavior theories that predict that experience may moderate the relationship between satisfaction and loyalty. First, attitude-formation theories such as the elaboration-likelihood model (the ELM; e.g., Petty & Cacioppo, 1986; Petty et al., 1983) and the heuristic–systematic processing model (the HSM; Chaiken, 1980) suggest that consumer experience or knowledge is a key variable that determines how attitude is formed. According to the ELM and the HSM, both ability and motivation influence a person's attitude-formation process. The central route (the ELM) or systematic process (the HSM) is more likely to be used when the level of both ability and motivation is high. When a person lacks either ability or motivation, the attitude is formed via the peripheral route (the ELM) or heuristic process (the HSM). When the central route or systematic process is used, the attitude is formed relying on the argument strength or message cues, and becomes more persistent with a stronger influence on behavior (e.g., Petty et al., 1983).

The ELM and HSM provide explanations about the difference in strength of the relationship between attitude and behavior between higher versus lower experienced consumers. When a person's motivation is reasonably high, how an attitude is formed is affected by her/his ability.[1] Knowledge and experience are factors that are strongly related to the ability (Alba & Hutchinson, 1987). Therefore, it is expected that when a consumer has more experience, satisfaction is judged on the basis

[1] It is posited in this study that the level of motivation related to on-line service purchase and usage is substantially higher than typical low-involvement situations (e.g., grocery shopping), in which purchase and usage decisions are less important and frequently made. However, the postulation about the level of motivation is not tested in this study.

of the central route or systematic process, and thus, satisfaction is more strongly related to behavioral loyalty.

Second, theories on attitude accessibility also suggest that the relationship between satisfaction and behavioral loyalty is stronger for consumers with higher experience or knowledge. It is suggested that the attitude–behavior relationship is moderated by the attitude accessibility (Berger & Mitchell, 1989; Fazio, Powell, & Williams, 1989). These studies define an attitude as the evaluation of an object associated in memory with the representation of that object. Attitude accessibility refers to how quickly the attitude is activated in memory. More accessible attitudes are more powerful determinants of behavior than less accessible attitudes because they are more likely to be activated on exposure to the attitude object or cues related to it. Eagly and Chaiken (1993) suggest that for knowledgeable individuals, attitudes are formed based on more information, thus becoming more accessible. This explains the finding that the attitude–behavior relationship is stronger for experts than for novices (Kallgren & Wood, 1986). Likewise, it is also expected that satisfaction is more strongly related to loyalty for individuals with higher domain experience than it is for those with lower experience.

H3: The relationship between on-line satisfaction and on-line loyalty is stronger for consumers with more on-line experience than for consumers with less on-line experience.

Effect of On-line Experience on the Factors Affecting On-line Satisfaction. The existing literature on attitude formation also suggests that antecedents to consumer satisfaction are influenced by domain knowledge. As discussed earlier, theories of attitude formation and change, such as the ELM and the HSM, suggest that the key determinants of attitude differ for experts and for novices. When individuals are knowledgeable, they process information carefully (the systematic processing or the central route to persuasion). Argument strength is a primary determinant of persuasive effect and the attitude is relatively enduring and stable. However, when individuals lack domain knowledge, heuristics, cues, and other processes besides consideration of message determine the persuasive effect (the heuristic processing or the peripheral route to persuasion). These "heuristic cues" or "peripheral route" include nonmessage factors such as physical attractiveness of the endorser or picture (Cacioppo & Petty, 1985; Miniard, Bhatla, Lord, Dickson, & Unnava, 1991).

It is expected that the type of information that is used to make a satisfaction judgment differs for novices and for experts. As discussed, three quality-perception dimensions of the on-line service—information quality, system quality, and service quality—are antecedents to on-line satisfaction. However, these dimensions are different in terms of the degree to which they are central (or systematic) or peripheral (or heuristic). In other words, one of the quality-perception dimensions may be more central or

peripheral than others. For example, an element of information quality is entertainment. It is conjectured that this element is more peripheral (or heuristic) and has a stronger influence for novices than for experts.

However, the properties of the three dimensions of perceived quality are not yet clearly understood. As such, it is difficult to define the degree to which a dimension is more central rather than peripheral. Therefore, this hypothesis is rather exploratory. Although there is no clear specification of which dimension will have a stronger influence for experts than for novices, it is expected that the effect of the quality-perception dimensions on on-line satisfaction differ between high versus low on-line experience consumers.

H4: The strength of the relationship between quality-perception dimensions—system quality, information quality, and service quality—and on-line satisfaction differs between high on-line experience consumers and lower on-line experience consumers.

METHOD

Overview and Sample

A survey was conducted to test the moderating effect of on-line experience on the relationship between satisfaction and loyalty. The model presented in Figure 1 was tested through structural-equation models.

A total of 886 undergraduate and graduate students served as subjects for this study. Web sites of U.S. universities were randomly selected in order to select 54 professors assigned to teach information systems courses. E-mails were sent to the professors inquiring about their willingness to participate in this study. Seventeen professors responded that they are not teaching during the study period, and an additional 6 declined to offer extra credit as an incentive for participating students. Thirty-one professors, from 22 U.S. universities, agreed to have their students participate in the study. About half the universities were from the western U.S. and the other half were from the midwest and east.

The instructors administered the survey. When students completed the survey they were asked to click the "Submit" button to send their response. Students received extra credit as incentive for participating in the study. To receive class credit, students had to submit to their instructor a "Thank you" note generated by the computer after it received their response.

Fifty subjects whose responses substantially missed key measures were eliminated from the sample. This resulted in a final sample size of 836. The gender ratio was 45% female and 55% male, with the majority of the students (75%) under 25 years of age, as might be expected from a college population. Further, the sample produced 8% graduate and 92%

undergraduate students. Student majors included 45% information systems, 26% business, 15% accounting, and 14% other disciplines.

Measurement. A survey questionnaire was designed with a 5-point scale (1 = *strongly disagree,* 5 = *strongly agree*), using items that were validated in prior studies. Minor modification in the wording was made to reflect Web-based support. System quality, information quality, service quality, on-line satisfaction, and loyalty questions were taken from the studies of DeLone and McLean (1992) and Pitt et al. (1995).

System quality was assessed by seven questions assessing two elements of system quality—interactivity and access. These items depicted system feedback and ease of system access in order to understand individual perception about system quality of Web-based services. Information quality was measured by eight questions capturing two dimensions—informativeness and entertainment. These items included questions on the information accuracy and the entertainment value of the information. Service quality was measured by 14 questions that assess various aspects of perceived service performance such as tangibility, reliability, responsiveness, assurance, and empathy (Cronin & Taylor, 1992).

On-line satisfaction was operationalized with three items. Respondents were asked to rate their overall satisfaction and their satisfaction with the quality of the Web-based services. On-line loyalty was assessed by three items that asked participants about their willingness to return and use the company's products and services. Table 1 summarizes the variables of the study, their operationalization, and their mean and standard deviation. The table also presents reliability of measures (Cronbach's alpha) for the dependent and independent constructs. All the coefficients were above the 0.68 level, providing evidence of measure reliability (Nunnally & Bernstein, 1994).

On-line experience was measured by a single ordinal scale question that assessed amount of computer experience and the frequency of Web-based support system use (1 = *less than once a month,* 2 = *a few times a month,* 3 = *a few times a week,* and 4 = *several times a day*).

DATA ANALYSIS

Structural equation modeling (SEM) with maximum-likelihood estimation was used to test the relationships among quality-perception dimensions, on-line satisfaction, and loyalty. Variance–covariance matrix was used as input. The data-analysis procedure consisted of three stages.

In the first stage, a confirmatory factor analysis (CFA) was performed to assess the measurement model. It is proposed in this article that three latent constructs anteceding to on-line consumer satisfaction (i.e., information quality, system quality, and service quality) consist of subdimensions. Figure 2 depicts the proposed measurement model consisting of three

Table 1. Summary of Measurement Scales ($n = 836$).

Construct	Measures	Mean	*SD*	Alpha
System quality	Interactivity			.71
	X1: Provide quick feedback	3.97	0.95	
	X2: Give me a variety of alternatives	3.63	1.02	
	X3: Have natural and predictable screen changes	3.82	0.88	
	Access			.82
	X4: Respond quickly during the busy hours of the day	3.29	1.13	
	X5: Easy to contact the customer manager	3.23	1.14	
	X6: Easy to get to customer support information	3.60	1.02	
	X7: Makes information immediately accessible	3.81	0.94	
Information quality	Informativeness			.82
	X8: An accurate source of information	4.10	0.81	
	X9: Provide timely information	4.14	0.84	
	X10: Have up-to-date information	4.20	0.85	
	X11: Supply complete information	3.78	0.95	
	Entertainment			.93
	X12: Entertaining	3.74	0.99	
	X13: Enjoyable	3.86	0.92	
	X14: Pleasing	3.91	0.89	
	X15: Fun to use	3.76	0.99	
Service quality	Tangibility			.81
	X16: Have a modern looking interface	4.11	0.82	
	X17: Have visually appealing features	4.16	0.83	
	X18: Have visually appealing materials	4.04	0.81	
	Reliability			.76
	X19: Provide the right solution to my question	3.96	0.93	
	X20: Present a useful alternative to solve my problem	3.76	0.94	
	X21: Dependable	3.87	0.95	
	Responsiveness			.72
	X22: Tell me exactly when service will be performed	3.82	1.08	
	X23: Give me prompt service	3.86	1.04	
	X24: Always available to help me	3.91	0.93	
	Assurance			.81
	X25: I trust the web-based interface I use	3.91	0.94	
	X26: I feel safe when making transaction	3.83	1.04	
	Empathy			.68
	X27: Give me individual attention	3.43	1.10	
	X28: A good interface to communicate my needs	3.80	0.99	
	X29: Have convenient operating hours	4.13	1.05	
Satisfaction				.79
	Y1: Overall satisfaction level	3.82	0.90	
	Y2: Overall satisfaction level relative to others	3.99	0.99	
	Y3: Overall quality relative to others	3.75	0.92	
Retention				.84
	Y4: I will continue to use in the future	3.57	1.05	
	Y5: I will continue to use in the next 3 months	4.06	0.89	
	Y6: I will continue to use in the next 6 months	4.02	0.90	
	Y7: I will continue to use in the next 12 months	4.00	0.93	

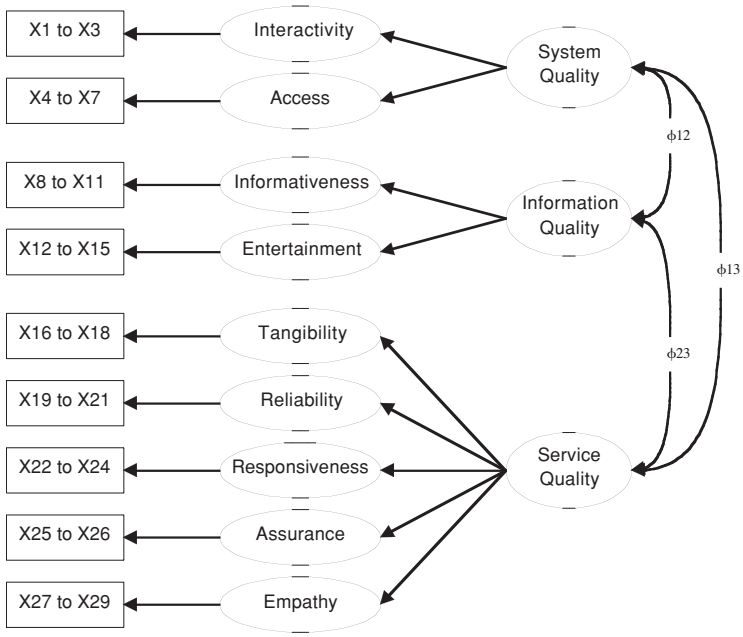

Figure 2. A suggested second-order factor model of system quality, information quality, and service quality.

second-order factors and nine first-order factors. The three second-order factors are latent construct reflecting system quality, information quality, and service quality. The three second-order factors are allowed to intercorrelate. The nine first-order factors are loaded onto one of the second-order factors. The first-order factors are measured by their respective multiple indicator variables. The proposed second-order measurement model was tested by a higher-order confirmatory factor analysis. Checking whether the data fit the proposed measurement model before conducting the full structural equation modeling is recommended, because a poor measurement model should lead to poor overall model fit and estimation (J. C. Anderson & Gerbing 1988). Moreover, there is little research that validated the factors anteceding to on-line satisfaction. Pitt et al. (1997) suggested a model depicting that system quality, information quality, and service quality influence on-line satisfaction. However, little research has attempted to include all three dimensions or to validate these dimensions by examining convergent and discriminant validity of the constructs. Therefore, the first step of the analysis procedure is to validate the proposed measurement model.

In the second stage, a structural-equation modeling analysis was used to examine the overall relationships among quality-perception dimensions, on-line satisfaction, and on-line loyalty. The model presented in Figure 1 was tested with variance–covariance matrix derived from all respondents. The goodness of fit was used for the structural-equation model and tested Hypotheses 1 and 2. Although not hypothesized, the model included direct paths from perceived quality dimensions to loyalty.

The DeLone and McLean (1992) conceptual model posits the direct effect of quality dimensions on loyalty. However, empirical research found weak support of the direct effect on loyalty (e.g., McGill, Hobbs, & Klobas, 2003). Paths were added from perceived quality dimensions to loyalty to test the possible direct and indirect effect without formal predictions.

In the third stage, the same structural model was estimated separately for consumers with higher-level on-line experience and for consumers with lower-level on-line experience. Comparing the strength of the path coefficients between the two groups tested Hypotheses 3 and 4.

RESULTS

Confirmatory Factor Analysis

The results of a hierarchical confirmatory factor analysis indicate that the suggested second-order factor model fits the observed data well. Table 2 presents fit statistics. The chi-square test was significant, which frequently occurs with large sample sizes (Hayduk, 1987). The root-mean-square residual (RMR) was 0.04. In general, an RMSEA value less than 0.10 is considered a good fit, and a value less than 0.05 is considered a very good fit. The goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the normed fit index (NFI) were better than suggested criteria of 0.90, 0.80, and 0.90, respectively (Marcoulides & Schumacker, 1996). These fit statistics in general indicate that the data fit the suggested second-order measurement model pretty well. All the estimated correlation coefficients among the three perceived quality dimensions were significantly greater than zero and significantly smaller than 1.0 ($r_{\text{system quality, information quality}} = .84$, $r_{\text{system quality, service quality}} = .80$, $r_{\text{system quality, information quality, service quality}} = .87$), providing evidence of their discriminant validity. All first-order and second-order factor loadings were significant, indicating convergent validity, which assesses the extent to which different methods of measurements are in agreement with one another.

The second-order measurement model was further assessed by comparing it with three alternative measurement models. First, the data were fitted into a single-factor first-order model in which all 29 independent measures were loaded onto one factor. Second, a three-factor first-order model was tested by a confirmatory factor analysis. It is modeled in the way that the three quality-perception dimensions are directly measured by indicator variables. Third, a nine-factor first-order measurement model was tested. It included the nine subdimensional factors (e.g., "interactivity" and "tangibility") instead of the three quality-perception factors. Latent factors were allowed to intercorrleate in the second and third alternative models. Table 2 also presents fit indices of the tested alternative measurement models. Because all these models are nonnested, the fit indices were compared across models without formal statistical tests. The results

Table 2. Goodness of Fit Statistics of the Proposed and Alternative Measurement Models.

	Second-Order	Alternative First-Order Models		
Fit Measures	Model	Single Factor	Three Factor	Nine Factor
Degree of freedom	365	377	374	341
Chi square	1,246 ($p < .01$)	4,980 ($p < .01$)	3,318 ($p < .01$)	1,123 ($p < .01$)
Root mean square residual (RMR)	.04	.08	.09	.04
Goodness of fit index (GFI)	.90	.66	.75	.91
Adjusted goodness of fit index (AGFI)	.88	.61	.71	.89
Normed fit index (NFI)	.91	.62	.75	.91

of the alternative models indicate that the single-factor model and the three-factor model showed poor fit indices. The nine-factor first-order model's goodness-of-fit indices were as good as the indices of the suggested second-order model. This suggests that the nine-factor first-order measurement model may replace the proposed second-order model. However, it was decided to keep the proposed model for two reasons. First, it is more consistent with the conceptual models proposed by the existing literature (e.g., Pitt et al., 1995). Second, the second-order model is more parsimonious with less estimated parameters than the nine-factor model.

Test of the Overall On-line Satisfaction Model: Hypotheses 1 and 2

A structural-equation model using LISREL version 8.3 tested the model presented in Figure 1. A variance–covariance matrix of the total subjects (n = 836) was used as input. The estimated model includes the second-order measurement model and paths among latent constructs. Although the chi-square test was significant, other model fit indices indicated that the suggested model fits the data. The adjusted goodness-of-fit index (AGIF = 0.87), the normed fit index (NFI = 0.90), and the root-mean-square residual (RMSR = 0.05) met the recommended threshold levels. The goodness-of-fit index (GFI = 0.89) was lower than but close to the recommended level.

Figure 3 shows the estimated path coefficients of the structural-equation model and the squared multiple correlations (SMC) for dependent latent constructs, which provide an estimate of variance explained. Hypothesis 1 predicts positive paths from the system quality (H1a), information quality (H1b), and service quality (H1c) to on-line satisfaction. Results showed that the paths from system and service quality to on-line satisfaction were significant (all p's $< .05$), supporting Hypotheses 1a and 1c. However, the path from information quality to on-line satisfaction was not significant, although the sign was positive. Therefore, Hypothesis 1b was not supported. Hypothesis 2 predicts a positive path

from on-line satisfaction and on-line loyalty. The path coefficient was significantly greater than zero ($p < .05$), supporting Hypothesis 2.

Although the direct paths from quality-perception dimensions to loyalty were not hypothesized, they were tested by the model. Only a direct path from information quality to loyalty was significant.

Test of the Difference between High- and Low-Experience Groups: Hypotheses 3 and 4

Separate structural-equation models were estimated for high- and low-experience consumers. Respondents were split into two groups based on on-line experience, which is operationalized as frequency of Web-service use. Respondents who use Web-based support systems a few times a month or less were placed in the low-experience group ($n = 523$), whereas respondents who use Web-based support system a few times a week or more were classified as the high-experience group ($n = 313$).

Separate variance–covariance matrices for novices and experts were used as input for the structural-equation models. Table 3 presents model fit indices and estimated path coefficients. Goodness-of-fit indices suggested that the model fit the data better for the lower-experience group than for the higher-experience group. For the lower-experience group, most fit indices exceeded or were close to the suggested criteria. For the higher-experience group the root-mean-square error residual and adjusted goodness-of-fit index met the recommended level, and the rest did not.

Estimated path coefficients are also shown in Table 3. For high on-line experience respondents, the paths from system quality to satisfaction and service quality to satisfaction were significant. However, the path from information quality to satisfaction was not significant. The path from on-line satisfaction to on-line loyalty and the direct path from information quality to loyalty were also significant. For low on-line expe-

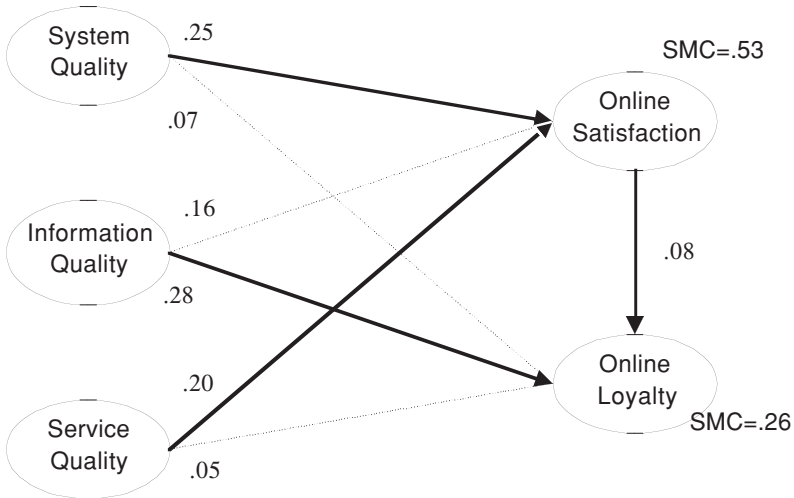

Figure 3. Path coefficient of the general model of online satisfaction and loyalty.

rience respondents, only the path from information quality to on-line satisfaction was significant.

To test Hypothesis 3, the path coefficient from on-line satisfaction to on-line loyalty was compared between the high and the low on-line experience groups. For the high-experience group, the path coefficient was significantly different from zero ($\beta_{high} = 0.14, t = 2.78, p < .01$). However, for the low-experience group, the coefficient was not significantly different from zero ($\beta_{low} = 0.01, t < 1.0$). The comparison between the two coefficients revealed that the path coefficient for the high on-line experience group was significantly stronger than the path coefficient for the low on-line experience group ($t = 2.26, p = .03$), supporting Hypothesis 3.

Hypothesis 4 posits that the significant antecedents to on-line satisfaction will be different between the high versus the low on-line experience groups. A series of two-tailed t tests were conducted to test the difference in the strength of the path coefficients. A test on the information quality indicated that the path from information quality to on-line satisfaction was stronger for the low-experience group ($\gamma_{low} = 1.04$) than for the high-experience group ($\gamma_{high} = –0.25$, t = 3.63, $p < .01$). Comparison of the path from system quality to on-line satisfaction ($\gamma_{high} = 0.51$ vs.

Table 3. Fit Indices and Path Coefficients of High and Low Experience Groups.

	High Experience ($n = 313$)	Low Experience ($n = 523$)
Fit Measures		
Degree of freedom	575	575
Chi square (p-value)	3,275 ($p < .01$)	1,498 ($p < .01$)
Root mean square error residual (RMR)	.06	.07
Goodness-of-fit index (GFI)	.82	.86
Adjusted goodness-of-fit index (AGFI)	.80	.84
Normed fit index (NFI)	.82	.87
Paths (standard error)		
System quality → Satisfaction	0.51***	0.02
	(.10)	(.17)
Information quality → Satisfaction	–0.25	1.04*
	(.10)	(.61)
Service quality → Satisfaction	0.36***	–0.47
	(.07)	(.50)
Satisfaction → Loyalty	0.14***	0.01
	(.04)	(.08)
System quality → Loyalty	–0.03	–0.05
	(.06)	(.06)
Information quality → Loyalty	0.18***	0.22
	(.06)	(.27)
Service quality → Loyalty	–0.06	0.04
	(.04)	(.19)

*** $p < .01$, two-tailed t test; ** $p < .05$, two-tailed t test; * $p < .10$, two-tailed t test.

$\gamma_{low} = 0.02, t = 3.63, p < .01$) and the path from service quality to on-line satisfaction ($\gamma_{high} = 0.36$ vs. $\gamma_{low} = -0.47, t = 2.95, p < .01$) revealed that the coefficients were significantly stronger for the high-experience group than the low-experience group. These findings suggest that the relationship between information quality and on-line satisfaction is stronger for on-line consumers who have less experience, whereas the relationship between service quality and on-line satisfaction is stronger for the high on-line experience group.

DISCUSSION

Conclusion and Implications

Test of the overall relationship among perceived quality dimensions, on-line satisfaction, and on-line loyalty indicate that both system quality and service quality influence on-line satisfaction. When consumers are satisfied with on-line service, consumers are more likely to continue the service. Information quality is not directly related to on-line satisfaction. Instead, it directly influences on-line loyalty. The effect of information quality will be further discussed by examining its effect separately for the high- and the low-experience groups.

Also, the antecedents and consequences of on-line loyalty differ substantially by on-line experience. For consumers who have more on-line experience, on-line satisfaction is influenced by factors that are presumably more essential to the quality of on-line service, such as system quality and service quality. For experienced consumers, the level of on-line satisfaction is positively related to behavioral loyalty. These findings are consistent with theories on attitude formation and attitude strength. One implication of these findings is that in order to retain experienced consumers, it is recommended that they be provided with better service and access, as this should increase their on-line satisfaction and loyalty.

The results indicate that for consumers with less on-line experience, on-line satisfaction is only influenced by information quality. The conjecture on the stronger effect of information quality for low-experience consumers is that one of its subdimensions is entertainment, which is considered a peripheral cue. A simple structural-equation model was implemented with only two subdimensions of information quality—informativeness and entertainment—as independent variables and their effect on on-line satisfaction and loyalty, separately for the high- and low-experience group (GFI for high-experience group = 0.86, GFI for low-experience group = 0.88). As anticipated, the path from entertainment to on-line satisfaction is stronger for the low-experience group than for the high-experience group ($\gamma_{high} = 0.09$ vs. $\gamma_{low} = 0.22, t = 3.21, p < .01$). However, a test on the path from informativeness to satisfaction yielded a nonsignificant difference between the high- ($\gamma_{high} = 0.73$) and low- ($\gamma_{low} =$

0.68) experience groups ($t = 0.72, p = .46$). This exploratory examination supported the conjecture.

Consequently, the findings imply that it is less likely to satisfy consumers with lower on-line experience by providing better service or access. Moreover, no direct path to on-line loyalty is significant. This implies that it is difficult to retain consumers by providing a better-quality system, information, or service and that an on-line business should employ different approaches to retain novice consumers. For example, for consumers with less on-line experience, a company should develop consumer loyalty programs (i.e., frequent user discounts) that are intended to directly influence repeat usage and purchase even if these programs have little influence on quality perception or satisfaction.

FUTURE RESEARCH

Although it is not the main goal of the study, the measurement model of factors anteceding on-line satisfaction was tested by examining a confirmatory factor analysis and comparing it with alternative models, given the lack of previous research examining validity of the three dimensions. Although the suggested second-order model fit the data reasonably well, there still exists opportunity to improve and modify the model. Goodness-of-fit indices of one alternative model (i.e., nine-factor first-order model) were as good as the suggested model, indicating that alternative models may represent the data better than the proposed model. It was found that two subdimensions of information quality (i.e., informativeness and entertainment) had a differential effect for high- and low-experience consumers. This suggests that these two subdimensions may be separate factors rather than subfactors belonging to the same dimension. The subdimensions of service quality may also be modified. The service-quality dimension was modeled as consisting of five subdimensions, as suggested by Parasuraman et al. (1991). Many empirical studies on service quality, however, do not support the five subdimension model (e.g., Buttle, 1996; Cronin & Taylor, 1992). Consequently, research that thoroughly examines the validity of the factors anteceding on-line satisfaction is necessary to answer these questions.

Another limitation of the study is the lack of a clear understanding of the properties of quality-perception dimensions. The key antecedents to on-line satisfaction were different for high versus low on-line experience consumers. However, the underlying properties of the three on-line service-quality dimensions in relation to their influence on on-line satisfaction are not clearly understood. For example, it was found that system quality and service quality are more important for experienced on-line consumers, but this study does not detect which properties of system quality or service quality make such a difference. Future studies may consider including measures of various properties of quality

perceptions, such as the degree to which each dimension acts as a central or peripheral cue.

The existing research on on-line satisfaction examines system quality, information quality, and service quality as factors affecting on-line satisfaction and on-line loyalty. According to the findings, these variables better explain their effect on on-line satisfaction and loyalty for consumers with substantial experience. However, these quality-perception dimensions do not provide good explanations about on-line satisfaction and loyalty of consumers with little on-line experience. Thus, in order to have a model that is more robust, and one that works for both high- and low-experience consumers, factors other than the three quality dimensions should be considered.

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