Developing Multi-construct Model of User Satisfaction in E-Commerce Environment by the Empirical Evidence

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Ⅰ. Introduction

Over the past several decades, the subject of electronic commerce (e-commerce) has received a great deal of attention among practitioners as well as academics. Few topics have received as much attention as e-commerce in the business related literatures. The growing popularity of e-commerce and internet shopping has opened up exciting opportunities not only for the businesses finding new customers but also for the potential customers looking for best trade in the e-commerce environment. Even though there are numerous researches in the field of e-commerce [14, 18, 19, 29], virtually all the studies dealing with the e-commerce have neglected or given cursory attention to the user satisfaction. User satisfaction is considered one of the most important measures of information systems success [11, 16]. User satisfaction is also important because of its potential effect on systems environment and extent of voluntary usage of systems.

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However, previous studies of the user satisfaction have approached the definition of satisfaction from a narrow perspective.

In an information systems (IS) context, expectancy theory emphasizes the effectiveness of the outcome [30]. Expectancy theory suggests that people are motivated by how much they want something and how likely they think they are to get it [28]. The predictive orientation of the model can change the focus of IS research from describing, to predicting, and ultimately to influencing user evaluative responses [22]. While the terminology may differ, it is clear that a variety of researchers hold a positive view of applying expectancy theory to the IS user satisfaction construct along with the overall goal of providing theoretical foundation from which to view user satisfaction in IS [8, 30].

Other concerns noted in the recent studies on IS area were inadequate construct development and a lack of valid, reliable measurements in IS research [5, 12, 17, 22]. The explanation for the lack of progress in IS area is the lack of conceptual development offered by studies investigating the relationship between user satisfaction and IS success [30]. Even if the construct has been developed, a single construct apart from its relationship to other construct does not facilitate prediction and therefore contributes minimally to science [22]. Researchers have emphasized the importance of developing standardized instruments for measuring user satisfaction [11, 16, 26]. The objective of this study is to apply confirmatory factor analysis to confirm the multiple construct model of internet user satisfaction. First, the hypothesized model, which includes four constructs concerning user satisfaction, is developed based on MIS related researches. Second, the relationships among constructs in the model are examined. If the result of this study specifies the relationships among constructs of the model, it will provide a concrete theoretical base for interpreting user satisfaction and further understanding of an important antecedent to e-commerce system implementation success.

Ⅱ. Model development

As shown in Table 1, recent survey conducted by the authors shows a number of significant studies on user satisfaction. Numerous researchers studied about the positive relationship between user's attitude and user's intention. However, most of the studies viewed user satisfaction as a single construct model.

Among these researches, Allport [2] provided a theoretical basis for the link between attitude and behavior by postulating that an attitude is a stage of readiness, which exerts influence over one's actions. Fazio [13] also made a view that a given attitude or ability to use will influence behavior when the attitude is formed as a result of direct experience and held with confidence. Lucas [21] found that attitude toward the computer's potential and systems staffs predict use. Robey [24] found the significant associations between system use and users' attitudes. Based on the logic of those researches, this study proposed the multiple construct model of internet user satisfaction by integrating these single construct views. The following relationship between internet users' attitude and internet user's intention is hypothesized.

H₁ : *User's intention to use internet will be positively influenced by user's attitude.*

<Table 1> Significant Studies on the User Satisfaction for Information Systems

Authors	Year	Title	Findings	Reference
Ajzen & Fishbein	1980	"Understanding Attitudes and Predicting Social Behavior"	"Attitude do not directly influence actual behavior, but are fully mediated through behavioral intentions."	[1]
Allport, G.W.	1935	"A Handbook of Social Psychology"	"Provides a theoretical basis for the link between attitude and behavior by postulating that an attitude is a stage of readiness which exerts influence over one's actions."	[2]

Bailey & Pearson	1983	"Development of a Tool for Measuring and Analyzing Computer User Satisfaction"	"Satisfaction in a given situation is the sum of one's feelings or attitudes toward a variety of factors affecting the situation."	[5]
Davis et al.	1989	"User Acceptance of Computer Technology: A Comparison of Two Theoretical Models"	"Computer use can be predicted from their intentions." "Perceived usefulness is a major determinant of people's intentions to use computers." "Perceived ease of use is a significant secondary determinant of people's intention to use computers."	[10]
Fazio	1986	'How do Attitude Guide Behavior"	"Attitude will influence behavior when the attitude is formed as a result of direct experience and held with confidence	[12]
Ives et al.	1983	"The Measurement of User Information Satisfaction"	"UIS is a perceptual or subjective measure of system success." 'System usage can be a surrogate indicator of system success under certain conditions."	[14]
Lucas	1975	"Performance and the Use of an Information System"	"Attitude toward the computer's potential and systems staff predict use." "Several specific perceptions are consistently related to use."	[16]
Robey	1979	"User Attitudes and Management Information System Use"	"Significant associations between use and attitudes." "Significant correlation between use and perceived worth." 'Low correlation between attitude and perceived worth."	[19]
Schewe	1976	"The Management Information System User: An Exploratory Behavioral Analysis"	"Perceptions are beliefs about an object and related object, and attitudes result from evaluations of those beliefs." "No significant relationship between attitudes and system usage behavior."	[20]
Swan & Trawick	1981	"Disconfirmation of Expectations and Satisfaction with a Retail Service"	"Intentions are predicted most strongly by satisfaction, followed by inferred disconfirmation and then by expectations."	[21]

This hypothesis suggests that if a user develops attitude that using the internet is effective, he/she will be more likely to have intentions to use the internet.

Second, any influence on the internet user's intention by the internet user's perception is hypothesized. The positive influence on user intention by user's perception was discussed in numerous studies. David et al. [10] argued that perceived usefulness and perceived ease of use are major determinant of people's intentions to use computer systems. Lucas [21] suggested that several specific perceptions on IS were consistently related to use the system. Robey [24] also found a significant correlation between MIS use and perceived worth of the MIS.

H_2 : *User's intention to use internet will be positively influenced by user's perception.*

This hypothesis suggests that if a user has a positive perception on using the internet, his or her intention to use the internet will be positively effected.

Third, any effect on the internet user satisfaction by the internet user's attitudes is hypothesized. Factors that effect the IS user satisfaction were found in the study by Bailey and Pearson [5]. Their study shows that, in a given situation, satisfaction is the sum of one's feelings or attitudes toward a variety of factors affecting that situation. It suggests that internet user satisfaction will be influenced by internet user's attitudes on internet use.

H_3 : *User's attitude toward internet will positively influence user's satisfaction.*

This hypothesis shows that once the user develops the attitude that internet is worth to use, the attitudes will contribute to make the internet users satisfactory.

Fourth, any effect on user satisfaction by user's perception is

hypothesized. The study by Bailey and Pearson [5] supports this hypothesis, since they suggested that the user satisfaction is affected by the user's feelings toward a variety of factors.

H_4 : *User's perception for internet will positively influence user's satisfaction*

This hypothesis tests that if the user has positive perception for using internet, it will enforce their satisfaction in using internet.

Fifth, any effect on user's attitude by internet user's perception is hypothesized. Schewe [25] described that perceptions are beliefs about an object and related objects, and attitude resulted from evaluations of those beliefs.
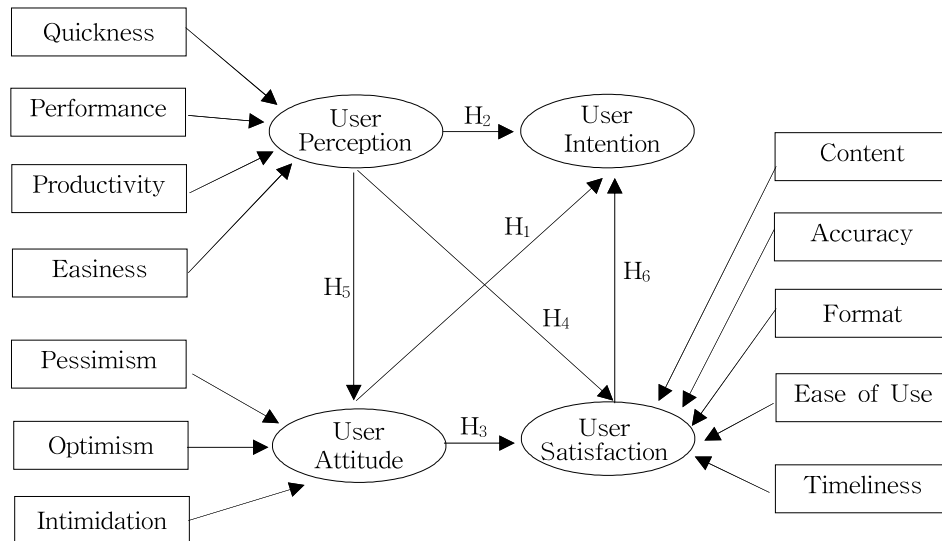
H_5 : *User's perception for internet will positively influence user's attitude.*

This explains that the most of the users who perceive the internet as useful, they will have a positive attitude toward internet.

Lastly, any effect on user's intention by user satisfaction is hypothesized. A relationship does exist between satisfaction and behavior. Ives et al. [17] suggests that user satisfaction is a perceptual or subjective measure of system success. Thus, he continued, system usage can be a surrogate indicator of system success under certain conditions. Swan and Trawick [22] also argued that intentions are predicted most strongly by satisfaction.

H_6 : *User satisfaction for using internet will positively influence user's intention.*

This suggests that there is certain feedback effect on the intention of internet users by the internet user satisfaction. Figure 1 shows the path diagram of causal relationship constructed based on the hypothesis, which rely on various studies on internet user satisfaction.

Sources ; Adapted from the works by Adjen & Fishbein [1]. Allport [2]. Davis et al., Fazio [13], Ives et al., [17], Lucas [21], Robey [24], Schewe [25], and Swan & Trawick [27]

<Figure 1> Causal Diagram for the Research

Ⅲ. Research Methodology

Making a survey on the on-line users presents a unique problem. At the heart of the issue is the methodology used to collect responses from individual users. Since there is no central registry of all on-line users, to contact every user is neither practical nor feasible financially. As such, surveys attempt to answer questions about all users by selecting a subset of users to participate in the survey. In order to reach to a proper subset of internet users, more than a hundred students were chosen for this study. Selecting sample out of students was used since it is relatively convenient to collect sample in any classroom environment. Also, the statistics by GVU Center at Georgia Tech. University suggested that the most experienced Internet users were between twenty one and thirty years old, which was the age range of most college students. Subjects were all volunteers who were interested in on-line purchase and they were clearly told that their response to these questions would be kept

strictly confidential.

Four pages of the questionnaire are going to be used. A five-point Likert scale will be employed, with "Strongly disagree" on one extreme and "Strongly agree" on the other. The questionnaire will be composed of six parts. The questions, which ask users' opinion on the user satisfaction in the e-commerce environment, will be included for each part. The questions for measuring user perception adapted from five-item perceived usefulness scale by Davis [9] will be used to test H, H, and H. The five factors of measuring user's perception about system characteristics are Quickness, Performance, Productivity, Effectiveness, and Easiness. They are used to make questionnaire to measure the influences from user's perception to user's intention, user satisfaction, and user's attitude. The questions based on Computer Attitude Scale [20] will be used to test H and H. The three factors defined by the study are Pessimism, Optimism and Intimidation. They are used to make questionnaire to measure the influences from user's attitude to user intention and user satisfaction. The latent variables from the end-user computing satisfaction instrument by Doll et al. [12] are adapted to test H. The five factors of system to measure user satisfaction are Content, Accuracy, Format, Ease of Use, and Timeliness. They are used to make questionnaire to measure the influence from user satisfaction to user's intention.

Ⅳ. Data Analysis

The data analysis consists of a three parts test of non-response bias, test of validity and reliability of the model, and test of hypothesis. A pretest was performed to determine reliability and validity by sampling a number of responses from the targeted subject. After the pretest, the questionnaire was edited. The important criteria for evaluating a measurement tool are validity and reliability. Reliability is defined as the accuracy or precision of the research instrument. The use of structural equations modeling allows us to test the reliability of the model by testing a series of confirmatory factor

analysis (CFA). As opposed to components analysis, it is possible to test models that more closely resemble the hypothesized construct and its relationship to other constructs (Long, 1983). Rather than merely specifying the number of components and items to be analyzed, CFA allows the researcher to specify the exact relationship between common factors and the items used to measure them as well as the linkages among the factors. As can be seen on Table 2, reliability coefficients of all variables are higher than the minimum cutoff score of 0.65. All of the model fit indices surpass the recommended value for a good model and therefore suggest the measures are reflective of a single factor.

The next step was to ensure that this set of items provided both convergent and discriminant validity. Convergent validity was checked to assure the loadings of the measures to their respective constructs. In order to achieve discriminant validity, the correlations between constructs should not be equal to 1.0. The discriminant validity can be tested empirically by using a chi-square difference test.

<Table 2> Results of Reliability Tests

Variables	Number of Measurements	Cronbach Alpha
User Perception	5	.728
User Attitude	3	.813
User Intention	3	–
User Satisfaction	5	.812

<Table 3> Results of the analysis for model fit

Statistic	Suggested	Obtained
Chi-square		358.62
RMR (Hu and Bentler, 1995)	<0.1	0.031
GFI (Joreskog and Sorbom, 1988)	>0.9	0.93
AGFI (Joreskog and Sorbom, 1988)	>0.8	0.84
CFI (Bentler, 1990)	>0.9	0.91

A series of confirmatory factor analyses were performed to find if the loadings of the measures to their respective constructs are above 0.6 (Bagozzi and Yi, 1988). Discriminant validity is suggested if the correlation between constructs is not equal to 1.0. While this is suggested by the relatively low correlations between constructs, it can be tested empirically using a chi-square difference test. A chi-square difference greater than 3.82 (p=0.05) is suggested. As seen on table 3 the final set of items appear to demonstrate both convergent and discriminant validity.
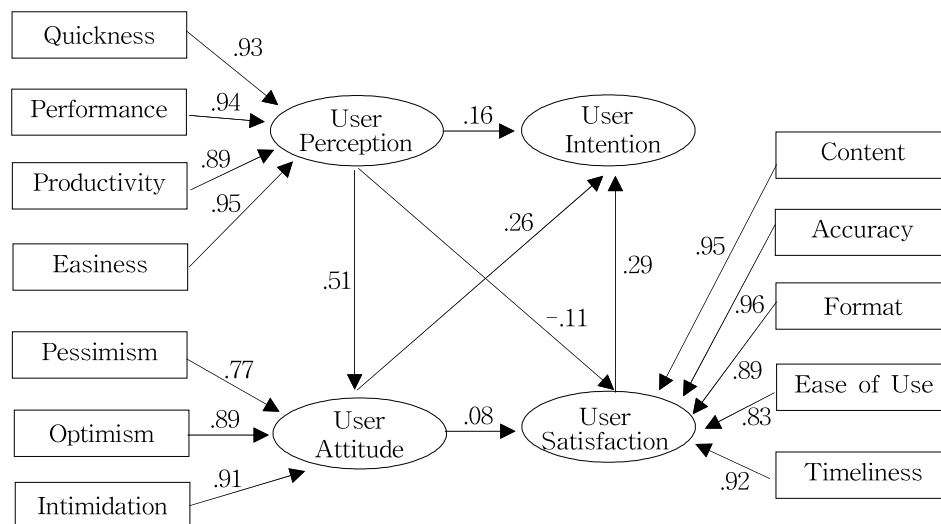
Ⅴ. Findings and Discussions

Structural equation modeling technique is used in numerous studies to verify a theoretical framework by testing the relationship between the factors and the variables [15, 20]. For this study, confirmatory factor analysis will be employed to analyze the relationships between the multiple dependent variables and independent variables. It can be used for confirming a priori design of plausible factor patterns from previous theoretical or empirical work [3, 4, 6, 7]. Confirmatory factor analysis also allows the researcher to specify the exact relationship between the common factors and the items used to measure them as well as the linkage among the factors.

Figure 2 depicts causal diagram for the model with path loading. The results of the study support several findings. In terms of the hypothesized links between factors, user perception favorably influences user intention (0.16) and user attitude (0.51). In contrast with that, user perception negatively influences user satisfaction (-0.11). These findings are important, especially to practitioners who are interested in developing e-commerce platforms. It is clear the users will satisfy for the e-commerce platform if she/he has positive perception and attitude for it. However, user satisfaction for the platform is not guaranteed and even negatively affected by the user perception. The links between user attitude and user satisfaction were also favorable to user intention. Internet users with positive attitude for the

platform will have positive intention for e-commerce activities. Those users with satisfactory experience with the platform will maintain the positive intention for the e-commerce. In addition to that, the suggested impact of user perception on user intention (0.16) and the impact of user attitude on user satisfaction (0.08) were also significant.

Based on these results, several interesting facts can be announced. Even though the e-commerce researchers did not show a great attention for using the terms like perception, intention, and satisfaction, they need to be aware of the terminological differences of those words if they like to value the result of their studies. If they use these terms interchangeably as they used to, the results of their e-commerce researches can be altered dramatically and unvalued the study results.

<Figure 2> Causal Diagram

As described above, the contribution of this study will be to inform the internet users and firms a standard in using the terms for commercial purpose and suggest possible improvement in deploying internet platform. For the IS research community, the integrated internet user satisfaction model poses several opportunities for further inquiry into the variables and

the processes that impact internet user satisfaction. Alternative measurement approaches associated with each of the components of the model need to be investigated. This will also help all internet marketers to pay attention for developing better internet commerce platforms by understanding the consumer needs and expectations in internet commerce.

This study has some limitations too. First, the sample may not be representative of the population of all the internet users who deals with e-commerce activities. Secondly, the responses to the items may have been constrained due to the subjects' lack of previous experience with e-commerce activities. However, this study provides many opportunities for future research. One issue that should be addressed is the constructs that were chosen for this study. The causal model used in this study contains six hypothesized relationships. The results of the study are expected to show how the main constructs of the model that will eventually interact for the user satisfaction in internet commerce environment. These results obtained have two practical implications for individuals, in both the academic and practitioner community; (1) a solid foundation for the development of other research models relating to the study of internet user satisfaction, and (2) application of confirmatory factor analysis to the multiple constructs model of internet user satisfaction. Future research could address other relevant constructs. While the causal model tested here is and should be subject to further revision, the primary goal of this study has been met. The scales have been carefully tested and validated, and it provides a compact instrument that may be used for future research.

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Abstract

Developing Multi-construct Model of User Satisfaction in E-Commerce Environment by the Empirical Evidence

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In this study, the hypothesized model of internet user satisfaction in e-commerce environment is developed and the relationships among constructs in the model are examined. A Confirmatory factor analysis is employed to analyze the relationships between the multiple dependent variables and independent variables.

Key Words : Multi-construct model, Internet user satisfaction, Empirical study

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