MODEL OF INTERNET USER SATISFACTION BY THE APPLICATION OF CONFIRMATORY FACTOR ANALYSIS

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1. INTRODUCTION

Over the past several years, 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 information technology. 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 buy 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. 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 relation-

ship 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 specify 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.

2. 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, 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.

H_1 : *User's intention to use internet will be positively influenced by user's attitude.*

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,

(Table 1) Significant Studies on User Satisfaction

Authors	Year	Title	Findings	Ref.
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	1935	"A Handbook of Social Psycology"	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]
Baily & 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	[13]
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	[17]
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	[21]
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	[24]
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	[25]
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.	[27]

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.

H3 : *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.

H4 : *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.

H5 : *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.

H6 : *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.
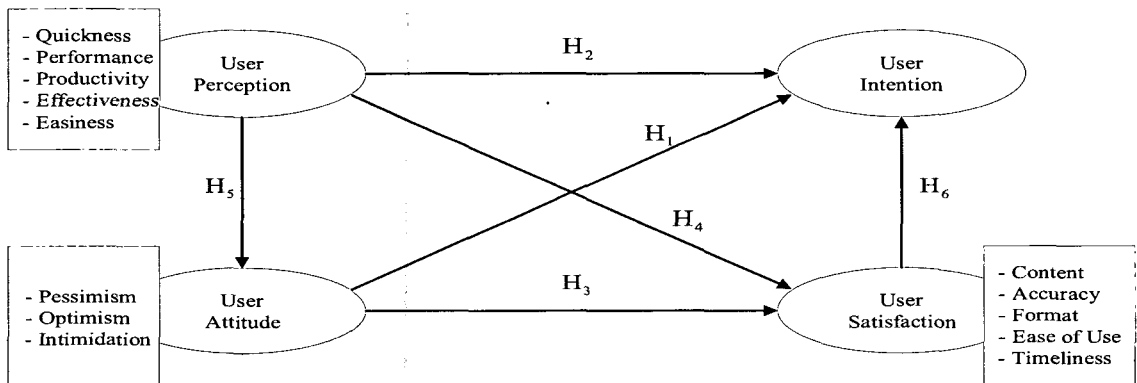
Sources: Adapted from Ajzen & Fishbein [1], Allport [2], Bailey & Pearson [5], Davis et al. [10], Fazio [13], Ives et al. [17], Lucas [21], Robey [24], Schewe [25], and Swan & Trawick [27]

(Figure 1) Causal Diagram for the Research

3. RESEARCH METHODOLOGY

3.1 The Sample

The sample investigated in this study will be randomly taken from various commercial internet auction sites such as eBay.com. The reaction via survey will be related to the factors to the World Wide Web context such as user's perception, user's intention, user satisfaction, and user's attitude.

3.2 Research Instrument

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_2, H_4, and H_5. 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_1 and H_3. 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_6. 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.

3.3 Data Analysis

The data analysis will consist of a three parts test of non-response bias, test of validity and reliability of the model, and test of hypothesis. A pretest will be performed to determine reliability and validity by sampling a number of responses from the targeted subject. After the pretest, the questionnaire will be edited if found to be necessary.

The important criteria for evaluating a measurement tool are validity and reliability. Reliability is defined as the accuracy or precision of the research instrument. Confirmatory factor analysis will test the reliability of the model by specifying the relationship between factors and items used to measure the factors as well as the linkages among them. Convergent validity will be 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.

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. Reliability and validity of the factors and items can be accessed in the designed model.

4. EXPECTED FINDINGS AND IM-PLICATIONS

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.

The contribution of this study will be to inform the internet users and firms any success factors in internet uses for commercial purpose and suggest possible improvement in deploying internet commerce for various users. 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.

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