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# HOW ONLINE INFORMATION SEARCH INFLUENCES ONLINE PURCHASING BEHAVIOR: A CAUSAL AND EFFECT VALIDATION

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## Abstract

*This study explains development process of two important online behaviors, including online information search and online purchasing. A decision-making model is integrated into intention theories to develop this study's research model. The research model hypothesizes that development of information search and online purchasing behaviors is evolutionary or in sequential order. Sequential linkages of the two behaviors are based on two underlying assumptions, Theory of Mere Exposure and relationship between perceived risk and information search. Structural equation modeling is used to test this study's hypotheses. The result of this study could be used to provide a better understanding of how, why, and to what extent consumers adopt Internet stores as their sales channel.*

**Keywords:** Consumer Behaviors, Internet, intention theories, decision-aking theories, structural equation modeling

## Introduction

Although Electronic Commerce (EC) research has been an emerging an ongoing research topic, there has been very little theoretical development to explain online consumer behaviors (Romano and Fjermestad, 2001). Application of intention models is one of the attempts from past stream of research to explain consumers' behavior in the World Wide Web (WWW) environment (e.g. Chen, 2000; Gefen and Straub, 2000). Despite significant knowledge from past stream of research, two consumer behaviors in the WWW have not yet been distinctively differentiated. Those behaviors include online information search and online purchasing.

The importance of online information search behavior to online purchasing behavior has been widely touted (e.g. Bellman et al, 1998). Past studies described the relationship between these two behaviors only in a descriptive manner and development process of these two behaviors has not been studied. This study expands our knowledge in this field. By integrating decision-making theories into intention models, this research proposes a new model that could be used to explain development process of the two behaviors in the WWW environment. The prime intention of this study is to propose a model for the description, explanation, and prediction of consumer behaviors in the WWW environment.

## Theoretical Background

### Intention Theories

As early as 1862, psychologists began developing theories that explain human behaviors by suggesting that human attitudes could influence actions. Later, Fishbein and Ajzen (1975) have proposed the mediating role of behavioral intention in the relationship between attitude and behavior/action. The Technology Acceptance Model (TAM) (Davis 1986) is one intention model that adopts these relationships. TAM has received a significant attention from MIS researchers due to two major characteristics. Firstly, it demonstrates a strong theoretical foundation. Secondly, it is parsimonious and could be used as a guideline to develop a successful information system (Taylor and Todd 1995).

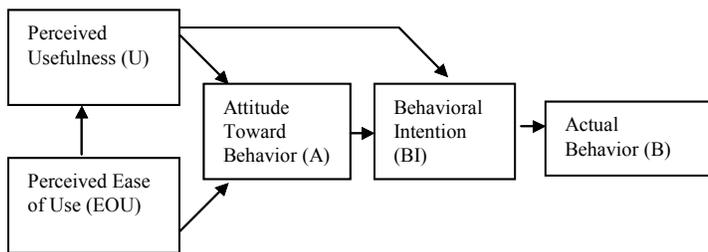


Figure 1. Technology Acceptance Model (TAM)

TAM hypothesizes that actual system use is determined by users' behavioral intention to use (BI), which in turn is influenced by users' attitudes toward using (A). Attitude toward using is directly affected by two salient beliefs about the system. Those two beliefs include perceived usefulness and perceived ease of use. Perceived usefulness (U) is defined as "the prospective user's subjective probability that using a specific application system will increase job performance." Perceived ease of use (EOU) refers to "the degree to which the prospective user expects the target system to be free of effort" (Davis et al. 1989). An additional relationship from U to BI in

TAM is based on the assumption that intention to use computer application could be based on an expected improvement in job performance from using a computer application regardless of attitude (Davis et al, 1989; Davis, 1986). Figure 1 shows TAM and relationships of its antecedents.

### Decision-Making Theories

This study employs a decision-making approach to investigate development of consumer behaviors in an online shopping atmosphere. Simon's model (Simon, 1955; Simon, 1960) is a highly accepted decision model in the area of decision-making. It initially consisted of three stages, including intelligence, design, and choice (See Figure 2). The model is based on an assumption that three stages in decision-making process are *evolutionary* (Simon, 1978). In other words, these three phases have to be developed in a consecutive order. A study conducted by Lipshitz and Bar-Ilan (1996) validated Simon's decision model. It verified that the phases in Simon's model exist and are present in a sequential order.

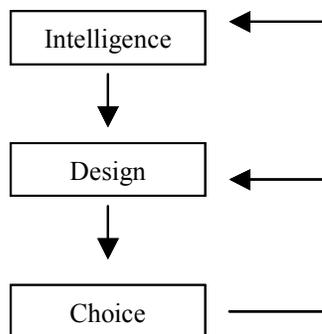


Figure 2: Flowchart of Decision Process

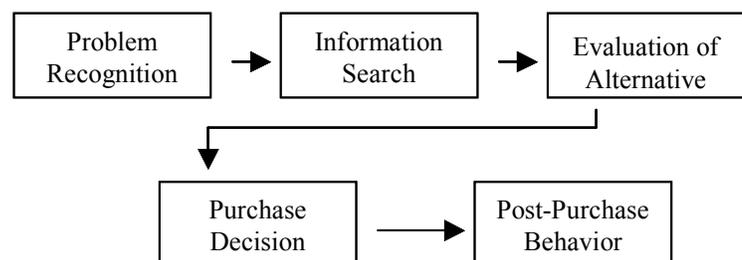


Figure 3: Buyer Decision-Making Process

Simon's decision model has been given a considerable amount of attention from various research disciplines. One of which is the marketing area. Engel, Kollat, and Blackwell (1973) expanded Simon's decision-making model to a marketing context and developed a new model, namely the Buyer Decision-Making Process. Based on this model, five phases of buying decision-making process were proposed (See Figure 3) (Engel, Kollat, and Balckwell 1973; Howard and Sheth 1972; Nicosia 1982). They are (1) Problem Recognition; (2) Information Search; (3) Evaluation of Alternatives; (4) Purchase Decision; and (5) Post-Purchase Behavior (See Figure 3).

The problem recognition phase arises when a consumer recognizes a need by finding disparity between actual state and a desired state (Bruner, 1987). The information search phase is an additional phase from Simon's model. It represents a mechanism that consumers employ to find potential alternatives (Engel, Kollat, and Balckwell 1973; Howard and Sheth, 1972). The information search phase yields a set of alternatives to be analyzed in the following phase, the evaluation of alternative phase.

The evaluation of alternative phase refers to a process that consumers prioritize alternatives (Phillips, Olson, and Baumgartner, 1995). The evaluation of alternative phase determines the likely consequences of the selected alternative (Phillips, Olson, and Baumgartner, 1995). The purchase decision phase is the stage where an alternative is selected and a transaction is made. After a transaction is made, satisfaction or dissatisfaction will be developed and they would determine consumers' future purchase decisions (Spreng, MacKenzie, and Olshavsky, 1996). Satisfaction and dissatisfaction are generated in the post-purchase behavior phase.

Based on the above description, the five phases in the Buyer's Decision-Making Model represent two different groups of activities, including the cognitive process and actions. Problem recognition and evaluation of alternative phases could be categorized into the group of cognitive process. The information search, purchase decision, and post-purchase behavior phases could be categorized into the group of action to which intention theories could be applied.

## **Model Development and Research Hypotheses**

To explain evolutionary development of information search and online purchasing behaviors, these two behaviors should be placed in a sequential order, where information-seeking behavior precedes Internet shopping behavior. The sequential order is consistent with evolutionary assumption of Simon's model. It represents a causal-effect relationship.

At this stage of research model development, the focus is on the application of the intention theories to the two behaviors. It is suggested that researchers attempt to apply TAM in the context of E-Commerce (Gefen, 1997). The application of intention theories to information search and Internet shopping behaviors are in Figure 4. The intention theories are applied only to two behaviors, information search and online purchasing. These two behaviors represent the information search and purchase decision phases in the Buyer Decision-Making Process Model. They are not applied to problem recognition and evaluation of alternative phases. It is because these phases represent cognitive activities rather than human behaviors to which intention theories could be applied.

In the model, independent variables on the left-hand side are temporarily omitted and will be determined later (See Figure 4). They are currently represented by question mark (?) symbols. At this stage, it is important to understand that the intention theories are applied to two behaviors, information seeking and online purchasing behaviors, which render two phases of behaviors (See Figure 4). Each phase of behavior has a unique attitude, Attitude toward using Internet Browser (A/Browser) and Attitude toward using Internet store (A/Store). These two different attitudes are based on the concept of intrinsic and extrinsic tasks.

Tasks that are intrinsic to IT are defined as "the tasks where the IT provides the primary ends (Gefen and Straub, 2000 p.3). On the other hand, tasks that are extrinsic to IT are those "in which the IT is only the means to achieving the primary product or service, i.e., and where IT is not the central component of the process but is instrumental in achieving it" (Gefen and Straub, 2000 p. 3).

When a user searches for product information, Internet browsers are mainly used to provide the primary result (showing the product information). Therefore, an information search could be considered an intrinsic task. In contrast, users use Internet browsers as an avenue for making an online transaction. The online transaction is truly managed by the Internet vendor (Gefen and Straub, 2000). In this case, Internet browser could be considered an instrumental device, which is used to complete online purchasing tasks. Therefore, online purchasing could be considered an extrinsic task. This research study consequently argues that attitude toward using Internet browser is suited to the information search phase (Phase I of Figure 4), whereas the attitude toward using the Internet store is appropriate for the online shopping phase (Phase II Figure 4).

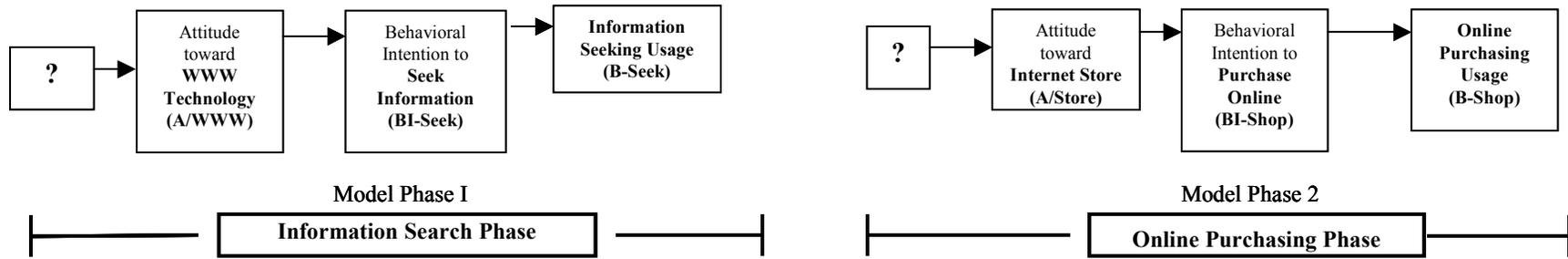


Figure 4. Information Search and Online Purchasing Phases

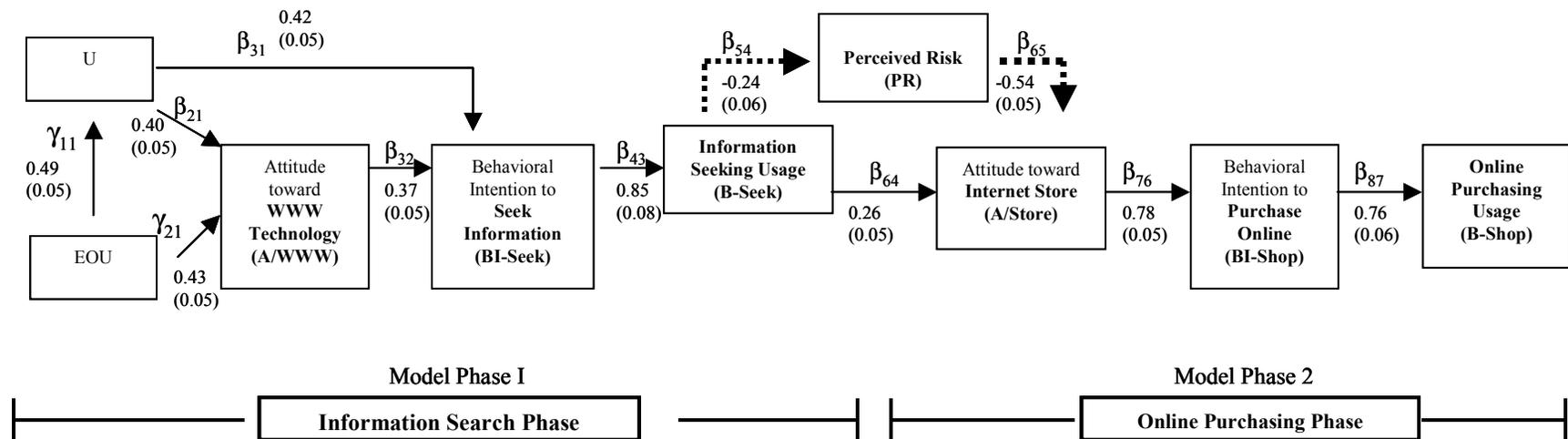


Figure 5. Modified Linkage between Information Search and Online Purchasing Phases and Result of Structural Model Testing

### **Modification of Information Search Phase**

Based on the Buyer's Decision Making Model, the information search phase is a prerequisite for the online purchasing phase. This research additionally argues that it is apropos to apply EOU and U to the information search phase because EOU and U could be considered important characteristics of Internet browsers. This argument is based on a study (Salisbury, Pearson, Pearson, and Miller, Working Paper) that verifies that an intention to gather information on the WWW antecedes the intention to purchase online. In the same study, EOU and U were determined to have a significant relationship only to intention to gather information on the WWW (BI-Seek) but not to intention to purchase online (BI-Shop) (Salisbury et al., Working Paper). Therefore, it is appropriate to apply TAM to the information search phase rather than the online shopping phase. In other words, the question mark symbol in Phase I of Figure 4 is now replaced with two antecedents, EOU and U. The application of TAM to the information search phase is shown in Phase 1 of Figure 5.

The following research hypotheses are formed from Phase I Figure 5:

- H<sub>1</sub>: Usefulness (U) is a positive function of Ease of Use (EOU).
- H<sub>2</sub>: Attitude toward using Internet browser (A/Browser) is a positive function of ease of use (EOU).
- H<sub>3</sub>: Attitude toward using Internet browser (A/Browser) is a positive function of usefulness (U).
- H<sub>4</sub>: Behavioral Intention to seek information (BI-Seek) is a positive function of attitude toward using Internet browser (A/Browser).
- H<sub>5</sub>: Behavioral Intention to seek information (BI-Seek) is a positive function of Usefulness (U).
- H<sub>6</sub>: Information seeking usage (B-Seek) is a positive function of Behavioral Intention to Seek Information (BI-Seek).

### **Modification of Online Shopping Phase**

The objective of this section is to find an appropriate antecedent that is represented by a question mark symbol in the online shopping phase (See Phase II of Figure 4). This antecedent is required to perform two functions. The two functions include the ability to explain the attitude toward using the Internet store and the ability to tie the information search phase to the online purchasing phase, rendering a sequential relationship of two behaviors. To tie the two behaviors together, the appropriate antecedent should also represent the outcome of information search behavior. This research therefore argues that perceived risk could be well suited for those conditions.

The concept of risk has been acknowledged by various research disciplines. It was initially applied in a marketing context by Bauer (1960). In several studies, risk was measured from consumer perspective and is represented in terms of perceived risk. A comprehensive review of perceived risk can be found in prior studies (e.g. Ross, 1975; Stem, Lamb, and MacLachlan, 1977; Dowling, 1986). Perceived risk has been applied to a context of consumer behavior in an electronic market. Its significant negative relationship to online purchasing behavior has also been validated (Salam, 1998).

Perceived risk could also represent an outcome from the information search phase. There appears to be a significant amount of studies supporting the relationship between information search mechanism and perceived risk (e.g. Chaudhuri, 2000; Dowling and Staelin, 1994, Bauer, 1960). Bauer (1960) and Gabbott (1991) enunciated that consumers develop ways of reducing risk by searching for information that enables them to act with a degree of confidence in situations of uncertainty. In other words, the more one searches for information, the less risk he/she would perceive. This represents a negative relationship between information search behavior and risk perception.

Perceived risk is also considered a factor that could prevent consumers from making an online purchase (Lasch, 1998; Salam, 1998). Therefore, it is logical to assume that perceived risk could have a negative influence on an attitude toward using Internet stores. With this relationship, this study proposes that perceived risk (PR) could be an appropriate independent variable for the online purchasing phase. The addition of PR to online purchasing phase is shown in Phase II of Figure 5.

### ***Linkage of Behaviors***

Perceived risk (PR), a construct that was introduced in a previous section, has two important functions. One of which is to explain the attitude toward using Internet stores (A/Store). Another function of PR is to tie information search to online purchasing behavior. The ability to relate these two behaviors is based on the concept that humans employ the information search behavior as a mechanism to reduce their perceived risk (Bauer, 1960; Gabbott, 1991). This assumption allows this study to relate the two phases of behaviors, as shown in Figure 5.

In addition to the indirect relationship between information search and online purchasing via perceived risk, this study further argues that there could be a direct relationship between the two phases of behaviors. That relationship is the one between information seeking behavior (B-Seek) and attitude toward using Internet store (A/Store). This argument is based upon the theory of mere exposure (Zajonc, 1968).

Theory of mere exposure (Zajonc, 1968) postulated that a person's attitude toward a stimulus is positively related to exposure frequency. In this circumstance, Internet stores could be viewed as a stimulus since they provide the front end of their advertisement. Information Seeking Behavior (B-Seek) could be considered an opportunity for consumers to expose themselves to this stimuli. A direct link from B-Seek to A/Store is shown in Figure 9.

From the discussion in the sections of modification of online purchasing phase and linkage of behaviors, five additional research hypotheses are formed. (See Figure 5)

H<sub>7</sub>: Attitude toward using Internet store (A/Store) is a *negative* function of perceived risk (PR).

H<sub>8</sub>: Behavioral Intention to Purchase Online (BI-Shop) is a *positive* function of Attitude toward using Internet store (A/Store).

H<sub>9</sub>: The online purchasing behavior (B-Shop) is a *positive* function of behavioral intention to purchase online (BI-Shop).

H<sub>10</sub>: Perceived Risk (PR) is a *negative* function of Information Seeking Behavior (B-Seek).

H<sub>11</sub>: Attitude toward using Internet Store (A/Store) is a *positive* function of Information Seeking Usage (B-Seek).

### **Research Methodology**

Survey is the underlying research methodology of this study. An online survey was developed for data collection purposes. An e-mail list purchased from a market research company was used to distribute an invitation to prospective participants. This study adopts survey instrument from prior studies. Those instruments were modified to fit the context of this study. The following resource list provided primary source of survey instruments. See Vankatesh and Davis (2000), Taylor and Todd (1995), MacKenzie et al. (1986), Salste (1996), Eroglu et al. (1990).

A sample of 491 was collected. It consists of 353 consumers and 138 students. Four hundred and thirty-five (435) respondents completed the questionnaires, and their data were used to conduct the analysis. The sample group contains 263 males (60.46 percent) and 172 females (39.54 percent).

Maximum likelihood estimation (Joreskog and Sorbom, 1984) was used in the measurement and model testing of the study. This analysis provided a simultaneous test of model relationship as well as estimates of measurement errors in the constructs. LISREL 8.3 was used to conduct data analysis.

### **Data Analysis**

#### ***Measurement Model***

There are a total of 41 variables that makes up 9 constructs in this study's proposed model. Using the correlation matrix as the input, a test of the measurement model generated a strong measure of fitness between the data and the proposed model (Chi-

Square = 2,245.64,  $df = 734$ ). GFI and NFI are 0.79 and 0.89 respectively, which is closed to a recommended value of 0.90. Comparative Fit Index demonstrates the value of 0.92 which is higher than the recommended value.

Due to the limited space of the proceeding, this study is not allowed to show the detailed parameter estimates of the measurement model. In sum, most of the variables demonstrated an acceptably high values of lambda ( $> 0.70$ ). Only two of forty-one variables have the lambda values lower than 0.70. Those variables are two out of three variables that belong to Online Purchasing Behavior (B-Shop). Although they demonstrated relatively small lambda values, the values are significant at  $p = 0.05$ . The full result of measurement model testing and correlation matrix are available upon request to the first author.

### ***Structural Model***

Data analysis of structural model generated a Chi-Square value of 2,356.53 ( $df = 767$ ). The structural model testing demonstrated CFI of 0.92, which is greater than the recommended value of 0.90. This demonstrated that the structural model generated a strong measure of fitness between the data and the proposed model.

Figure 5 shows the standardized correlations with their standard errors between constructs. It is shown that all of 11 research hypotheses are supported by the data of this study. The correlations between constructs in Figure 5 are all significant at  $p < 0.05$ . The supported hypotheses show that online information search is the behavior that precedes online purchasing behavior, rendering a confirmation of evolutionary development process of the two behaviors.

From the findings, it is important for consumers to have Internet browsers that are easy to use and hasveuseful functionalities. An easy and useful Internet browser would allow a user to use it more often for finding product information. The higher frequency of using Internet browser gives more exposure of Internet stores to consumers.

Such exposures would enhance consumer's attitudes' toward making an online purchase. In addition, the more exposures could reduce consumer's risk perception toward making a purchase online. The reduction of risk perception would lead a consumer to make an online purchase eventually.

## **Contributions of the Study**

By combining intention theories and decision-making models in a systematic manner, this study was allowed to produce an empirical investigation of development process of consumer behaviors in electronic market. It validated intention theories, theory of mere exposure, and the relationship between perceived risk and information search. These could be considered theoretical contributions from this study.

In term of practical implications, the result of this study shows that web designers should understand the target users and user's Internet browsers. Since a web page can have different appearances on different browsers, web designers should test and retest web pages on different browsers. A repeated testing would ensure the consistency of web page's appearance. A consistent appearance would enhance the usefulness of Internet browser and render a higher Internet usage from consumers.

Exposure to Internet store is shown to be an important factor of online purchasing behavior. Online business should generate different strategies that increase the exposure of their stores to consumers. Exposures of stores could come from different ways such as posting a banner on other Internet stores. In addition, advertising the stores on different medium, such as billboard and TV commercials, would enhance the exposure as well.

## **Limitations and Directions for Future Research**

The generalizability of this study could be enhanced by adding more consumer respondents to the sample group. Future research should find opportunities to incorporate other phases in decision models into this study's proposed model. Special attention should be given to the evaluation of alternatives phase. This phase could provide a better understanding in how consumer compares different sales channels, which is another task that could take place before an online transaction is made.

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## **Full Result of Measurement Model Testing**

Available upon a request to the first author (achita@cs.depaul.edu).