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EXPLAINING ALTERNATIVE BEHAVIORS OF ONLINE CONSUMERS: AN INTEGRATION OF THE TECHNOLOGY ACCEPTANCE MODEL TO PREFERENTIAL DECISION

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Abstract

Intention theories, such as the Theory of Reasoned Action, the Theory of Planned Behavior, and the Technology Acceptance Model, have been widely adopted to explain information system usage in Management Information Systems discipline. Although these theories have received an enormous amount of attention from MIS researchers, they suffer from a lack of ability to explain alternative behaviors. This study proposes an avenue to mend such a drawback by presenting an integration of preferential decision knowledge to the Technology Acceptance Model. Such integration would allow this study to explain alternative behaviors of using Internet or conventional stores to make a purchase. A sample of 435 was collected and used to run a structural equation model. A new intention model, namely the Theory of Preferred Technology, is proposed and validated. Business implication is provided at the end of this study.

Keywords: Theory of Preferred Technology, preferential choice, structural equation modeling, business-to-consumer e-commerce

Introduction

Acceptance of Internet stores has been consistently studied by several researchers (e.g. Chen 2000; Kunz, 1997; Salam, 1998; Yoh, 1999). The acceptance of this new form of sales channel has been divided into two major categories, including using Internet stores for seeking product information and using Internet stores of making purchases (e.g. Muthitacharoen et al, 2002; Salisbury et al 2001, Gefen and Straub 2000). Past stream of research has claimed that a majority of Internet users use Internet stores only for seeking product information and only a small group of consumers makes purchases online (e.g. Kraut et al., 1997; Kerstetter, 1999). It was recently found that online retail transactions makes up to be only 1.3 percent of total retail sales in the third quarter of 2002 (US Census Bureau 2003). The failure of many Internet stores is witnessed by extinctions of several dot-com companies in today's financial markets (e.g. Barker 2000; Blumenthal 2001). This pinpoints that several individuals have not adopted the Internet as a sales channel. They remain loyal to other sales channels that are available in the market. Such situation indicates an urgent need to investigate how consumers make their choices of where to make purchases.

Making comparisons of where to purchase is an example of alternative behaviors that consumer is experiencing on daily basis. While there are a significant number of Internet research, there appears to be none, at least known to this study, providing a theoretical insight of how comparison of sales channel influences Internet store adoption. By using the Technology Acceptance Model (TAM) as an example, this study demonstrates how existing intention theories could be extended to explain alternative behaviors. A new intention model, namely the Theory of Preferred Technology (TPT), is proposed. By applying TPT to the context of consumer behaviors in electronic market, this study is allowed to provide an insightful pragmatic and theoretical implications of how consumer compare alternative behaviors and how such a comparison influence their acceptance to use Internet store for purchasing.

Technology Acceptance Model in E-Commerce Research

Technology Acceptance Model (TAM) is a relatively new theory in MIS research. By using the theory of reasoned action (TRA) as an underlying model, Davis (1986) proposed a theory that could be specially applied to the context of information technology usage. TAM is an intention model that incorporates two parsimonious beliefs variables, namely Perceived Ease of Use (EOU) and Perceived Usefulness (U). According to Davis et al. (1989), EOU and U could impact Usage Behavior (B) indirectly by sending their impact through two mediating variables, Attitude toward Usage (A) and Behavioral Intention (BI). In TAM, It is hypothesized that A is directly influenced by EOU and U. In turn, A is theorized to send its direct influence to BI, which is the sole variable that has direct relationship with B.

TAM additionally asserted that U and EOU could have positive relationships with other variables. One is a relationship between U and BI and another is a positive relationship between EOU and U. These additional relationships are established on two different assumptions. While the relationship between EOU and U is based on the assumption of self-efficacy (Bandura, 1982) and personal control (Lepper 1985), the relationship between U and BI is rooted in the concept of expected improvement in job performance regardless of attitude (Davis et al 1989; Davis 1986). It is beyond the scope of this study to delineate the elements and background of TAM. More information of TAM can be found in several studies (e.g. Davis et al 1989, Taylor and Todd 1995; Gefen and Straub 2000). The relationships between antecedents in TAM are manifested in Figure 1.

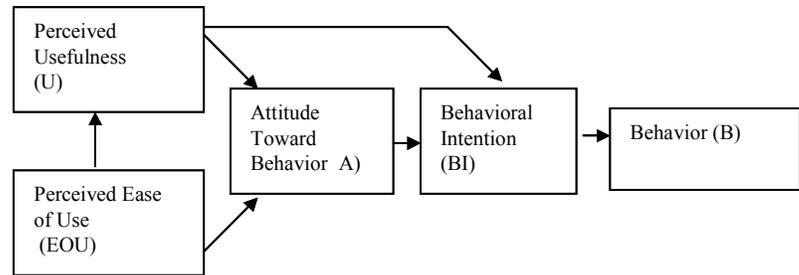


Figure 1. Technology Acceptance Model (TAM)

TAM has gained in its popularity for the part two decades. Until recently, Gefen (1997) recommended that TAM be applied to the context of E-Commerce. Several approaches, in using TAM to study online consumer behavior, have been taken by MIS researchers. While some employed only few variables (e.g. U, EOU) in their studies (e.g. Salisbury et al 2001, Gefen and Straub 2000), others attempted to integrate TAM to other well-designed theories (e.g. Chen et al 2002; Koufaris 2002). Many strived to improve explanatory power of TAM by including psychological variables (e.g.. trust, perceived risk etc) to the model. This phenomenon has brought deeper understanding in online consumer behaviors.

Despite numerous contributions from the past studies, there appears to be no research, at least known to date, attempting to extend TAM to a level that provide an avenue to explain alternative behaviors. While TAM could elicit reasons of adopting a technology, it could not be used to explain why a user prefers a technology to its counterparts and vice versa. The inability to explain alternative behavior is a limitation that TAM inherited from its fundamental model, the Theory of Reasoned Action (TRA) (Ajzen and Fishbien 1980a 1980b; Fishbien and Ajzen 1975). Ajzen and Fishbein (1980b) admitted that disregarding alternative behaviors demonstrated a drawback of TRA. It has been recommended that TRA be extended by incorporating situations in which individuals are forced to choose alternative behaviors (Sheppard et al. 1988). Since TRA is an underlying model of TAM, such situation should also be applied to TAM.

This research argues that extending TAM to explain alternative behavior is imperative, especially in the domain of electronic shopping. In reality, consumer faces several options of sales channels (i.e. Internet store, conventional store, catalog, home shopping network, etc.). By incorporating TAM to preferential decision knowledge, this study proposes a new intention model that could be used to explain how a user/customer compare sales channels and how such a comparison influences variables in TAM.

Preferential Decision Knowledge

Preferential choice is a well-developed research area in marketing discipline. There are several approaches in preferential choice studies. One of which is the multi-attribute modeling approach. This approach has gained an increasing significance in the last three decades (Jacoby 1976; Kassarijan 1982). Within the domain of multi-attribute modeling approach, two concepts of preference development have emerged. They are Attribute-Based Preference and Attitude-Based Preference. First approach

suggests that preference formation involves comparing specific attributes (Attribute-Based Preference), while the second approach signifies the overall evaluation of alternatives (Attitude-Based Preference) (Mantel and Kardes 1999).

When Attribute-Based Preference is used, individuals compare their alternative in detail. For instance, a consumer, who is engaged in an automobile selection, might want to compare colors, transmission systems, number of seats, size, etc. When Attitude-Based Preference is used, individuals employ their general feeling to develop their preference. Such general feeling might be derived from brand, past experience, etc (Wyer and Srull 1989).

Tversky (1969) proposed that alternatives are compared directly on each dimension (attribute), and the differences on those dimensions are summed together to reach a decision. In addition, it was proposed that human somehow combines all dimensional (attribute) value cognitively and comes to an overall evaluation (attitude) before making his or her decision (Einhorn, 1971). In other words, these propositions asserted that Attribute-Based Preference influences Attitude-Based Preference or Attitude-Based Preference is function of Attribute-Based Preference. The relationship between Attribute-Based and Attitude-Based Preferences is shown in Figure 2.

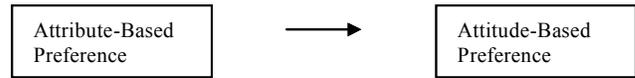


Figure 2. Relationship between Attribute-Based and Attitude-Based Preferences

In reality, consumers have to make choices between vendor alternatives or sales channels alternatives (McGaughey and Mason, 1998). This study argues that although consumer faces several sales channels alternatives, they are likely to compare Internet stores to conventional stores. This argument is based on the concept of Anchoring and Adjustment. In social judgment theory of attitude change, it was postulated that there is an “Anchor” effect in any comparison process (Sherif, Taub, and Hovland, 1958; Sherif and Hovland, 1961; Sherif, Sherif, and Nebergall, 1965). Intuitively, it was suggested that the first or the most familiar alternative might serve as an anchor in a comparison process. In other words, when a consumer encounters a new alternative, he/she would compare the new alternative to something to which they feel familiar. A series of studies done by Tversky and Kahneman (Kahneman and Tversky, 1972, 1973; Tversky and Kahneman, 1971, 1973, 1974) provided theoretical insights of the role of anchor or reference. This study therefore argues that it is logical to analyze a consumer comparison between Internet store (New Alternative) and conventional store (Anchor) to provide a comprehensive picture of how consumer makes decisions to make purchases online.

Integrating Preferential Decision to TAM

This research is proposing a new intention model, namely the Theory of Preferred Technology (TPT), with an attempt to mend a weakness of currently available intention models, such as TRA and TAM. Figure 4 shows how this study integrates the concept of Attribute-Based and Attitude-Based Preferences to TAM.

This research argues that employing U and EOU to investigate user acceptance of information technology could be considered a study of user’s acceptance at the absolute level, where only characteristics of a proposed technology is analyzed without considering characteristics of its alternatives. To have a comprehensive understanding in how a user/customer would adopt a new technology, it is necessary to extend TAM to a comparative level where a proposed technology is compared to the alternative that is currently in use. Figure 3 manifests how this study integrates TAM to Attribute-Based and Attitude-Based Preferences.

Figure 3 shows that Attribute-Based and Attitude-Based Preferences are appended to TAM, rendering a new model, namely the Theory of Preferred Technology (TPT). TPT is consisted of two levels including absolute and comparative levels. All relationships between variables at the absolute level are drawn from TAM. Antecedents at the absolute level, such as U and EOU, belong to an information system that system developers are trying to propose to system users. Within the comparative level, this study argues that users would compare new and current systems in detail (attribute-based preference), before developing his/her general preference (attitude-based preference).

This study further argues that after users compare alternatives, they would develop attitude toward using new technology (A). Theoretically, if a user believes that new alternative is *better* than the one currently in use (comparative level), he/she would have a *good* attitude toward using such a new alternative (absolute level).

Before moving forward to the examination of attributes that could be used to compare Internet and conventional stores, this study argues that it is important to include an additional construct, namely Perceived Risk, into the absolute level. In the domain of E-

Commerce, consumers have been aware of the secondary use of their personal data by business for a long period of time. The perceived threats posed by the new computerized record-keeping systems brought the privacy issue to public attention (Bennett, 1992; Culnan, 1993; Wang et al., 1998). Perceived risk has been applied to a context of consumer behavior in the electronic market. Its significant negative relationship to online purchasing behavior has also been validated (Salam, 1998; Lasch, 1998). Therefore, it is logical to assume that Perceived Risk could have a negative influence on Attitude toward Using Internet Stores for Making Purchases. This study consequently included this variable to the absolute level of the proposed model as shown in Figure 4.

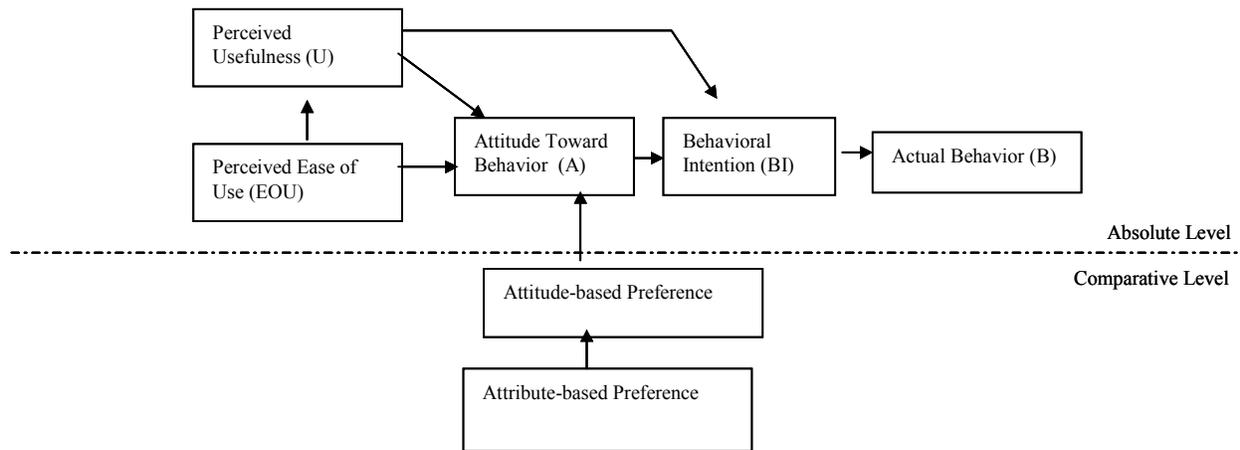


Figure 3. Theory of Preferred Technology

A prime intention of this study is to provide an empirical validation of the Theory of Preferred Technology (TPT). To achieve this goal, TPT is applied to the context of consumer behavior in electronic market. Since this study employs TAM as the underlying model of TPT, this study endeavors to preserve the parsimonious characteristic of TAM. The parsimony of TAM is derived from a decomposition of beliefs in TRA into two easily understandable constructs, including EOU and U. To maintain the parsimony of TAM, this study decomposes Attribute-Based Preference into a number of constructs (attributes) that could be used as a guideline to develop business strategies. The following section is devoted to the search of attributes that consumer might use in the comparison process between Internet and conventional stores.

A Search for Possible Comparable Attributes

Several studies have provided descriptive information of how consumers compare Internet and conventional stores (e.g. Alba et al. 1997; Bakos 1997, 1998; Rigdon 1996). Although they showed only descriptive comparison, they produced a guideline of what could be the criteria that consumers use in the comparison process. Some articulated that consumers make comparison of products, such as product variety, product categories, and product quality between Internet and conventional stores (Alba et al. 1997; Bakos, 1997, 1998). Therefore, this study proposes that consumers might compare the above characteristics of products that are provided by these two sales channels. In other words, Product Preference is proposed as a decomposed variable from Attribute-Based Preference (See Figure 4).

In addition, this study argues that consumers also compare prices between sales channels. Price has been considered a major factor, perhaps the most influential, that lead people to make online transaction. Bakos (1991) posited that the intense competition of online businesses would lead to declination of product prices. A study also showed that online purchasers are those who are more price-conscious than those who do not shop online (Donthu and Garcia, 1999). Consequently, Price Preference is considered another attribute or variable to investigate in the research model (See Figure 4).

This study further argues that consumers gain different levels of social experience from different types of sales channels. Internet shopping currently faces a problem of social interaction paucity (Alba et al., 1997; Kraut et al. 1998; Lohse and Spiller 1998). Consumers might compare different social activities that they might gain while shopping in different sales channels. Therefore,

this study proposes Social Experience Preference as an additional attribute that consumers use in the comparison process between Internet and conventional stores (See Figure 4).

The proposed research model of this study consists of two levels, including absolute and comparative levels. The absolute level manifests the constructs that could be viewed as prospective outcomes of using Internet stores for making purchases. The comparative level demonstrated the relationships between Attitude-Based and Attribute-Based Preferences, according to Tversky (1969) and Einhorn (1971). The Attribute-Based Preference is currently decomposed to three variables, including Product Preference (Product), Price Preference (Price), and Social Experience Preference (Social) (See Figure 4).

This study further argues that Perceived Risk, a variable that belongs to the absolute level, might be an outcome of consumer comparison of Internet and conventional stores. This study consequently proposes another attribute, namely Comparative Risk Preference. Therefore, Comparative Risk (Com Risk) is considered another variable that represents Attribute-Based Preference (See Figure 4).

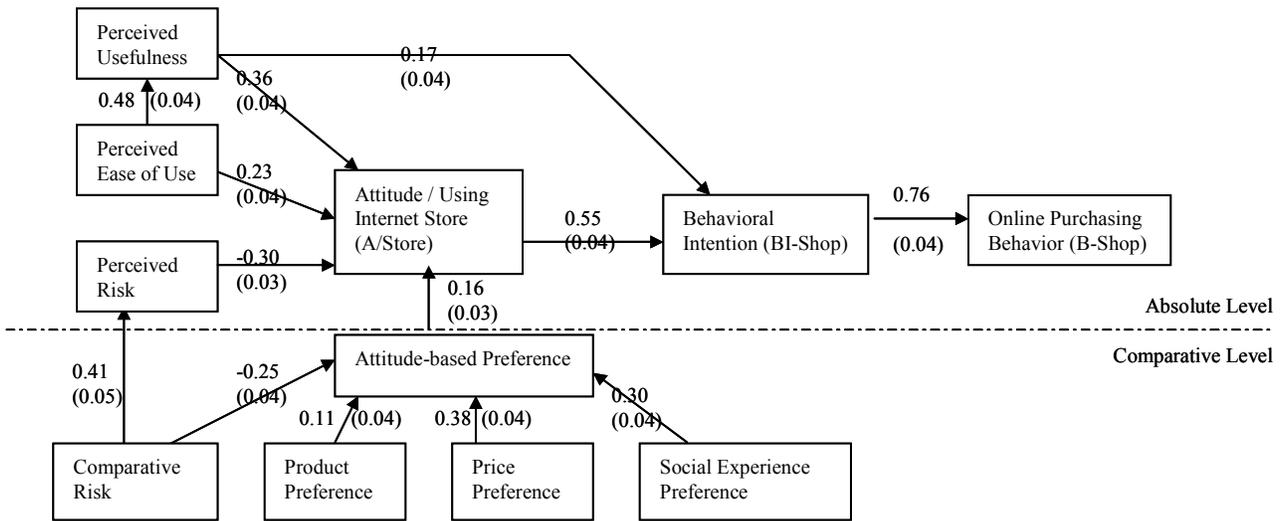


Figure 4. Standardized Correlations between Constructs and their Standard Errors

Proposed Relationships between Variables and Model Testing

There are six latent variables that locate at the absolute level of this study’s research model, including Perceived Ease of Use (EOU), Perceived Usefulness (U), Perceived Risk, Attitude toward Using Internet Store for Making Purchases (A/Stores), Intention to Use Internet Store for Making Purchases (BI-Shop), and Behavioral Variable of Internet Usage (B-Shop). To test this study’s proposed model, measurement scales of U, EOU, PR, A, BI-Shop, and B-Shop were drawn from past studies (See Appendix A).

Five additional constructs are proposed at the comparative level, including Attitude-Based Preference (Pref), Product Preference (Product), Price Preference (Price), Social Experience Preference (Social), and Comparative Risk Preference (Com Risk). Based on the guideline of instrument development from Churchill (1979) and Straub (1989), this study introduces fifteen new items that makes up five newly developed preferential constructs (See Appendix A). To simplify the idea of hypothesis setting, a comprehension of the nature of scale development is required. The best way to explain the relationships among constructs is to use an example.

If Mr. A finds that it is less expensive to make a purchase at an Internet store (higher price preference toward Internet store), then he is likely to prefer Internet store as a sales channel in general (Attitude-Based Preference, ADP). Therefore, Price Preference is hypothesized to have a positive relationship to ADP. This inherent relationship is also applied to the relationship from Attitude-Based Preference to Attitude toward Using Internet Store for Purchasing (A/Stores). If a consumer scores 7 to Attitude-Based Preference construct (See Appendix A), he/she is likely to have a good Attitude toward Using Internet Store for Purchasing. The following is a summary of hypotheses tested in this study.

- H₁: Online purchasing usage (B-Shop) is a *positive* function of Behavioral Intention to Seek Information (BI-Shop).
- H₂: Behavioral Intention to Make a Purchase Online (BI-Shop) is a *positive* function of Perceived Usefulness (U).
- H₃: Behavioral Intention to Make a Purchase Online (BI-Shop) is a *positive* function of Attitude toward Using Internet Stores for Purchasing (A/Stores).
- H₄: Attitude toward Using Internet Stores for Purchasing (A/Stores) is a *positive* function of Perceived Usefulness (U).
- H₅: Attitude toward Using Internet Stores for Purchasing (A/Stores) is a *positive* function of Perceived Ease of Use (EOU).
- H₆: Attitude toward Using Internet Stores for Purchasing (A/Stores) is a *negative* function of Perceived Risk (PR).
- H₇: Perceived Usefulness (U) is a *positive* function of Perceived Ease of Use (EOU).
- H₈: Attitude-Based Preference (Pref) is a *positive* function of Product Preference (Product).
- H₉: Attitude-Based Preference (Pref) is a *positive* function of Price Preference (Price).
- H₁₀: Attitude-Based Preference (Pref) is a *positive* function of Social Experience Preference (Social).
- H₁₁: Attitude-Based Preference (Pref) is a *negative* function of Comparative Risk Preference (Com Risk).
- H₁₂: Attitude toward Using Internet Stores for Purchasing (A/Stores) is a *positive* function of Attitude-Based Preference (Pref).
- H₁₃: Perceived Risk (PR) is a *positive* function of Comparative Risk Preference (Com Risk).

Research Method

Survey is the underlying research methodology of this study. Some survey instruments were adopted from prior studies. Those instruments were modified to fit the context of this study. A sample of 491 was collected. It consists of 353 consumers. To expedite the process of data collection, a number of student subject at the University of Memphis were invited to participate. One hundred and thirty eight students participated in the study. 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 11 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 = 2,082.42, df = 724). GFI and NFI are 0.81 and 0.89 respectively, which is closed to a recommended value of 0.90. Comparative Fit Index (CFI) demonstrates the value of 0.93, which is higher than the recommended value. CFI could be considered a superior indicator for examining the model fitness since it takes sample size into consideration (Bentler, 1990). All

of the eleven constructs in this study met the recommended value of Cronbach's alphas (Nunnally, 1978; Hair et al., 1998). Attitude-Based Preference is the variable that achieved the highest value of 0.98.

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 value of lambda (> 0.70). Only three of forty-one variables have the lambda values lower than 0.70. They are items that belong to Perceived Risk (PR), Social Experience Preference (Social), and Comparative Risk Preference (Com Risk). Although they demonstrated relatively small lambda values, the values are significant ($t\text{-value} > 2.00$). The full result of measurement model testing and correlation matrix is available upon request to the first author.

Structural Model

Data analysis of structural model generated a Chi-Square value of 2,590.97 ($df = 836$). The structural model testing demonstrated CFI of 0.91, 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 4 shows the standardized correlations with their standard errors between constructs. It is shown that all of 13 research hypotheses are supported by the data of this study. The correlations between constructs in Figure 4 are all significant ($t\text{-value} > 2.00$). The supported hypotheses show that consumers do not only consider characteristics of Internet stores, such as Ease of Use and Usefulness, they also make comparison between Internet and conventional stores before making online purchasing decision.

Structural equation testing reveals that all proposed thirteen hypotheses were supported by the data. It was found that original variables in TAM still hold its strong predictive and explanatory power. Perceived Ease of Use (EOU) and Perceived Usefulness (U) produce significant correlations in the proposed model. However, it is worth noting that Attitude toward Using Internet Store for Purchasing (A/Store) could not be explained solely by EOU and U. In the context of using Internet store of purchasing, Perceived Risk (PR) should be included in the model. In fact, PR produced a stronger correlation to A/Store than that of EOU. This validates the idea of risk that persists in the online shopping environment.

The findings additionally indicated that A/Store is an outcome of a consumer comparison between Internet and conventional stores. Consumers compare products, prices, social experiences, and risks that belong to these two sales channels to generate an overall comparison. The overall comparison has a significant influence to A/Store. Price appears to be the most influential attribute that defines consumer's overall comparison between Internet and conventional stores ($\gamma = 0.38$). In addition, the comparison of risk between these two stores has a significant impact on how consumer perceived risk of making a purchase at an Internet store.

In sum, the result shows that variables that are located at the absolute level could have relationships to attribute-based preference (i.e. price, product, social experience, and comparative risk) both directly and indirectly. An example of the indirect relationships is the relationship from Price Preference to A/Store via Attitude-Based Preference. An example of direct relationship is the relationship from Comparative Risk to Perceived Risk.

Implications and Discussion

In term of practical implications, the result of this study suggests a number of guidelines for online stores to design their business strategies. Product prices are found to be the most significant factor that influence consumer's overall comparison of sales channels in this study. Businesses that have multiple sales channels could adopt price discrimination strategy. Product prices for different sales channels could be different. For example, a business may sell their products to online customer less expensively to enhance the popularity and acceptance of business website. Such a strategy has been implemented by several companies, such as Northwest Airlines and Dell Computer Inc. In addition to pricing strategy, Internet stores should take an extra effort to develop a community on their websites. Chat room and other social-related functionalities should be incorporated to enhance social interaction.

In term of theoretical importance, this study proposed and validated a new theory. By integrating preferential decision knowledge to intention theories in a systematic manner, this study was allowed to produce an empirical investigation of how consumer make a purchase decision in the electronic market. Such an integration explain that consumers not only consider characteristics of Internet stores but also compare Internet store to conventional stores before making a purchase decision. A new theory, namely

the Theory of Preferred Technology (TPT), is proposed and validated. The new theory produces an avenue explain alternative behaviors, which is a limitation of existing intention theories. In this study, TPT is used to explain why consumers choose to make a purchase at Internet or conventional stores. This ability to explain alternative behaviors could be considered a theoretical contribution from this study. This same approach adopted in this study could also be applied to the Theory of Reasoned Action, the Theory of Planned Behaviors, and other intention models.

The generalizability of this study could be enhanced by adding more consumer respondents to the sample group. In addition, this study examined a comparison process of two sales channels only. In reality, consumers encounter more choices of sales channels, such as direct sales, Home Shopping Network, catalogs, etc. In this study, these sales channels are not included in the comparison process. A new scale that could be used to capture a comparison of three or more alternatives should be developed to solve this limitation.

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Correlation Matrix and Appendix A

Due to limited space, the correlation matrix and appendix A are available upon request from the first author.