DECISION SCIENCES
A JOURNAL OF THE DECISION SCIENCE INSTITUTE

Decision Sciences
Volume 42 Number 1
February 2011

Building a Model of Technology Preference: The Case of Channel Choices

Achita (Mi) Muthitcharoen
W. Frank Barton School of Business, Wichita State University, Box 77, Wichita, KS 67260, e-mail: achita.muthita@wichita.edu

Prashant C. Palvia
Bryan School of Business and Economics, The University of North Carolina at Greensboro, P.O. Box 26170, Greensboro, NC 27402-6170, e-mail: pcpalvia@uncg.edu

Varun Grover[†]
Department of Management, Clemson University, 101 Sirrine Hall Clemson, SC 29634-1305, e-mail: vgrover@clemson.edu

ABSTRACT

Intention theories, such as the Theory of Reasoned Action, the Theory of Planned Behavior, and the Technology Acceptance Model (TAM), have been widely adopted to explain information system usage. These theories, however, do not explicitly consider the availability of alternative systems that users may have access to and may have a preference for. Recent calls for advancing knowledge in technology acceptance have included the examination of selection among competing channels and extending the investigation beyond adoption of a single technology. In this study, we provide a theoretical extension to the TAM by integrating preferential decision knowledge to its constructs. The concept of Attitude-Based Preference and Attribute-Based Preference are introduced to produce a new intention model, namely the Model of Technology Preference (MTP). MTP was validated in the context of alternative behaviors in adopting two service channels: one a technology-based online store and the other a traditional brick-and-mortar store. A sample of 320 responses was used to run a structural equation model. Empirical results show that MTP is a powerful predictor of alternative behaviors. Furthermore, in the context of service channel selection, incorporating preferential decision knowledge into intention models can be used to develop successful business strategies.

Subject Areas: Alternative Behaviors, Intention Theories, Online User Behavior, Preferential Choices, Structural Equation Model, Survey, and Technology Acceptance Model.

INTRODUCTION

Intention theories, such as the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980, 1986), the Theory of Planned Behavior (TPB; Ajzen, 1985), and the Technology Acceptance Model (TAM) (Davis, 1989), have

[†]Corresponding author.

long been employed to explain and predict information systems (IS) acceptance. There are virtually hundreds of articles related to TAM alone and the proliferation has led to the belief that technology acceptance research has been either overdone or reached a level of maturity. Despite such perception, several leading scholars have postulated that there is still room for research to grow if accompanied by richer theorizing and addition of fundamentally new concepts, especially in previously unexplored domains (Venkatesh, Morris, Davis, & Davis, 2003; Jasperson, Carter, & Zmud, 2005; Venkatesh, 2006). A collective effort to show how to expand research in this area can be found in a recent special issue of the *Journal of the Association for Information Systems* (e.g., Bagozzi, 2007; Venkatesh, Davis, & Morris, 2007). Venkatesh (2006) encouraged an integration of established works in individual-level technology adoption with knowledge and theory bases in other domains. He suggested three research areas: business process change and process standards, supply chain technologies, and services.

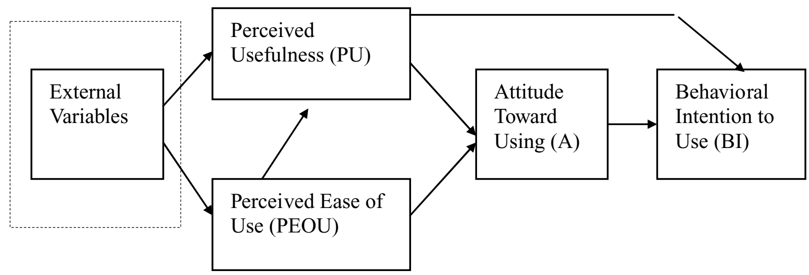
The focus of this study is behaviors in the services area where the consumer faces sales channel alternatives. Although intention theories have gained in popularity in IS research, they are not effective in explaining alternative usage behavior given multiple systems (Sheppard, Hartwick, & Warshaw, 1988). This limitation inhibits IS researchers from investigating the possible failure that could occur from a user's resistance to adopt an IS in light of other alternatives or systems. Consider the case when users have the options of face-to-face channels and self-service online channels. In this context, this study expands TAM to incorporate alternative systems and adopts the concepts of anchoring and adjustment (Sherif, Taub, & Hovland, 1958; Sherif & Hovland, 1961; Sherif, Sherif, & Nebergall, 1965) as its underlying assumption. By including preferential decision knowledge for one system versus another, the proposed model expands the predictive power of TAM.

The proposed model, called the Model of Technology Preference (MTP), has different instantiations depending on the context. In the present study, the model is developed to explain intention to use a self-service channel (e.g., an Internet store) to make purchases in the presence of an alternative face-to-face channel (e.g., a brick-and-mortar store). The inclusion of preferential concepts offers a fundamental and parsimonious improvement over the often-used TAM and demonstrably improves its explanatory power.

LIMITATIONS OF INTENTION THEORIES IN INFORMATION SYSTEMS RESEARCH

In the bailiwick of information technology (IT) usage, intention theories have received an enormous amount of attention from IS researchers. The most prominent of these, TAM (Figure 1), was introduced to the IS community by Davis and his colleagues (Davis, Bagozzi, & Warshaw, 1989). Built upon the TRA (Fishbein & Ajzen, 1975), TAM has received wide attention for at least three reasons. First, it has a strong foundation in psychological theory (Taylor & Todd, 1995; Chau 1996). Second, it is parsimonious and can be used as a guideline to develop a successful IS (Taylor & Todd, 1995; Venkatesh, 2000). Third, the past stream of research supports the robustness of the model across time, settings, populations, and

Figure 1: Technology acceptance model (TAM).



technologies (Venkatesh, 2000, 2006). The relationships between TAM variables (perceived ease of use, perceived usefulness, attitude toward using technology, and behavioral intention) have been investigated and discussed extensively in the literature.

Several attempts have been made to enhance the explanatory and predictive power of TAM. New intention models have emerged as a result. Examples of those models can be found in the following studies: Taylor and Todd (1995); Agarwal and Prasad (1997), Venkatesh and Davis (2000), Venkatesh et al. (2003), and Venkatesh and Bala (2008). Despite reported improvement in the explanatory power of these models, IS researchers have maintained their interest in TAM. The large number of empirical TAM related studies have even led some to critique their incremental nature (Lee, Kozar, & Larsen, 2003).

While TAM is effective in predicting technology usage, it does not incorporate a broader set of alternatives that might limit or increase usage of one technology over the others (Lee et al., 2003). The inability to incorporate alternative behavior is a limitation that TAM and its extended models inherited from TRA, its underlying theory. Dabholkar (1994) stated that TRA only implicitly captures choices between engaging in a behavior and not engaging in it. Any inclusion of competing alternatives in TAM is therefore at best indirect and implicit, operationalized through the variables Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). TAM does not allow researchers to explicitly and specifically identify what alternatives users may employ in the comparison process. Ajzen and Fishbein (1980) stated that disregarding alternative behaviors is a drawback of TRA. Venkatesh (2006) agreed and suggested that future research should look into choice models, especially in the service arena.

We argue that extending current intention models to incorporate explicit comparison with an alternative is a worthwhile activity. Using the critical incident technique, Meuter et al. found that the main reason consumers (68%) adopt a new self-service technology is its superiority over its alternatives (Meuter, Ostrom, Roundtree, & Bitner, 2000). The implicit comparison in current intention models makes it difficult for managers and system developers to assess users' perception towards newly proposed systems. By knowing the point of reference users utilize in evaluating a new system and explicitly comparing to it, appropriate modifications to the new system can be made. Similarly, businesses that attempt to employ multiple service channels can take effective steps when introducing a new service channel to the market. As an example, Curran, Meuter, and Surprenant (2003) tested several self-service technologies in the banking industry, including online banking, ATM, and bank by phone. They found that users' attitude toward one self-service technology significantly affected their attitude toward other self-service technologies. Their results laid important groundwork for how explicit comparison among alternatives can influence the user's future adoption and rejection of a newly proposed system.

PREFERENTIAL DECISION KNOWLEDGE

We develop a choice model for IS research by integrating preferential decision knowledge with TAM. Preference is generally defined as "the setting by an individual of one thing before or above another thing because of a notion of betterness" (Brown, 1984, pp. 323). A neutral preference occurs when an initial evaluation of the alternative resulting in neither of the other alternatives being perceived as superior (Lilly & Walters, 2000). Preferential choice is a well-developed research area in the marketing discipline. Marketing researchers and social psychologists have taken several approaches to study how humans develop preferences, one of which is the multi-attribute modeling approach. This approach has gained increasing significance and its benefits have been witnessed over the last three decades (e.g., Green & Wind, 1973; Jacoby, 1976; Lutz & Bettman, 1977; Shocker & Srinivasan, 1979; Dabholkar, 1996).

It is important to note that there is another stream of IS research addressing issues related to preference decision knowledge. Rogers (1983) proposed the diffusion of innovation theory (DOI), and its application has been widely accepted by IS researchers. One of the technology dimensions proposed in DOI is the Relative Advantage (RA) of technology. RA has been occasionally used with TAM (e.g., Taylor & Todd, 1995; Venkatesh & Davis, 2000; Chen, Gillenson, & Sherrell, 2002). For example, Taylor and Todd (1995) made a comparison of intention models. They combined TAM with DOI, and PU was used to substitute RA. Moreover, previous studies have indicated a close relationship between PU and RA; some researchers view them as separate, but related, entities (Chen et al., 2002) while others view them as equivalent (Taylor & Todd, 1995). RA has, at times, been criticized due to its measurement scales that embrace only job performance or users' task efficiency although its definition is much broader (Van Slyke, Johnson, Hightower, & Elgarah, 2008). A summary of different scales used to operationalize RA can be found in studies by Compeau, Meister, and Higgins (2007), and Van Slyke et al. (2008).

We argue that both PU and RA suffer from the same limitation—they both do not explicitly compare alternatives available to the user. The implicit comparison of alternatives found in many intention models provides only a limited view and prevents researchers and managers from explicating existing rival alternatives to the proposed technology, and therefore offers an inadequate explanation of users' resistance to the proposed technology. Integrating this preferential concept to TAM will allow us to investigate how alternatives can influence variables in TAM and improve our understanding of the individual decision-making process.

Figure 2: Relationship between attribute-based and attitude-based preferences.

Within the domain of the multi-attribute modeling approach, two concepts have emerged: Attribute-Based Preference (ATRP) and Attitude-Based Preference (ATTP). The first suggests that preference formation involves comparing specific attributes of alternatives, while the second signifies the overall evaluation of alternatives (Mantel & Kardes, 1999). When ATRP is used, individuals compare alternatives in detail, especially when individuals have little prior knowledge about the alternatives (Bettman & Park, 1980). For instance, an individual who is engaged in a computer selection might want to compare processor, memory, and hard drive capacity. When ATTP is used, individuals employ their general feelings to develop their preference. It was noted that ATTP is likely to be used when prior cognition exists about alternatives (Dabholkar, 1994). In this situation, individuals will choose an alternative that has the most positive effect (Jaccard, 1981; Jaccard & Baker, 1985). Such positive feelings might be derived from brand or past experience (Wyer & Srull, 1989).

ATRP, ATTP, and their relationships have long been under the microscope in social sciences studies. Much research on ATRP and ATTP has been applied in the context of product choice (Tversky, Sattath, & Slovic, 1988; Mantel & Kardes, 1999; Sanbonmatsu, Kardes & Gibson, 1991). Tversky (1969) proposed that alternatives are compared directly on each dimension (attribute) and the differences on these dimensions are summed together to reach a decision. In addition, it has been proposed that humans somehow combine all dimensional (attribute) values cognitively and reach an overall evaluation before making a decision (Einhorn 1971; Carpenter, Glazer, & Nakamoto, 1994).

The relationship between ATRP and ATTP has rarely been investigated. Dabholkar (1994) proposed four different choice models and found that expectancy-value components (EVC) models outperform attitudinal models. EVC can be considered as beliefs that are grouped into different dimensions. Dabholkar (1994) considered EVC as "valenced belief clusters that hang together in the individual's mind in schematic or categorical representations." These models suggested that individuals compare their beliefs regarding alternative characteristics (i.e., ATRP). The comparison in turn influences the individual's relative attitude (ATTP). Thus ATTP can be argued to be a function of ATRP (Figure 2).

It is important to note that there are two parallel sets of knowledge that address how individuals take a course of action. The preferential knowledge discussed earlier has been categorized as information processing research while intention models have been considered attitudinal research. Both seem to have their own limitations. Dabholkar (1994) argued that the information processing area fails to acknowledge affective processes while attitudinal models ignore choices. Despite the fact that these two research areas are often studied separately, it is postulated that the two can be integrated through the incorporation of choice into a multi-attribute attitude model (Dabholkar, 1994).

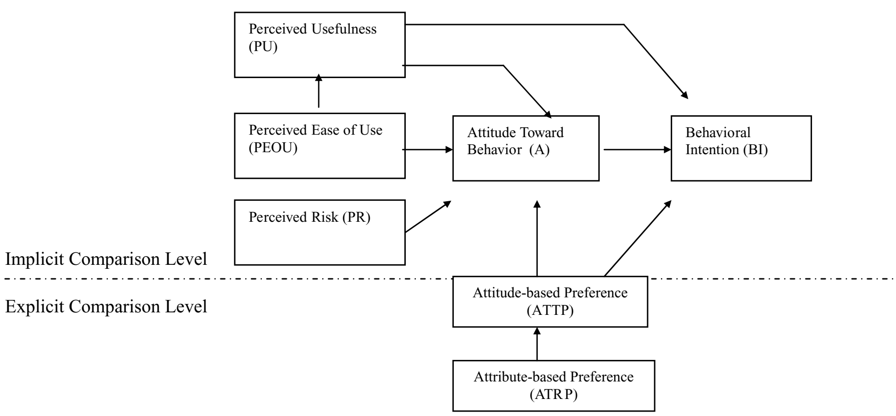
MODEL DEVELOPMENT

To address the problem of the ability to explain alternative behaviors, we integrate preferential decision knowledge with TAM and apply it in the context of channel choice where consumers can compare many alternatives, such as face-to-face, telephone, self-service, and an online store. An online store is a self-service channel that allows users to complete most of their purchasing tasks. This study focuses on online stores and the alternative is the face-to-face option (i.e., brick-and-mortar stores). Most users browse the Internet primarily to gather information (Venkatesh and Agarwal, 2006); however, the potential for sales transactions remains enormous. The challenge for organizations and IT managers is to find the underlying reasons for the lack of full utilization of the online sales channel and seek ways to improve it.

Literature review indicates that the attitudinal variable has at times been omitted in recent intention models. A group of researchers argued that the user's attitude toward using a technology should be omitted due to its partial mediation role between PU and behavioral intention (Davis et al., 1989). Chau (1996) has argued that attitude should be removed from TAM so that the model can be simplified. Other researchers have advocated maintaining the user's attitude in intention models. We found that an attitude variable is much more well received outside the IS research stream, especially in the area of self service technology (Raub, 1981; Dabholkar, 1994; Dabholkar, 1996; Curran et al., 2003). Its fundamental role in shaping behavioral intention has been repeatedly addressed by social sciences researchers (Bagozzi, 1981; Shimp & Kavas, 1984; Sheppard et al., 1988; Dabholkar & Bagozzi, 2002). Sheppard et al. (1988) encouraged future research to examine how choice fits into the attitudinal model. Interestingly, when attitude was included in previous works, there was always a significant relationship with behavioral intention in the context of online purchasing (Dabholkar, 1994; Chen et al., 2002; Dabholkar & Bagozzi, 2002; Suh & Han, 2003). No research has indicated otherwise. We therefore chose to preserve attitude, as in the original TAM.

TAM, when applied to the context of sales channels, often has been augmented with perceived risk or trust to improve its explanatory power (e.g., Gefen, Karahanna, & Straub, 2003; Heijden, Verhagen, & Creemers, 2003; Pavlou, 2003; Suh & Han, 2003; Pires, Stanton, & Eckford, 2004; Pavlou & Gefen, 2005). Trust and risk are related constructs, and risk is a predicament of trust (Schlenker, Helm, & Tedeschi, 1973; Lewis & Weigert, 1985). Risk is hypothesized to have negative relationships with variables such as attitude and intention, while trust has positive relationships with the same variables. Because the two variables are related, we used only one and combined perceived risk with TAM. This choice is supported by several prior studies. For example, Meuter and his colleagues (Meuter, Bitner, Ostrom, & Brown, 2005) supported the use of perceived risk in the context of channel choice. Pavlou and Gefen (2004) included both trust and perceived risk,

Figure 3: Model of technology preference (base model).



but suggested that trust is an antecedent to perceived risk. Further, in their study, perceived risk had stronger linkage with intention than did trust. Other examples of recent research that incorporate Perceived Risk (PR) with TAM include Pavlou (2003), Salam (1998), Heijden et al. (2003), and Pires et al. (2004). Figure 3 shows the augmentation of TAM with perceived risk.

The central thesis of this study is that employing PU, PEOU, and PR to investigate user acceptance of information technology does not explicitly consider alternatives to the proposed technology. Any such consideration is only indirect and implicit. This is the modus operandi of most TAM related research. To build a more useful model of technology acceptance, it is important to extend TAM to capture an explicit choice comparison.

Preference, intention variables, and their relationships have been frequently discussed in prior research. There appear to be at least two theoretical pluralisms that serve as competing explanations for the role of user preference. The first approach treats preference as one of the external variables (Davis et al., 1989) and suggests that it impacts behavior intention (BI) via user beliefs. External variables are claimed to influence BI only through user beliefs. User beliefs in the evaluation of a proposed system are presumably formed by a schematic comparison with past experiences in a similar domain. Therefore, this approach recommends that user preference be considered an external variable, signifying the mediating role of users' beliefs in the relationship between preference and behavioral intention.

The second approach provides a different theoretical lens in the relationship between users' preference and variables in TAM. Tversky and other social psychologists claim that new and current alternatives are compared in detail (ATRP) before users develop a general preference (ATTP) (e.g., Tversky, 1969; Einhorn, 1971), which will then influence attitude toward using a technology (A). Therefore, if users believe that a new alternative is superior to the one currently in use, they will develop a positive attitude toward using the new alternative (Einhorn, 1971).

This stream of research also underscores a direct relationship between preference and BI (Reibstein, 1978). Such an association is based on the supposition that humans generally minimize cognitive effort while making a decision (Bettman, Luce, & Payne, 1998). The existing mode of operation is used as an anchor. If a new alternative is deemed superior to the anchoring alternative, one will develop an intention to use the new alternative. While there appear to be several approaches that an individual can adopt to form preferences, it is generally assumed that the relationship between preference and behavioral intention remains consistent over time (Tversky et al., 1988; Nowlis & Simonson, 1997).

In this study we pursue the second approach mainly because of its explicit consideration of alternatives, something which has not been pursued in technology acceptance research. The selection of the second approach is consistent with a prior study by Dabholkar (1994). In his research, attitudinal models that incorporate choices were proposed. He found that the expectancy model (analogous to ATRP) outperformed other models when there were few alternatives to consider. The expectancy comparison model suggested that the comparison of EVC can affect the formation of relative attitude and intention. Figure 3 captures how our study integrates the concepts of attribute-based preference (ATRP) and attitude-based preference (ATTP) with TAM.

The inclusion of attribute-based and attitude-based preferences in TAM results in a new intention model, namely the MTP. MTP consists of two levels of comparison: implicit and explicit. Antecedents at the implicit level, such as PU, PEOU, and PR, belong to a new information system or technology that is being proposed to the users. The relationships between variables at the implicit level are predicated based on well-established reasoning and considerable research on TAM and perceived risk. The explicit level allows for the user's direct comparison with an alternative. The proposed relationships between ATTP, A, and BI are derived from the assumptions in the second theoretical pluralism.

To test and validate MTP, we examine users' comparisons between Internet and brick-and-mortar stores. Literature in the area of self-service technologies points out that intention to use self-service technologies can be influenced by multiple attitudes (Curran et al., 2003). These findings indicated that a user's attitude toward face-to-face service is related negatively to attitude towards the use of ATM self-service technology. In other words, having a favorable attitude toward business employees (i.e., face-to-face service) can actually decrease self-service technology usage. These results are consistent with those found by Dabholkar (1994). His study examined the role of choice in an attitudinal model by allowing the subject to evaluate two service alternatives: ordering fast food with sales clerks and using an ordering terminal. His results indicated that EVC of one option influence the attitude toward the other option.

Our research takes a similar approach in studying the impact of multiple attitudes on behavioral intention. We capture the role of multiple attitudes toward behavioral intention by adding the variable, attitude-based preference (ATTP). ATTP signifies that attitudes toward alternatives are formed in a comparative frame of reference. Attitude-based preference allows us to capture an explicit comparison of users' attitudes toward using two competing sales channels. In other words, if the users' preference toward Internet stores is more favorable than toward brick-and-mortar store, they will develop a more positive attitude toward using the Internet store. Furthermore, the attitude-based preference will be based on a comparison of the attributes of the two channels. Hence, we propose;

H1: Behavioral intention to make a purchase online (BI-Purchase) is a positive function of attitude-based preference (ATTP).

H2: Attitude toward using Internet stores for purchasing (A/Stores) is a positive function of attitude-based preference (ATTP).

H3: Attitude-based preference (ATTP) is a function of attribute-based preference (ATRP).

A Search for Comparable Attributes

In order to have a meaningful understanding of attribute-based preference (ATRP), it is necessary to identify the underlying attributes. The decomposition of ATRP into relevant attributes can offer practical guidelines for developing Internet business strategies. This section is devoted to the search for attributes that users would employ when comparing Internet and brick-and-mortar stores.

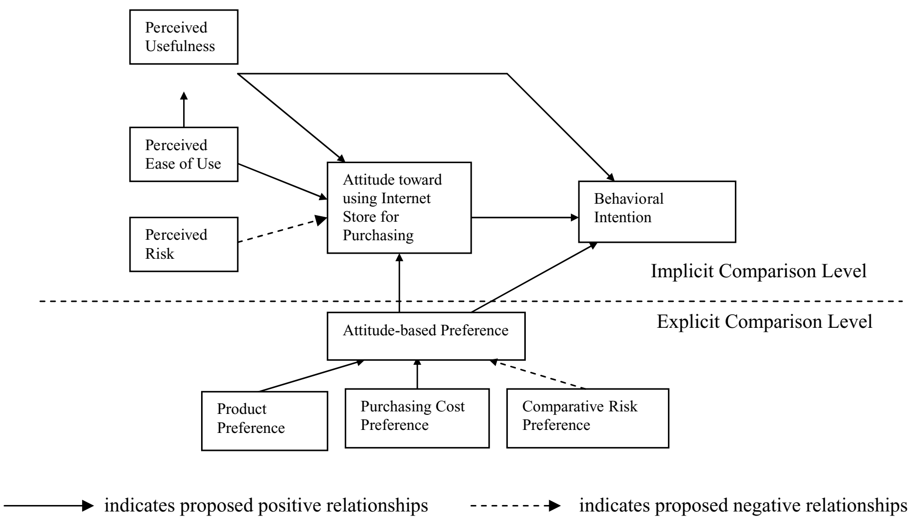
While there are potentially many attributes users can examine in comparing sales channels, we focus on the ones that have often been included in prior research. Early studies provide insightful information regarding factors that online consumers use in making online purchase decisions. Among the various factors studied, we selected several that others have repeatedly claimed are vital factors in the electronic market (Jarvenpaa & Todd, 1996; Bakos 1998; Bhatnagar, Misra, & Rao, 2000; Degeratu, Rangaswamy, & Wu, 2000; Devaraj, Fan, & Kohli, 2002; Torkzadeh & Dhillon, 2002). These are purchasing cost, product selection, and comparative risk. Other attributes worthy of investigation in the future may include social experience, convenience, and enjoyment, among others. Note also that the implicit comparison level attributes of perceived ease of use and usefulness pertain to technology use alone, while risk is applicable at both the implicit and explicit levels and is therefore included in both places.

The three attributes are defined as follows:

- *Purchasing Cost Preference (Cost)*: The superior setting of a sales channel based on the ability to provide customers with a favorable product price and associated costs (e.g., shipping cost, sales taxes, etc.) occurring during the purchasing process.
- *Product Preference (Product)*: The superior setting of a sales channel based on the ability to provide customers with a favorable product at the point of purchase, including variety, selection, and availability of product.
- *Comparative Risk Preference (CR)*: A higher degree of personal risk inherently stemming from the use of a sales channel to make purchases (see also definition of personal risk in a study by Jarvenpaa and Todd (1996)).

The definitions of purchasing cost and comparative risk are fairly standard and are similar to those of other studies. Product preference emphasizes two aspects: accessibility and variety. Prior research suggests that these two dimensions

Figure 4: Decomposed version of MTP for user behavior in E-markets.



are crucial when sales channels are compared (Alba et al., 1997; Bakos, 1998). One may find that a product is more readily available in one sales channel than another. For example, an online user may perceive that an Internet store is connected to several warehouses and has more products in stock than those found in a brick-and-mortar store. The product variety dimension is utilized to capture the concept of "one stop shopping" for different types of products. For example, an Internet store may provide the ability to browse through and order different kinds of products (e.g., books, CDs, clothes, etc.) that users can add to their shopping carts.

The decomposition of ATRP into the three attributes yields the full model depicted in Figure 4. Note that the scaling of each attribute in our instrument is such that a higher value signifies preference for the Internet store over the physical store. With the decomposition of ATRP, the relationship between ATTP and ATRP proposed in *H3* now consists of three sub-hypotheses.

H3: Attitude-based preference (ATTP) is a function of attribute-based preference (ATRP).

H3a: Attitude-based preference (ATTP) is a positive function of product preference (Product).

H3b: Attitude-based preference (ATTP) is a positive function of purchasing cost preference (Cost).

H3c: Attitude-based preference (ATTP) is a negative function of comparative risk preference (CR).

RESEARCH METHOD

A survey instrument was prepared to measure the proposed constructs (Appendix A). The majority of questionnaire items were taken from previous studies and were adapted to fit the context of user behavior in electronic markets. The primary source of items were instruments reported in Venkatesh and Davis (2000), Taylor and Todd (1995), MacKenzie, Lutz, and Belch (1986), and Eroglu and Machleit (1990). The instrument allowed the respondent to select an actual Internet store and use it as a benchmark to answer questions for variables at the implicit comparison level (PU, PEOU, PR, A/Store, and BI).

As per our model, four constructs were proposed at the explicit comparison level. Based on the guidelines for instrument development (Churchill, 1979; Straub, 1989), fifteen new items were developed for the four constructs. Each respondent was asked to select a brick-and-mortar store and compare it with their selected Internet store. Most respondents selected Internet stores like Amazon.com and Walmart.com, which sell general consumer products. The scale to measure sales channel preference is presented in Appendix A (e.g., see the Product Preference scale). On this scale, 1 indicates that the selected brick-and-mortar store is much more favorable, 4 is the neutral point where there is no perceived difference between the two sales channels, and 7 indicates that the selected Internet store is much more favorable.

An online survey method was used and survey pages were made available at a privately hosted Web site. From a list of online consumers purchased from an Internet marketing firm, one thousand invitations were sent to prospective participants in the United States. Three hundred and fifty three people accepted the invitation, yielding a response rate of 35%. Of the 353 participants, 320 responses were usable. The sample group contained 186 males (58.13%) and 134 females (41.87%). None of the participants were older than 49 years of age. Table 1 shows the demographics of the sample.

DATA ANALYSIS

Structural equation modeling was used to evaluate the research model using LISREL (Jöreskog & Sorbom, 1984). The measurement model started with 35 items that made up the 9 constructs. Modification indices suggested elimination of specific items in PEOU, PU, BI, A/Store (Appendix B). These were eliminated, so 26 items were used to test the measurement 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 = 418.17, df = 263). The Goodness of Fit Index (GFI), Normed Fit Index (NFI), Non-Normed Fit Index, and Comparative Fit Index (CFI) had values of 0.91, 0.95, 0.98, and 0.98, respectively. Root Mean Square Residual and root mean square error of approximation (RMSEA) values were at 0.035 and 0.04. All nine constructs met the recommended value of Cronbach's α (0.70) (Nunnally, 1978; Hair, Anderson, Tatham, & Black, 1998). ATTP achieved the highest α at 0.979 (Table 2).

Composite and discriminant validities were examined and the results provided supportive evidence. Table 2 shows that the constructs are robust in terms of

Table 1: Respondent demographics.

Gender		Age	
Male	186 (58%)	<20	4
Female	134 (42%)	20–29	135
		30–39	163
Ethnic Background		40–49	18
African-American	38 (11.9%)		
Asian	25 (7.8%)		
Caucasian	235 (73.4%)	Marital Status	
Hispanic	21 (6.6%)	Single	126 (39.4%)
Others	1 (0.3%)	Married	175 (54.7%)
Divorced	16 (5.0%)		
Annual Income (in thousands)		Separated	2 (0.6%)
<$10	n/a	Widowed	1 (0.3%)
$10–$20	20 (6.3%)		
$20–$30	71 (22.2%)	Current Education:	
$30–$40	116 (36.3%)	High School	1 (0.3%)
$40–$50	82 (25.6%)	Undergraduate	216 (76.5%)
$50–$60	17 (5.3%)	Graduate	103 (32.2%)
Over $60	14 (4.3%)		

Table 2: Assessment of the measurement model (internal consistency reliability and discriminant validity).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	ICR	α
(1) BI-Purchase	*0.89*									0.90	0.957
(2) A/Store	0.78	*0.84*								0.85	0.936
(3) PU	0.68	0.71	*0.76*							0.78	0.905
(4) PEOU	0.49	0.61	0.61	*0.74*						0.77	0.893
(5) PR	–0.54	–0.62	–0.51	–0.40	*0.61*					0.67	0.814
(6) ATTP	0.64	0.54	0.53	0.38	–0.35	*0.94*				0.94	0.979
(7) Product-Pref	0.22	0.18	0.20	0.23	–0.14	0.28	*0.72*			0.75	0.879
(8) Cost-Pref	0.45	0.38	0.38	0.29	–0.18	0.47	0.42	*0.78*		0.80	0.870
(9) CR-Pref	–0.30	–0.31	–0.28	–0.23	0.38	–0.40	–0.04	–0.21	*0.77*	0.79	0.893

Note: Diagonal elements are variances extracted for the individual constructs. Off-diagonal elements are the correlations between the different constructs.
ICR = internal consistency reliability; α = Cronbach's alpha.

both reliability and extracted variance. The recommended value of extracted variance is 0.50 or higher (Byrne, 1998; Hair et al., 1998). The recommended value of internal reliability ranges from 0.5 to 0.7 (Nunnally, 1978; Fornell & Larker, 1981; Hair et al., 1998). All eight constructs achieved acceptable levels of discriminant validity, where the squared correlations to other constructs are less than the construct's own extracted variance. Harman's single factor test (for a method factor) was conducted using EFA across all variables (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The results yielded eight factors with eigen-values around 1 with no single factor dominating. These results correspond to the CFA and indicate that there is little or no common-method bias in the data.

Figure 5: Structural model testing (standardized correlations and *t* values).

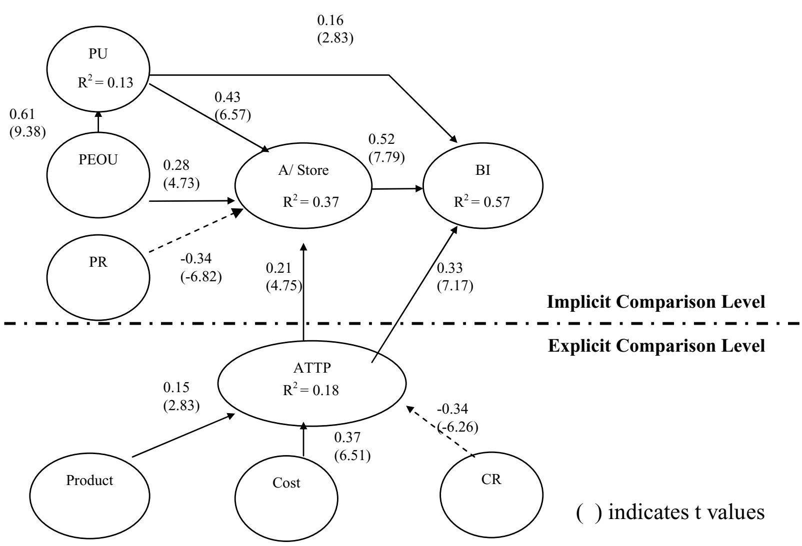


Table 3: Summary of hypothesis tests.

Hypothesis	Relationship From	Relationship To	Standardized Correlations	*t*-values	Interpretation
H1:	ATTP	BI-Purchase	0.33	7.17	Supported
H2:	ATTP	A/Stores	0.21	4.75	Supported
H3:	ATRPs	ATTP			
H3a:	Product	ATTP	0.15	2.83	Supported
H3b:	Purchasing cost	ATTP	0.37	6.51	Supported
H3c:	Comparative risk	ATTP	−0.34	−6.26	Supported
	PU	BI-Purchase	0.16	2.83	Supported
	A/Stores	BI-Purchase	0.52	7.79	Supported
	PU	A/Stores	0.43	6.57	Supported
	PEOU	A/Stores	0.28	4.73	Supported
	PEOU	PU	0.61	9.38	Supported
	PR	A/Stores	−0.34	−6.82	Supported

Analysis of the structural model generated a chi-square value of 719.88 (df = 288). Most fitness indicators were in the accepted range. Goodness of Fit (GFI), Normed Fit Index (NFI), Non-Normed Fit Index, and CFI had values of 0.85, 0.91, 0.94, and 0.95, respectively. Root Mean Square Residual and RMSEA were at 0.022 and 0.069. Figure 5 shows the standardized correlations along with the *t*-values for the paths between constructs. All five hypotheses are supported (Table 3). Original TAM hypotheses were also supported by our data. The correlations are all significant at $|\,t\text{-value}\,| >= 2.00$ and $p\text{-value} < .05$.

From the above results, it is clear that MTP exhibits strong explanatory power. The model can explain approximately 57% of the variance in behavioral intention. The supported relationships between variables at the implicit comparison level (TAM) are consistent with those reported in prior studies (e.g., Davis et al., 1989; Chen et al., 2002). As expected, Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) have significant correlations with the proposed variables in the model. It is, however, worth noting that attitude and intention toward using Internet store for purchasing are not explained solely by TAMs original belief variables (PU and PEOU). In the context of online shopping, Perceived Risk (PR) needs to be included in the model. In fact, PR has a stronger correlation to A/Store than does PEOU. This underscores the importance of risk in the online shopping environment.

More importantly, the main thesis of the study about the importance of alternative behaviors is supported. The users' overall preference (ATTP) had a significant relationship with attitude and intention to make purchase online (*H1* and *H2*). These findings provide a theoretical enhancement to TAM, rendering a model that can explain alternative behaviors in the channel choice context. Behavioral intention and A/Store are not only influenced by the user's beliefs but also by ATTP and ATRP, both directly and indirectly. Furthermore, the correlation between ATTP and BI is higher than that of ATTP and A/Store. The direct linkage between ATTP and BI emphasizes the notion that when a new alternative is perceived superior to its precursor, users have a higher intention to use the new alternative and it complements their attitude. There is also support for the three comparative attributes (product, cost, and CR) as all three are significantly related to ATTP (*H3*).

Our results are consistent with an important study in the area of self-service technologies by Curran et al. (2003). They found a negative relationship between attitude toward face-to-face service and behavioral intention to use a self-service technology. In other words, the negative feeling toward face-to-face service was a driving factor for customers to adopt self-service technology. The interconnectedness between two sales channel alternatives is, however, explicitly characterized by MTP. Furthermore, we found concrete evidence to demonstrate how user preference intertwines with attitude and intention toward using a self-service channel.

DISCUSSION AND IMPLICATIONS

Theoretical Importance

In the past two decades, IS researchers have adopted and proposed several intention models and their explanatory powers have been compared to provide guidelines for future research. The contribution of the current study is the proposed intention model that captures choice in channel selection. By integrating preferential decision knowledge with TAM, the MTP was developed and evaluated in the context of online user behavior.

It is difficult to conduct a fair comparison of intention models across studies (Cooper & Richardson, 1986; Mathieson, 1991; Taylor & Todd, 1995). Nonetheless, we make several comments on the different characteristics of the MTP. Among

Table 4: Model comparison.

	MTP	TAM	MTP without Attitude (A/store)	MTP with ATRP as External Variables
Chi-square	719.88	975.84	1,087.29	605.13
Degrees of freedom (df)	288	293	292	282
Normed chi-square	2.50	3.35	3.72	2.15
RMSEA	0.069	0.09	0.092	0.060
CFI	0.95	0.93	0.90	0.96
R^2 of BI	0.57	0.33	0.34	0.66
R^2 of A/store	0.37	0.26	n/a	0.53
Models compared	Chidist (difference in chi-square, difference in df)			
MTP vs. TAM		0.00**		
MTP vs. MTP with ATRPs as external variables		0.00**		
MTP vs. MTP without A/store		0.00**		

these, we emphasize explanatory power, parsimony, and practical use. First, in terms of explanatory power, the R^2 achieved in our study is at the higher end of some representative studies (e.g., Davis et al., 1989; Mathieson, 1991; Taylor & Todd, 1995; Gefen & Straub, 2000; Venkatesh & Davis, 2000; Chau & Hu, 2001; Gefen et al., 2003; Venkatesh et al., 2003; Chen, Gillenson, & Sherrell, 2004; Jiang & Benbasat, 2007; Chang & Chen, 2008; Venkatesh & Bala, 2008). It is lower than some extant models such as UTAUT—a large model with ten variables and 31 interactions. Second, in terms of parsimony, MTP elicits a relatively smaller number of variables and yet incorporates choice evaluation into the model. MTP was built on the concept of preference formation based on two psychological variables, ATTP and ATRP. The final model is larger only because it further decomposes attribute-based preference into its constituent components. Third, our study is the only one that explains the role of alternatives in technology adoption.

Using our own dataset, additional analyses were conducted to compare four different intention models (MTP, TAM, MTP without attitude, and MTP with preference as external variables). Using the same dataset allows a fair comparison and eliminates the difficulties of comparing across studies. Four measurements were used to evaluate the models: normed chi-square, CFI, RMSEA, and hierarchical model improvement. Guidelines from Bentler (1990), Browne and Cudeck (1993), and Marsh and Hocevar (1985) were used to evaluate CFI (0.90 and above), RMSEA (<0.10), and normed chi-square (between 1 and 3), respectively. As for hierarchical model improvement, a chi-square value was evaluated based on the difference between chi-squares and degrees of freedom of the two models. A value of .05 or lower suggested significant improvement in the model.

Table 4 indicates significant improvement in the model when expanding TAM to MTP. By adding ATRPs and ATTP to the original TAM, the R^2 values of BI improved from 0.33 to 0.57. In addition, we can explain 11% more variance in A/Store (TAM–26% vs. MTP–37%). CFI and RMSEA values also improved

Table 5: Total effect of proposed variables on BI and A/Store.

Constructs	Total Effect on BI	Total Effect on A/Store
BI	N/A	N/A
A/Store	0.52	N/A
PU	0.38	0.43
PEOU	0.38	0.55
PR	−0.17	−0.34
ATTP	0.44	0.21
Product preference	0.06	0.03
Purchasing cost preference	0.16	0.08
Comparative risk preference	−0.15	−0.07

from 0.93 and 0.085 to 0.96 and 0.06, respectively, indicating a better model fit. Other improvements in the model fit such as chi-square and degree of freedom are also reported in Table 4. In short, it can be said that MTP has significantly higher explanatory power than TAM, particularly in the context of sales-channel selection.

As discussed earlier, there are two theoretical pluralisms in explaining the relationship between preference and intention models. We adopted the second approach where the relationships from ATTP to A/Store and to BI are directly investigated. Further analysis was undertaken to explore the first option, where preferences would be treated as external variables. The relationships from ATRPs to PU and PR were examined. The new R^2 values were 66% and 53% for BI and A/Store, respectively. All other indicators (CFI, RMSEA, chi-square) also indicated improvement (Table 4). Thus, treating ATRPs as external variables also helps improve the model's explanatory power. These improvements deserve additional theoretical justification and investigation in future research.

Revisiting Behavioral Intention

Behavioral intention has repeatedly been shown to be the most proximal determinant of IT usage. In our study, A/Store was found to be the most influential factor that has the highest total effect on BI (0.52) (Table 5). This finding contradicts some of the previous studies (e.g., Taylor & Todd, 1995). We contend that the differences stem from dissimilar settings in which past studies were conducted. Many of the previous studies were conducted in either a work or an academic environment, whereas the current study was conducted in the context of sales channel selection. In a work-related setting, intentions are likely to be formed by performance-expectation, rather than users' likes and dislikes of technology. In a non-work-related setting, such as online shopping, attitude seems to have a pivotal role in shaping users' behavioral intention.

In an online shopping environment, users can choose to make purchases at different sales channels, whereas their choices of technology are limited in the workplace. Organizations, in general, have limited resources and cannot provide many choices or flexibility to users. In addition, the incompatibility across different technologies exacerbates this problem, rendering a smaller set of alternatives. Such a problem was acknowledged in prior studies (Davis et al., 1989; Taylor & Todd, 1995), where the authors suggested that users in work-related settings are urged to use a technology similar to their peers in order to ensure compatibility. Thus, while alternatives may not be a major issue in the workplace, they are certainly important in the channel choice selection and their investigation is warranted.

As evidenced by our results, variables related to alternatives such as ATTP and underlying attributes have direct and indirect effects on behavioral intention. In fact, ATTP has a stronger total effect (0.44) on BI than PU (0.38), PEOU (0.38), or PR (–0.17). Most remarkable is the finding that ATTP's direct effect on BI is stronger than that of PU. We argue that, in the shopping environment, efficiency is perhaps not the only goal. This finding is very revealing in suggesting that ATTP, among other proposed variables, is the second most influential factor that shapes users' acceptance of a proposed technology. Underscoring the thesis of this study, simply understanding the characteristics of a proposed technology (i.e., PEOU, PU, and PR) is not sufficient to explain user acceptance. Explicit comparison must be brought into the equation. For example, while a proposed technology may be perceived to be useful and easy to use, the user may feel attached to the alternative currently in use and resist using the new technology. Having an understanding of the dimensions of existing and new alternatives would help alleviate the resistance.

The Role of Attitude

Several prior studies have omitted the attitudinal variable due to its partial mediating impact between beliefs and intention and its weak direct link to PU (Davis et al., 1989; Venkatesh & Davis, 2000). At times, attitude did not demonstrate a significant effect on BI (Taylor & Todd, 1995, p. 165). It was claimed that the diminishing effect of attitude on BI stems from the role of PU in TAM (Taylor & Todd, 1995). MTP suggests otherwise in the context of channel choice. Our results show that A/Store alone explains approximately 30% of the variance in BI, making it the strongest predictor of BI. Furthermore, PU's role in explaining BI is smaller compared to A/Store and ATTP. In addition, the omission of attitude would lead to difficulty in providing a comparative view of how preference variables can influence users' feelings toward using a technology and limits the investigation of how other psychological variables, such as perceived risk and ATTP, fit into the nomological network of related constructs. For example, MTP explains 37% of the variance in A/Store. The amount of variance explained in A/Store was reduced to 26% when removing its relationships from ATTP and ATRPs (Table 4).

Several researchers (Jackson, Chow, & Leitch, 1997; Chau & Hu, 2001; Chen et. al., 2002; Chen et al., 2004) support the idea of retaining attitude in TAM. They maintain that attitude plays an important role in some settings and retaining it facilitates replication of previous studies. A recent study showed that users' affective feeling toward using a store is critical in their purchase intention despite their favorable opinion about the product (Jiang & Benbasat, 2007). Furthermore, our literature review indicates that attitude is consistently related to BI in the online purchasing domain (i.e. Chen et al., 2002; Curran et. al., 2003; Suh & Han, 2003; Jiang & Benbasat, 2007).

To confirm the important role of A/Store in influencing BI, additional analysis was conducted. After removing A/store and its relationships from the model, a significant decrease in the R^2 value of BI was observed; it decreased from 0.57 to 0.34. Model fit indicators suffered as well (Table 4). We therefore reiterate the pivotal role of attitude as a mediating variable in intention models and that it provides the necessary mechanism to incorporate ATTP and perceived risk (PR) in the model. Further, our results reveal that the attitudinal variable, unlike in previous research, is formed not only by the users' perception toward using technology but also by users' preferences.

Understanding Preference

The ATTP construct had the highest internal consistency reliability, indicating robustness in its measurement. Results supported the hypothesized relationships between ATTP and the three ATRPs (*H3a–H3c*). These results are consistent with prior findings (e.g., Einhorn, 1971; Carpenter et al., 1994). Thus it can be claimed that ATTP and ATRPs are related, and consumers at least compare product, purchasing cost, and risk between competing service channels. These three attributes, however, explained only 18% of the variance in ATTP, indicating that additional attributes should be added to improve the variance explained in ATTP. Among the ATRP variables, purchasing cost and comparative risk preferences have almost equal influence on ATTP according to their correlation. The significant relationship between purchasing cost preference and ATTP can be attributed to the price-consciousness commonly found in online shoppers (Bakos, 1991; Donthu & Garcia, 1999; Devaraj et al., 2002). The significant relationship between CR and ATTP confirmed that service channel risk is important from the buyer's point of view—both from belief and preference standpoints. Interestingly, product preference had less impact on ATTP when compared to the two other ATRPs.

Our results show that ATTP has a stronger direct relationship with BI compared to PU. It is also interesting to compare the correlations from ATTP to A/Store and BI. The correlation between ATTP and BI (0.33) is stronger than that of ATTP and A/Store (0.21). This observation is further supported by the total effects values (Table 5–0.44 vs. 0.21). An explanation of this finding can be found in the cognitive effort minimization associated with decision-making (Bettman et al., 1998). In other words, when users find a superior alternative to the one currently in use, they would have a higher inclination to adopt the new alternative and it would complement their attitude.

It is worth noting that ATTP has a stronger total effect on BI than those from ATRPs combined. According to the information processing research, it was suggested that an individual will be more engaged in an ATRP type of comparison when the alternatives are somewhat unfamiliar (Park, 1976; Park & Lessig, 1981). When individuals have greater prior knowledge about the alternatives, they are likely to adopt an attitude comparison model (ATTP) (Dabholkar, 1994). Because we allowed the subjects to identify their own set of Internet and brick-and-mortar stores, they are more likely to be familiar with them, increasing the total effect of ATTP on BI.

Implications for Practice

The decomposed version of MTP provides guidelines for online businesses and allows them to evaluate, from the consumer's perspective, their selected sales channels. Based on the scales developed for ATTP and ATRP and our results, there seems to be much competition between the brick-and-mortar stores and Internet stores. This conclusion is based on the average values of ATTP and ATRP items, which are near the neutral point of 4 on the preference scale. To the extent our results are reflective of the larger online community, the clear challenge for online marketers is to enhance the perceived value of their Internet stores on several dimensions vis-à-vis the brick-and-mortar stores.

MTP provides insights on the relative significance of attributes that can be used to develop business strategies. By examining the relative strength of the various attributes' relationships to ATTP, priorities can be established. In our study, because purchasing cost preference has a relatively higher total effect on BI and the highest correlation with ATTP, online retailers will be well advised to prioritize their resources by focusing on competitive pricing strategies. This would take precedence over product preference, which has a much smaller effect on BI. In fact, several successful online retailers initially focused on their competitive price and product niche, and later expanded their product selection. For example, this is one of many strategies used by Amazon.com in its early years.

A business may utilize MTP to evaluate the complementary and rivalry roles of alternate service channels. In a separate analysis, we found that when users compare sales channels within the same business (e.g., Finish Line vs. Finishline.com), risk preference is ranked the highest, and not the purchasing cost preference. There is a logical explanation. In general, a business that adopts multiple service channels attempts to provide a consistent pricing strategy across channels. Thus price is not critical when comparing service channels within the same business. However, the same is not true when comparing service channels from different businesses. In such a case, purchasing cost is a distinguishing feature for the consumer. Thus different attributes are in play in channel selection within a business and across businesses.

Managing service channels has always been a daunting task for executives. MTP can be used to develop a service channel management plan by explicitly comparing different channels' attributes. Despite that fact that many businesses adopt a common price strategy across sales channels, some employ differential pricing strategies. For instance, product prices at a regular Wal-Mart store may be different than at its virtual store, and customers are not allowed to match prices between the two outlets. In order to assist the customers in decision-making, businesses may wish to adopt a mechanism which facilitates price comparison across various sales channels, thus preventing possible loss of a sale. Researchers agree that having information on options explicitly displayed to the consumer can reduce cognitive effort in their decision-making (Bettman & Kakkar, 1977; Bettman et al., 1998).

It is important to note that we applied MTP to a service channel context, which consists of two alternatives. Because one option is technology-related and the other is not, the two options are not entirely comparable on all of their dimensions. For instance, PEOU and PU are constructs designed more specifically to evaluate ISs. They are, therefore, included only at the implicit comparison level. Risk is however an element that is inherent in an IS and at the same time is comparable across two service channels. Therefore, risk is included at both comparison levels. Depending upon the context to which MTP is applied, a special consideration should be given to whether PEOU and PU need to be included at the explicit comparison level as well. When comparing one technology to another (e.g., two different payment systems—phone and online), users should be allowed to implicitly assess and explicitly compare these attributes, rendering two sets of PEOUs and PUs.

Customizing MTP

While MTP can be applied in various contexts, it will need to be customized. In this study, the decomposition of ATRP into three preference variables is customized to the context of sales channel selection. In other contexts, not all of these three variables may be applicable. For example, when applying MTP to group support systems (GSS), product and comparative risk preferences may not be the attributes that are relevant to the technology. In a GSS context, one may have to select a new competing alternative (an anchor) and a new set of attribute variables may have to be developed. There may be semantic differences that would be found when applying MTP to work-related and non-work-related settings. For instance, the impact of ATTP and ATRPs on BI may be alleviated in a work-related environment because the users' freedom to select a technology for their tasks is limited. On the other hand, in non-work settings, the use of IT is generally volitional and the relationships may take a more significant meaning.

Customizing ATRP for different IT contexts can be viewed as a limitation of MTP. On the other hand, it can be regarded as a flexible and scalable feature. A new study could extend the current model to one that incorporates more attributes, thus providing a more comprehensive picture of the comparison process between alternatives. It should be noted, however, that the decomposition process of ATRP could be time-consuming due to scale development. In any case MTP could be considered more context-sensitive than other intention models because it is necessary to customize and scale attributes, based on contexts.

An alternative that might be worth exploring is the aggregation of preference variables into a multiplication function of ATRP and its evaluation terms. An example in the context of TAM would be the reverse process of combining PU and PEOU back into beliefs (Davis et al., 1989). Thus, MTP would revert back to the base model of Figure 3. Later, evaluation terms could be added to ATRP. This concept is similar to the concept of relationship between beliefs and its evaluation terms in TRA. Such a model can provide theoretical insights into differences between users' personality traits. For instance, one user can be more price sensitive and/or risk averse than another. By following this approach, one can provide a more comprehensive set of attributes for the comparison process, possibly even rendering a higher value of R^2.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

In terms of limitations, one can find that the preference scales for ATTP and ATRP allow the study to capture only two sales channel alternatives. In reality, individuals have more choices of sales channels, such as direct sales, Home Shopping Network, and catalogs. In this study, these sales channels are not included in the comparison process. Future research can replicate and retest our models with a different pair of alternatives and also develop scales that simultaneously capture comparisons of more than two alternatives.

MTP's primary focus is on the adoption of Internet stores (technology behavior), and in the process it compares the consumers' experiences with brick-and-mortar stores. It therefore captures belief, attitude, and behavior intention only for the Internet stores. As an extension, MTP can be adapted and modified to focus on the use of brick-and-mortar stores. The model should then be modified to include beliefs, attitude, and behavioral intention to use the brick-and-mortar stores by replacing the variables at the implicit comparison level with variables that capture the use of brick-and-mortar store.

We acknowledge that users can also compare an Internet store to other Internet stores. MTP can be applied in such situations as well. For instance, by applying MTP and allowing customers to compare Amazon.com with Barnesandnoble.com, one could find Amazon's competitiveness relative to a major rival. Future research can also extend the task concept in MTP. In this study, we examined sales channels in the context of the purchasing task. Consumers' choices may change when sale channels are compared in other task contexts, such as an information search or customer support.

MTP inherits one limitation found in other intention models. While MTP encompasses alternative behaviors and addresses how choices influence behavioral intention, it does not address whether the decisions made by individuals are accurate. Accuracy of a decision is generally measured after a course of action is taken—a stage outside of intention models. Accuracy in decision-making can also be influenced by the degree to which ATRP and ATTP are used in the comparison process. Johnson (1986) stated that while comparing overall evaluation (ATTP) alone instead of attributes (ATRP) can minimize cognitive effort, it can also produce error in choice.

Future research can investigate two contradicting ideas about the role of individuals' habits and experience on preference formation. One stream of research suggests that as individuals grow more acquainted to a new alternative, they may abandon ATRP and focus more on ATTP (Dabholkar, 1994). Such a phenomenon suggests that the role of ATRP could decrease and error in decision-making could increase over time. A recent study, however, suggested otherwise (Li, 2010). A longitudinal study to observe the shifting role of ATRP and its relationships to ATTP, attitude, and behavioral intention could provide a more definitive answer.

Due to the challenges in developing new constructs, our current model proposed a limited set of ATRPs, resulting in a rather low value of explained variance (R^2) for ATTP. We encourage service channel researchers to capture a larger set of ATRPs by including other important variables such as convenience (Szymanski & Hise, 2000), social experience (Alba et al., 1997), and enjoyment. Future research can further enhance MTP's explanatory power by (i) explicitly including a trust variable (ii) exploring trust's relationships with PR and PU, and (iii) exploring and justifying relationships between ATRP variables and belief variables. In addition, one may explore attributes that are unique in one alternative but do not exist in others. For instance, while shipping cost is a common expense in online transactions, it is not generally found in a brick-and-mortar environment. One would have to examine the compensatory nature of such unique attributes in the comparison process.

Another opportunity for further research is to expand MTP to incorporate attitudinal and intention variables that are associated with the use of the anchoring/older alternatives. In other words, MTP can be expanded by adding one additional implicit comparison level where attitude and intention toward using brick-and-mortar channel are also included. Such an addition will bring concepts suggested by Curran et al. (2003) into the nomological network of MTP and produce a more comprehensive model that explains the role of alternative behaviors at a more granular level.

Further avenues for future research include applying preferential decision knowledge to other intention models (e.g., TRA and TPB). In addition, the role of ATRP variables as external variables to TAM can be examined. Longitudinal studies may be undertaken to find the pattern of changes in the relationships between ATRP, ATTP, A/Store, and BI over time. While MTP can be applied to various behaviors in IT, it can even be applied to non-IT or quasi-IT contexts. Ultimately, further research and applications will demonstrate the value of MTP.

CONCLUSION

In this study, we made a theoretical extension to the Technology Acceptance Model by incorporating preferential decision knowledge. The underutilization of technology-based online channels may be due to the availability of and anchoring caused by deep-rooted existing channels. The MTP demonstrates that users consider alternatives when forming their attitudes and intent to use a technological innovation. Incorporating attitude-based preference and attribute based preference into intention models will enrich them. From our vantage point, MTP is an effective way of accomplishing this objective. Our results are borne out in the context of on-line purchasing. We are encouraged by our results and we hope that this model is tested in other contexts, refined, and expanded as we develop a deeper understanding of technology usage behavior. [Received: July 2006. Accepted: October 2010.]

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APPENDIX A: QUESTIONNAIRE INSTRUMENT

Perceived Usefulness of Using Internet Store for Purchasing (PU)

(1) Using my Internet store enables me to purchase product more quickly.
(2) Using my Internet store improves my performance in purchasing product.
(3) Using my Internet store increases my productivity in purchasing product.
(4) Using my Internet store enhances my effectiveness in purchasing product.
(5) I find my Internet store useful for purchasing product.
(6) Using my Internet store makes it easier to purchase product.

Perceived Ease of Use of Using Internet Store for Purchasing (PEOU)

(1) My interaction with my Internet store is clear and understandable.
(2) I find my Internet store easy to use for purchasing.
(3) Interacting with my Internet store to make online purchases does not require a great deal of my effort.
(4) When making online purchases, I find it easy to get my Internet store to do what I want it to do.
(5) When making online purchases, I find my Internet store flexible to interact with.

Perceived Risk

(1) While making a purchase from my Internet store, my credit card information is at risk.
(2) I would feel totally safe while providing sensitive information about myself to my Internet store.^{R}
(3) Overall, my Internet store is a safe place to transmit sensitive information.^{R}

Note: Superscript R indicates reverse items.

Attitude toward Using Internet Store for Purchasing (A/Store)

(1) Making a purchase at my Internet store is a good idea.
(2) Making a purchase at my Internet store is a wise idea.

(3) I like the idea of shopping at my Internet store.
(4) Making a purchase at my Internet store is pleasant.

Behavioral Intention to Use Internet Store for Making Online Purchase (BI)

(1) I predict that I would make a purchase from my Internet store.
(2) I intend to make a purchase from my Internet store.
(3) How likely are you to make a purchase at your Internet store?

1	2	3	4	5	6	7
Extremely unlikely	Quite Unlikely	Slightly unlikely	neither	Slightly likely	Quite likely	Extremely likely

(4) How certain are your plans to make a purchase at your Internet store?

1	2	3	4	5	6	7
Extremely uncertain	Quite Uncertain	Slightly uncertain	neither	Slightly certain	Quite certain	Extremely certain

Your selected Internet store is __________.

Please indicate a brick-and-mortar store (physical store) that you generally use to compare with your selected Internet store bore you make a purchase decision.

You generally compare your selected Internet store to _________.

Please make comparison of your selected Internet and brick-and-mortar stores based on the following criteria.

Product Preference

1	2	3	4	5	6	7
Brick and mortar store is much more favorable.	Brick and mortar store is more favorable.	Brick and mortar store is slightly more favorable.	Neutral	Internet store is slightly more favorable.	Internet store is more favorable.	Internet store is much more favorable.

Product Availability	1	2	3	4	5	6	7
Product Variety	1	2	3	4	5	6	7
Product Selection	1	2	3	4	5	6	7

Purchasing Cost Preference

1	2	3	4	5	6	7
Brick and mortar store is much more favorable.	Brick and mortar store is more favorable.	Brick and mortar store is slightly more favorable.	Neutral	Internet store is slightly more favorable.	Internet store is more favorable.	Internet store is much more favorable.

Product Price	1	2	3	4	5	6	7
Financial Saving	1	2	3	4	5	6	7

Comparative Risk Preference

Where do you have more confidentiality of your personal information?

1	2	3	4	5	6	7
The confidentiality is much higher at my brick-and-mortar store.	The confidentiality is higher at my brick-and-mortar store.	The confidentiality is slightly higher at my brick-and-mortar store.	Neutral	The confidentiality is slightly higher at my Internet store.	The confidentiality is higher at my Internet store.	The confidentiality is much higher at my Internet store.

Where do you have more confidentiality of your credit card information?

1	2	3	4	5	6	7
The confidentiality is much higher at my brick-and-mortar store.	The confidentiality is higher at my brick-and-mortar store.	The confidentiality is slightly higher at my brick-and-mortar store.	Neutral	The confidentiality is slightly higher at my Internet store.	The confidentiality is higher at my Internet store.	The confidentiality is much higher at my Internet store.

Where do you have more fear of having unauthorized people knowing your personal information?

1	2	3	4	5	6	7
The fear is much higher at my brick-and-mortar store.	The fear is higher at my brick-and-mortar store.	The fear is slightly higher at my brick-and-mortar store.	Neutral	The fear is slightly higher at my Internet store.	The fear is higher at my Internet store.	The fear is much higher at my Internet store.

Where do you have more fear of having unauthorized people knowing your credit card information?

1	2	3	4	5	6	7
The fear is much higher at my brick-and-mortar store.	The fear is higher at my brick-and-mortar store.	The fear is slightly higher at my brick-and-mortar store.	Neutral	The fear is slightly higher at my Internet store.	The fear is higher at my Internet store.	The fear is much higher at my Internet store.

Where do you have more fear of having unauthorized people using your credit card information?

1	2	3	4	5	6	7
The fear is much higher at my brick-and-mortar store.	The fear is higher at my brick-and-mortar store.	The fear is slightly higher at my brick-and-mortar store.	Neutral	The fear is slightly higher at my Internet store.	The fear is higher at my Internet store.	The fear is much higher at my Internet store.

Attitude-Based Preference

1	2	3	4	5	6	7
Brick and mortar store is much more favorable.	Brick and mortar store is more favorable.	Brick and mortar store is slightly more favorable.	Neutral	Internet store is slightly more favorable.	Internet store is more favorable.	Internet store is much more favorable.

Overall feeling	1	2	3	4	5	6	7
Overall attitude	1	2	3	4	5	6	7
Overall preference	1	2	3	4	5	6	7
Overall positive feeling	1	2	3	4	5	6	7
Overall negative felling	1	2	3	4	5	6	7

APPENDIX B: PARAMETER ESTIMATES FROM THE MEASUREMENT MODEL

Variables and Their Items	Standardized Loading	Average Scores	Std. Dev.
Intention to Make a Purchase Online (BI-Purchase)			
BI-Purchase 1	0.97	5.45	1.50
BI-Purchase 2	0.97	5.32	1.55
BI-Purchase 3	0.89	5.23	1.64
BI-Purchase 4	Dropped	5.18	1.63
Attitude toward Using Internet Stores for Purchasing (A/Stores)			
A/Stores 1	Dropped	5.38	1.26
A/Stores 2	0.87	5.23	1.34
A/Stores 3	0.93	5.45	1.29
A/Stores 4	0.94	5.39	1.28
Perceived Usefulness: Usefulness of Using Internet Store for Purchasing (PU)			
PU 1	0.85	5.17	1.44
PU 2	Dropped	5.05	1.38
PU 3	0.87	5.07	1.39
PU 4	Dropped	5.05	1.38
PU 5	0.89	5.42	1.29
PU 6	Dropped	5.42	1.31
Perceived Ease of Use: Ease of Use of Using Internet Store for Purchasing (EOU-Purchase)			
PEOU 1	0.83	5.78	1.01
PEOU 2	0.86	5.93	0.91
PEOU 3	Dropped	5.78	1.06
PEOU 4	Dropped	5.75	1.02
PEOU 5	0.79	5.72	1.02
Perceived Risk: Risk of Losing Sensitive Financial Information (PR)			
PR1	0.77	3.33	1.69
$PR2^{R}$	0.90	3.66	1.72
$PR3^{R}$	0.68	4.28	1.61
Attitude-Based Preference (ATTP)			
ATTP1	0.97	3.66	1.65
ATTP2	0.98	3.72	1.66
ATTP3	0.96	3.73	1.76
ATTP4	Dropped	3.88	1.58
$ATTP5^{R}$	Dropped	3.04	1.35
Product Preference (Product)			
Product-Pref 1	0.91	4.40	2.10
Product-Pref 2	0.72	4.44	1.94
Product-Pref 3	0.90	4.43	2.03
Purchasing Cost Preference (Cost)			
Price-Pref 1	0.90	4.44	1.83
Price-Pref 2	0.87	4.38	1.58

Continued

APPENDIX B: (Continued)

Variables and Their Items	Standardized Loading	Average Scores	Std. Dev.
	Comparative Risk Preference (CR)		
CR-Pref 1[R]	Dropped	5.15	1.49
CR-Pref 2[R]	0.69	5.11	1.50
CR-Pref 3	Dropped	4.79	1.41
CR-Pref 4	0.96	4.83	1.38
CR-Pref 5	0.95	4.80	1.40

Note: Superscript R indicates the reversed items.

Achita (Mi) Muthitacharoen received her PhD in management information systems (MIS) at the University of Memphis, where she also earned an MBA. She is currently serving Wichita State University as an associate professor in MIS and focuses her research interests on online auctions, user involvement, and information system training. Her works have appeared in *Information & Management*, *IEEE Transactions on Engineering Management*, *Communications of the ACM, Journal of Electronic Commerce Research*, *Journal of Computer Information Systems, Electronic Markets*, and several national and international conferences.

Prashant C. Palvia is the Joe Rosenthal Excellence Professor and director of the McDowell Research Center in the Bryan School of Business & Economics at the University of North Carolina at Greensboro. He received his PhD, MBA, and MS from the University of Minnesota and BS from the University of Delhi, India. He is the editor in chief of the *Journal of Global Information Technology Management*. His research interests include global information technology management, healthcare information technology, virtual teams, open source software, electronic commerce, media choice theory, and trust in exchange relationships. He has published 90 articles in journals such as *MIS Quarterly*, *Communications of the ACM*, *Communications of the AIS*, *Information & Management*, *Decision Support Systems*, and *ACM Transactions on Database Systems*, and over 165 conference articles. He has co-edited four books on global information technology management.

Varun Grover is the William S. Lee (Duke Energy) Distinguished Professor of Information Systems at Clemson University. He has published extensively in the Information Systems (IS) field, with over 200 publications in refereed journals. Nine recent articles have ranked him among the top four researchers based on publications and citation impact in the top IS journals. He is a senior editor (Emeritus) for *MIS Quarterly*, *Journal of the AIS,* and *Database*. He is currently working in the areas of information technology value, system politics and process transformation and recently released his third book (with M. Lynne Markus) on process change. He is the recipient of numerous awards from USC, Clemson, AIS, DSI, Anbar, and PriceWaterhouse for his research and teaching.