Electronic Commerce Research and Applications 10 (2011) 115–125

Contents lists available at ScienceDirect

Electronic Commerce Research and Applications

journal homepage: www.elsevier.com/locate/ecra

From marketplace to marketspace: Investigating the consumer switch to online banking

Kuo-Wei Lee [a,*], Ming-Ten Tsai [b], Maria Corazon L. Lanting [c]

[a] Department of Business Administration, National Tai-Chung Institute of Technology, Taiwan
[b] Department of Business Administration, National Cheng Kung University, Taiwan
[c] Department of Business Administration, Southern Taiwan University, Taiwan

ARTICLE INFO

Article history:
Received 25 February 2010
Received in revised form 27 August 2010
Accepted 29 August 2010
Available online 7 September 2010

Keywords:
Attitude towards switching
Behavior intention to switch Online Banking

ABSTRACT

Even though scholars have placed considerable focus on studying the attitudes and intentions towards using the virtual market (marketspace), there are still few studies that examine the potential effect of the physical market (marketplace) on the virtual market. The physical and virtual markets have some substitution effects; as users utilize the virtual market more frequently, they use the physical market less regularly. Under this premise, factors relating to the physical market may have a potential effect on the user's acceptance of the virtual market. The primary goal of this study was to explore the factors that affect the attitude and intention towards switching from the physical to the virtual market in the context of online banking. In total, 400 questionnaires were sent out and 250 effective questionnaires were returned, for an effective recovery rate of 62.5%. Factor analysis and regression analysis were used to examine the hypotheses. The results showed that perceived usefulness, perceived ease of use and offline trust have positive effects on attitude towards switching. Additionally, offline loyalty and switching costs had negative significant influence on attitude towards switching. Moreover, attitude towards switching had a positive effect on the behavior intention to switch. Finally, computer self-efficacy moderates the effect of attitudes and behavior intention towards switching to online banking.

1. Introduction

Rayport and Sviokla (1994a,b) indicated that in the future, businesses will compete not only in the physical market (marketplace), but also in the virtual market (marketspace). That is, more and more companies will switch their business models from the physical to the virtual market (online technology). At present, the perspective of Rayport and Sviokla has been confirmed, as the physical distribution of goods through stores, banks, bookstores, mail and newspapers, among others, is gradually moving to the virtual market (see Table 1).

To a large extent, most consumer goods and services are now available through virtual markets (marketspace), hence the ubiquity of online business models (Wu and Chen 2005, Alam et al. 2009, Sejin and Leslie 2009). Yet consumers can also secure these goods and services via traditional markets (marketplace). This phenomenon prompts the research question: How does the marketplace affect consumers' decisions to switch from the physical to the virtual market? This question is investigated in the context of online banking. Physical banking allows personal interactions when conducting business transactions, and this gives consumers a sense of security. However, if these transactions are done online, how do offline banking factors interplay with the factors related to using online technologies? What factors influence consumers when switching to online banking? These questions will be examined further in the following sections.

This research underscores the potential effects of the marketplace on the virtual market and on the adoption and use of new technologies. The technology acceptance model (TAM) is utilized in this context to investigate the attitude and behavior towards switching to online banking (i.e., the virtual market). Physical market variables are then integrated into the framework.

According to TAM, users' perceived usefulness (PU) and perceived ease of use (PEOU) influence their attitude and behavior intention towards using new technologies (Davis 1989, Davis et al. 1989). TAM has been extensively verified using factors that affect consumers' intentions toward using virtual markets (Tan and Teo 2000, Kim and Prabhakar 2000, Cheng et al. 2006). For instance, some researchers have discussed behavior intentions to use e-mail, while others focused on user acceptance of the worldwide web (WWW) (Adams et al. 1992, Gefen and Straub 1997, Fenech 1998). Follow-up studies have included other constructs to derive a more comprehensive interpretation of consumers' intentions to use online technologies. Agarwal and Prasad (1999) probed this

* Corresponding author. Address: 13F.-11, No. 539, Chin Ping Rd., Anping District, Tainan 708, Taiwan. Tel.: +886 6 2980922; fax: +886 6 2422420.
E-mail address: leealan1022@yahoo.com.tw (K.-W. Lee).

1567-4223/$ - see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.elerap.2010.08.005

Table 1
Switching of business models from physical to virtual market.

Market	Business model					
Physical market (marketplace)	Store	Bank	Bookstore	Mail	Newspaper	Book
Virtual market (marketspace)	Online store	Online banking	Online bookstore	E-mail	E-paper	E-book

issue from the perspective of a professional background, and Bhattacherjee (2001) included personal creativity in his study. In addition, others extended the model by adding playfulness (Van der Heijden 2003) or convenience (Yoon and Kim 2007) as a factor.

Although TAM has been extensively verified with factors that affect users' intentions toward virtual markets, prior research has mostly focused on the concept of attitude towards using and behavioral intention to use (Davis et al. 1989, Adams et al. 1992, Agarwal and Prasad 1999, Tan and Teo 2000, Kim and Prabhakar 2000, Chan and Lu 2004, Porter and Donthu 2006). In this study, we argue that when business models switch from a physical to a virtual market, the constructs of attitude and behavioral intention to use cannot fully reflect users' acceptance of the virtual market because user acceptance of the virtual market implies that they will reduce use of the physical market. In other words, the physical and virtual markets are substitutes. As consumers use virtual markets to conduct transactions, they will use physical markets less often. To a certain extent, the use of the virtual market infers a behavioral switch away from the physical market. Before a consumer decides to accept this new technology, the behavioral intention to switch must take precedence. When consumers make a choice between physical and virtual markets, the viewpoints of "attitude towards use" and "intention to use" (Featherman and Fuller 2003, Lin 2006, Porter and Donthu 2006, Lee 2009) are not as applicable as "attitude towards switching" and "intention towards switching" in reflecting the substitution effect between physical and virtual markets.

Following the points above, the first objective of this study was to investigate the concept of attitude and intention towards switching from physical to virtual markets, instead of the traditional viewpoint of attitude and intention towards use of the virtual market.

Second, regarding the factors that affect users' attitudes and intention to use the virtual market, previous research has mostly focused on the features of the new technology itself, such as its PU, PEOU and characteristics of the users (personal creativity, professional background and online experience), or on the social perspectives, such as trust and subjective norms (Bhattacherjee 2001, Chau and Hu 2001, Featherman and Fuller 2003, Gefen et al. 2003). Because physical and virtual markets have some substitution effect, the factors relating to the physical market, like the satisfaction of consumers using the physical market, may also have a potential effect on the user's acceptance of the virtual market. Little research has been conducted that considers the impact of the physical market on consumers' intention toward switching.

Therefore, the second objective of this study was to integrate a technology acceptance model and the factors relating to the physical market to understand their reciprocal effects on attitude and intention towards switching. Fig. 1 identifies the gap of this research.

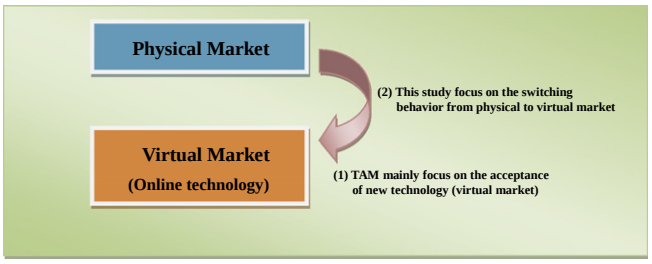

Fig. 1. The gap of this research.

2. Literature review

2.1. Technology acceptance model

Scholars and researchers have continuously expressed an interest in studying the acceptance and use of technology (see Lee and Lee 2001, Chau and Lai 2003, Featherman and Fuller 2003, Porter and Donthu 2006). The factors that are significant in using and accepting technology have been scrutinized across wide-ranging user technology and application platforms (see Lu et al. 2003, Yi and Hwang 2003, Shih 2004). Therefore, it is rational to say that the foundation for user technology acceptance research has been deeply entrenched. Of all the models proposed, TAM conceptualized by Davis (1989) has been widely received and adopted by IS researchers. Briefly, TAM hypothesizes that two variables, namely perceived usefulness and perceived ease of use, are the foremost elements in establishing the attitudes and behaviors toward IT adoption, the intention to use the technology and the actual usage. These two constructs have generally been validated in many empirical studies to be important factors affecting system usage. The high explanatory power and generalizability of TAM have also been examined and supported in many studies (see Fenech 1998, Jones and Hubona 2006, Lee 2009).

In this paper, TAM provides a template for analyzing behavior intention towards switching to online banking, which includes the constructs related to offline banking (marketplace variables). Even though the model is robust enough, it still needs to be expanded and adjusted to fit computing technologies in a typical business environment. For example, Featherman and Fuller (2003) applied TAM to e-services adoption. Im et al. (2008) included two variables, perceived risk and technology type, to assess user acceptance of technologies.

2.2. Online banking and the technology acceptance model

Huge advancements in information technology have tremendously affected the financial services industry, as is evident in the development of online banking in recent years. Online banking remained largely unnoticed in Taiwan until 2003, when web-based automated teller machines (ATMs) were introduced (Wang et al. 2003). Due to the great cost benefits of online banking, Taiwanese banks began to develop their online banking platforms in hopes of luring customers to use the Internet to conduct their business transactions.

Internet banking adoption has been the focus of several previous research studies, such as those by Kim and Prabhakar (2000), Tan and Teo (2000) and Cheng et al. (2006), which focused on Internet banking adoption and acceptance, and utilized TAM in conceptualizing a framework. TAM has been continuously and vigorously extended for use with some models, including trust (Mukherjee and Nath 2003), perceived risk (Verhagen et al. 2004), computer self-efficacy (Wang et al. 2003) and gender (Lai

and Li 2005). To fully analyze behaviors towards use, different factors have been added to extend TAM to adapt to different circumstances. The above-mentioned papers contributed to our study concept by citing extensions of TAM, yet failed to address the antecedents of this usage behavior. Once the substitution effect between conventional and new technologies exists, the switching behavior bridges the adoption and usage constructs. This, in turn, points to behavior towards switching, which comprises offline and online channels for banking.

2.3. Switching attitude and intention from offline to online banking

In examining the acceptance and usage of Internet banking, the authors argue that research on TAM often fails to consider the potential effects of a physical bank. TAM offers a rudimentary framework in this case because the Internet banking environment is not the default system being used in the first place. To a certain extent, it substitutes and replaces the physical platform for banking. This raises the issue of the difference between using and switching. In the context of technology acceptance, usage pertains to the utilization of technology to perform a certain task (Autzen 2007), while switching refers to the tendency or intention to exchange or shift from one method to the other. Thus, there is a need to understand users' switching attitude and intention from physical to virtual markets. The main purpose of this study was to explore the behavioral intention to switch to online banking in light of the technology acceptance model. In this paper, attitude and behavior are transformed into "attitude towards switch" and "behavioral intention to switch," rather than "attitude towards use" and "behavior towards use." This change is done to facilitate measuring the switching behavior, the precursor of usage behavior.

Furthermore, this research will shed light on understanding attitudes preceding a switch. Some factors related to physical banking, including offline trust (trust of a physical bank), offline loyalty (loyalty toward a physical bank) and switching costs are discussed in this study. Trust, loyalty and switching costs have been examined in prior research, and the empirical evidence shows that these factors will affect a user's purchasing intention and behavior (Jones et al. 2000, Srinivasan et al. 2002, Shankar et al. 2003, Wu and Chen 2005, Floh and Treiblmaier 2006). However, previous work used a holistic online perspective and did not specifically apply it to online banking or to the adoption of user technologies. Although the constructs of trust and loyalty have been discussed in the above research, no study has ever attempted to discuss how these factors related to physical banking affect the switching attitude towards moving from physical to virtual banking. This paper's research tackles both of these issues in lieu of the online banking environment.

Finally, this study also examines the role of perceived risk and computer self-efficacy involved in the research. These factors are user-related, which means they consider each user's ability and perspective on online banking. Perceived risk and computer self-efficacy have been replicated in various IS research (Mitchell 1999, Miyazaki and Fernandez 2000, Kim and Prabhakar 2000, Wang et al. 2003, Verhagen et al. 2004, Torkzadeh et al. 2006) and have been proven to affect users' attitudes and behavior in an online environment.

2.4. Extending the technology acceptance model

TAM is extended in this study to include offline banking constructs, namely offline loyalty, offline trust and switching costs, as well as user-related constructs, such as perceived risk and computer self-efficacy. Thus far, the extension of TAM to include the attitude and behavioral intention to switch has not yet been explored, and is therefore worthy of investigation.

Previous studies have emphasized the role of the perceived usefulness on attitudes towards use (Davis et al. 1989, Venkatesh and Morris 2000, Suh and Han 2002). Davis (1989) argued that individuals tend to undertake behaviors they believe will help them perform their job better and more efficiently. Regarding switching behaviors, Chen and Hitt (2002) argued that switching behavior and attrition are affected by usage behavior. When users consider online banking useful, they will hold a more positive attitude towards switching from a physical to a virtual platform.

Hence, the following hypothesis is developed:

H1a. Perceived usefulness will have a significant effect on a user's attitude towards switching to online banking.

Similar to perceived usefulness, perceived ease of use is one of the most important determinants of the TAM model (Davis et al. 1989). It follows that a system perceived to be easy to use has a higher chance of affecting customers' attitudes toward switching to online banking. Extensive literature has also been published regarding the importance of this antecedent on attitude towards use (Taylor and Todd 1995, Chen and Hitt 2002, Hsu 2004, Hsu et al. 2006). Consequently, if consumers perceive a service to be easier and more convenient for them to use, then it will directly influence their attitude towards switching, leading to the following hypothesis:

H1b. Perceived ease of use will have a significant effect on attitude towards switch to online banking.

The concept of trust has long been an important issue in online banking because it underlies what makes an enabling online banking environment (Mukherjee and Nath 2003). Customers are concerned about the security and privacy of their information. Wang and Emurian (2005) argued that trust leads to action, which includes risk-taking behaviors. Indeed, trust is an important element to consider when studying the behavioral intention to switch to online banking. As a bank expands its business model from a physical to a virtual market, and its customers feel that their physical bank is trustworthy, they will hold a positive attitude towards switching their service to online banking. The trust in their physical bank (offline trust) will reduce the uncertainty in their switching behavior. Thus, the following hypothesis can be formed:

H2. Offline trust will have a positive effect on the attitude towards switching to online banking.

As was discussed in the literature review regarding loyalty, allegiance towards a physical bank has a lot to do with the attitude towards switching. Loyalty measures how likely a customer is to repurchase and engage in partnership activities (Shoemaker and Lewis 1999). When a customer's loyalty to their physical bank (offline loyalty) is high, the intention to continuously use the physical bank will be high (Chen and Chen 2003). That is, the higher the customer's loyalty is to physical banking, the less enthusiastic his or her attitude toward switching to online banking will be. If there is no obvious stimulus for the consumer, they will be reluctant to switch from the physical to virtual bank. A study by Alam et al. (2009) also found that this reluctance to change has a significant effect on the consumer's attitude. Following this logic, the following hypothesis is formed:

H3. Offline loyalty will have a negative effect on attitude towards switching to online banking.

When a consumer faces a decision to switch from one provider to another, he or she is faced with the costs and benefits of switch-

ing (Ganesh et al. 2000). Generally, the benefits should outweigh the costs incurred in shifting to another provider (Lee and Feick 2001). From the online banking perspective, customers face the costs of learning how to use the new system when conducting transactions. Another area to look into is the cost of the loss of contact with the tellers. If, for example, the customer is suddenly faced with a problem in executing a transaction, the customer cannot immediately file a complaint because physical contact is not possible. Clearly these factors significantly affect attitude towards use, which in the model of Burnham et al. (2003), is the attitude towards staying with the current provider. Once consumers feel that the switching costs from the physical to the virtual market are too high, they will dislike the idea of switching to online banking. The following hypothesis follows this logic:

H4. Switching costs will have a negative effect on attitude towards switching to online banking.

Attitude towards use is an important element of TAM because it significantly affects online banking service in customers' future actions (Yeow and Yee 2008). Every study that extends TAM includes this variable because of its high explanatory power (see Wang et al. 2003, Yanga and Yoo 2004, Shih 2004). Attitude is the connecting link between the belief variables and behavior intention (Lai and Li 2005), leading to the following hypothesis:

H5. Attitude towards switching has a significant effect on the behavior intention to switch.

Self-efficacy reflects the belief of the customers regarding their performance in using the system. The moderating variables, perceived risk and computer self-efficacy, have been included in different research studies (see Cockrill et al. 2009, Featherman and Pavlos 2003, Verhagen et al. 2004). Computer self-efficacy moderates this kind of effect in the sense that people have different capabilities in executing a task, such as using the online banking platform. Perceived risk measures the effect of a user's attitude towards switching by distinguishing the risk that an online banking transaction entails.

Compeau and Higgins (1995) argued in their research that computer self-efficacy is associated with the individual's attitude towards the adoption of computer technologies. Previous studies (Igbaria and Iivari 1995, Johnson 2005, Mcilroy et al. 2007) also emphasized the effect of computer self-efficacy on adopting new innovations. Chang and Tung (2008) also suggested that self-efficacy plays an important role in motivation and behavior intention. If individuals are pessimistic about their ability to use a new system, then it will not have any significant effect on behavior. Thus, computer self-efficacy may influence the relationship between attitude and behavior towards switching. The following hypothesis is thus formed:

H6. The interaction of computer self-efficacy and attitude towards switching has a positive effect on the behavioral intention to switch to online banking.

Consumers face a lot of risk in conducting financial transactions, especially via a medium that does not have any kind of physical contact. Users' perceived risk will affect the adoption of Internet technology (Miyazaki and Fernandez 2000, Kim and Prabhakar 2000, Wang et al. 2003). Customer behavior varies according to how they perceive online banking risk. The higher their confidence level, the more positive their attitude and behavioral intention to switch will be. Featherman and Fuller (2003) observed in their study of undergraduate business students that increasing levels of perceived risk moderates the adoption behavior of technology. Thus, the following hypothesis is formed:

H7. The interaction of perceived risk and attitude towards switching has a negative effect on the behavioral intention to switch to online banking.

3. Methodology

3.1. Conceptual framework

The research model is illustrated in Fig. 2. As shown, the proposed model modifies TAM and adds several external variables, which are argued to influence attitudes towards switching and behavioral intention to switch in the context of Internet banking acceptance and usage.

3.2. Measurement

The questions used in this study were adapted from the previous TAM literature and its applications using a 7-point Likert scale ranging from (1) strongly disagree to (7) strongly agree. This study was composed of nine constructs: (a) perceived usefulness; (b) perceived ease of use; (c) offline trust; (d) switch cost; (e) offline loyalty; (f) perceived risk; (g) perceived computer self-efficacy; (h) attitude towards switching and (j) behavioral intention to switch. The first part of the questionnaire included background questions such as age, gender, education, income and occupation. The second part measured these constructs. The Appendix in Table A.1 lists the items with references to their resources.

TAM-related construct questions such as perceived usefulness, perceived ease of use, attitude toward switching and behavioral intention to switch were taken from studies by Davis et al. (1989), Venkatesh and Davis (2000) and Moon and Kim (2001). These constructs have been well researched, developed, validated and adopted in several previous TAM research projects. Although these studies also examined usage behaviors, the questions used in this study were modified to suit the authors' intentions.

Items regarding trust were taken from the measurements defined by Dimitriadis and Kyrezis (2008). These questions were carefully synthesized to identify three widely-used items that could be adapted for the model. Trust is deemed as offline trust because it refers to the physical bank. Trust in the previous TAM studies, such as those of Suh and Han (2002), Verhagen et al. (2004) and Mukherjee and Nath (2003), considered trust as a quality of the consumer, and not of the bank or any other entity used before the new technology.

Switch costs were quantified using items from Eastin (2002) and Wang et al. (2003). Three items were reproduced from these studies to reflect the costs of switching from offline to online banking. Two items were classified as time-related costs, while the other one measured the benefits lost cost (Burnham et al. 2003), which mirrors the cost of replacing an old medium with a new one.

Questions intending to assess offline loyalty came from Ping (1993) and Jones and Farquhar (2003). Although the loyalty used here is the loyalty for offline banking, these studies still replicated the construct. Three items were used to measure this kind of loyalty.

Perceived risk items were derived from items classified by Zeithaml et al. (1996). This construct is considered important as a moderating variable because it is as existential as some "disturbances" that may impinge on attitude and behavior. Two items were reproduced from the above-mentioned study.

Computer self-efficacy questions were taken from measurements evaluated by Yi and Hwang (2003) and Chan and Lu

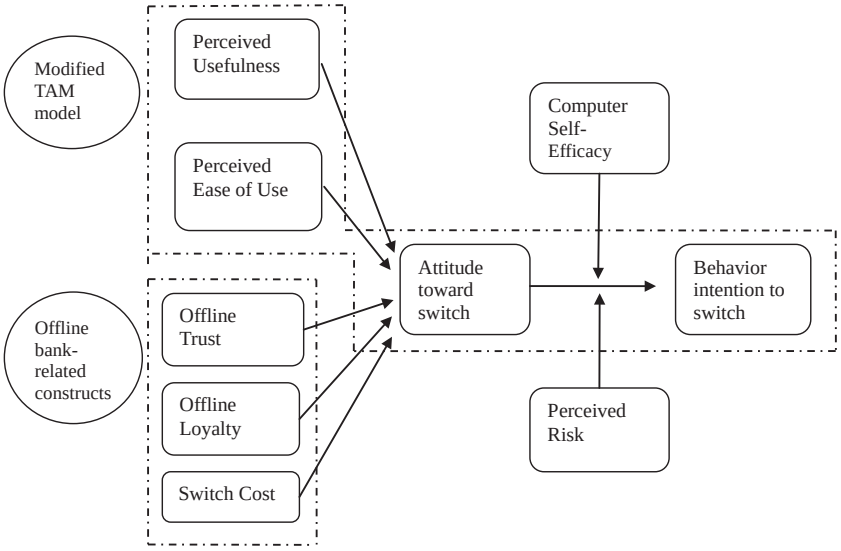

Fig. 2. The proposed conceptual model.

(2004). The three items used aimed to assess the confidence of the user in using an online banking platform.

3.3. Sampling

The data used in this study were gathered by means of a convenience sampling survey conducted among different banks in Tainan, Taiwan in 2008. Some of the banks included Taishin Bank, Bank of Taiwan, Mega International Commercial Bank, First Commercial Bank, Shanghai Commercial and Savings Bank and Bank Sinopac. Four hundred questionnaires were distributed and 250 were returned, which represents a response rate of 62.5%. Questionnaires were completed in different places around the Tainan area, during different times of day and on different days during the data collection period. The resulting sample was thus well distributed in terms of demographic information. The questionnaire (shown in the Appendix) consisted of questions related to background information and possible factors affecting the behavioral intention to switch to online banking. Seven-point Likert scales ranging from "strongly agree" to "strongly disagree" were used as a basis for answering the questions. This scale was used in previous TAM-extension studies (Tan and Teo 2000, Wang et al. 2003).

Convenience sampling is a non-probability method. This means that subjects are chosen in a nonrandom manner. To avoid the non-response bias, this study did a test of homogeneity on the demographic variables (Chang and Chen 2008). All items among the constructs were tested against demographic controls (gender, age and education) using ANOVA, which was adopted from Cho (2006). The mean scores of the items were all indifferent ($p > 0.05$) among the demographics. As a result, the survey response could be mixed as a single dataset for further analysis.

4. Data analysis and results

4.1. Sample characteristics

The descriptive statistics of the respondents' demographic characteristics were analyzed and are presented in Table 2. The majority of the respondents fell into the 30–40 year-old age group, which coincides with the target user group for online banking services. They were distributed among a variety of professional industries such as banking, manufacturing, social work, IT and medicine.

Table 2
Demographic characteristics of the respondents.

Demographic profile	Frequency	Percent (%)
Gender		
Male	88	35.2
Female	162	64.8
Age		
Under 20	1	.4
21–30	77	30.8
31–40	118	47.2
41–50	42	16.8
Over 50	12	4.8
Educational attainment		
Under junior high school/junior high school	19	7.6
University/college	200	80.0
Masters/Ph.D.	31	12.4
Respondents' industry		
Student	21	8.4
Manufacturing	34	13.6
Service	158	63.2
Finance	25	10
Others	12	4.8
Frequency of using online banking (per month)		
Less than once	38	15.2
2–3 times	77	30.8
4–5 times	70	28
More than five times	53	21.2

Most of the participants were female. The bulk of the respondents use the online banking platform more than five times per month.

4.2. Factor analysis and reliability test

Table 3 shows the factor analysis of PU, PEOU, offline trust, switching costs, offline loyalty, perceived risk, computer self-efficacy, attitude towards switching and behavioral intention to switch. The factor analysis was carried out using principal axis factoring with varimax rotation as an extraction method. The goal of this method was to verify the construct validity of the measurement used. According to Hair et al. (1998), factor loadings should be greater than 0.5 to be deemed significant. Following this logic, most of the factor loadings were greater than 0.5, with some above 0.9; hence, all factors used in this study had a significant level of convergent validity. It is also clear from Table 3 that all of the

Table 3
Summary of measurement scales.

Construct	Variables	Factor loading	Eigenvalue	Cumulative explanation (%)	Corrected item-total correlation	Cronbach's α
Perceived usefulness	PU1	.724	3.033	60.656	.768	.829
	PU2	.816			.668	
	PU3	.871			.754	
	PU4	.793			.656	
	PU5	.675			.621	
Perceived ease of use	PEOU1	.897	3.632	72.635	.829	.904
	PEOU2	.882			.813	
	PEOU3	.819			.724	
	PEOU4	.826			.720	
	PEOU5	.834			.729	
Offline trust	OT1	.837	2.407	80.249	.667	.877
	OT2	.933			.836	
	OT3	.914			.799	
Switching costs	SC1	.866	2.240	74.669	.686	.829
	SC2	.807			.602	
	SC3	.916			.783	
Offline loyalty	LT1	.859	2.161	71.699	.667	.780
	LT2	.847			.649	
	LT3	.834			.623	
Attitude towards switching	ATT 1	.949	3.428	85.698	.905	.944
	ATT 2	.897			.820	
	ATT 3	.933			.878	
	ATT 4	.924			.862	
Behavior toward switching	BTS1	.885	3.137	82.799	.725	.756
	BTS2	.858			.683	
	BTS3	.997			.741	
	BTS4	.897			.702	
	BTS5	.899			.739	
Computer self-efficacy	CS1	.922	2.641	88.044	.828	.931
	CS2	.947			.876	
	CS3	.946			.877	
Perceived risk	PR1	.916	1.831	91.570	.831	.908
	PR2	.916			.831	

variables tended to have a high coefficient item-total correlation (greater than 0.5), which suggested a high degree of internal consistency for each dimension. Moreover, the Eigenvalues were greater than 1 and Cronbach's α values were greater than the 0.8 cutoff (Peterson 1994).

These results further confirmed the reliability of the measurement items. No items were deleted from the analysis. This factor model was used to analyze the switching attitude and behavior intention towards online banking.

4.3. Test of hypotheses

Seven hypotheses were formulated in this study, and multiple regression analysis was used to test them. The independent variables (perceived usefulness, perceived ease of use, offline trust, offline loyalty and switching costs) were regressed against attitude towards switching. control variables such as age, gender and education were also added to the model to give precedence to user characteristics (Venkatesh and Morris 2000, Lai and Li 2005). Table 3 presents the results of the regression.

The overall model was statistically significant ($R^2 = 0.490$; p-value <0.05) and had high explanatory power for this type of research. The results were within the generally accepted range of 0.4. The Durbin–Watson test (DW = 2.140), which looks at serial correlation among residuals, was also within the generally accepted range of 1.5–2.5.

As can be seen in Table 4, the control variables were found to be insignificant in explaining the attitude towards switching. These constructs have different effects on diverse sets of studies. Most studies regard them as moderating effects (such as Lin and Qiu (2004) and Venkatesh and Morris (2000), while others treated them as direct effects (Igbaria and Iivari 1995, Chau and Lai 2003). Among the background variables (age, gender and education), only education demonstrated a positive, significant effect. Age and gender were insignificant and thus do not influence attitude towards switching, consistent with the findings of Jones and Hubona (2006). While age and gender do not significantly affect the attitudes of users towards information systems, the qualities of the users (such as education) clearly shape their attitudes and behavior.

Table 4 shows H1–H4 and all are supported. H1a and H1b followed the logic of TAM, and H1a (perceived usefulness) was statis-

Table 4
Results of multiple linear regression.

Independent variables	Attitude towards switching		
	β	t-value	p-value
Gender	.011	.231	.817
Age	−.032	−.655	.513
Education	.11-1	1.705	.040
Perceived usefulness	.149	2.874	.004
Perceived ease of use	.405	6.812	.000
Offline trust	.260	3.392	.001
Offline loyalty	−.162	−1.987	.048
Switching costs	−.247	−4.674	.000
R^2	.490		
Adjusted R^2	.473		
F-value	28.967		
p-value	0.0000		
Durbin–Watson	2.140		

tically significant ($\beta = 0.149$; $p < 0.05$). As previous studies have consistently demonstrated that perceived usefulness has a significant and positive influence on attitude towards use, such is the case in this study with respect to attitude towards switching. H1b (perceived ease of use) ($\beta = 0.405$; $p < 0.005$) has also been presented in previous research and has been proven to affect attitude towards use (see Tan and Teo 2000, Venkatesh and Morris 2000). In summary, if users perceive online banking as useful and easy to use, then they are more inclined to use the online banking platform. The evidence for H2 (Offline Trust) is consistent with a study by Lee et al. (2007) showing that offline trust is the key to using online banking. Offline trust refers to the fact that customers who patronize their traditional offline banking channel are more likely to utilize its online banking service. Hirschman (1980) also suggested that greater positive perception might lead to a greater acceptability of products, hence increasing the chance that the new products will be adopted. In the context of this study, an individual would be more willing to switch to an online banking service if he or she had enough experience with its supporting channel (i.e., the physical bank). Offline Trust was positive and significant ($\beta = 0.260$; $p < 0.05$).

On a similar note, Offline Loyalty fulfilled the expectation of H3 and was negative and significant ($\beta = -0.162$; $p < 0.05$). If the customer's loyalty to their physical bank is high, they will be unwilling to switch from physical to virtual banking. Therefore, Offline Loyalty is relevant in explaining attitude towards switching to online banking.

The results for Switching Costs supported the outcome of H4 ($\beta = -0.260$; $p < 0.05$). According to Chen and Hitt (2002), switching costs can adversely affect the attitude of the consumer towards switching because they take into account the different factors that could be avoided due to the resulting behavior. Perera and Kim (2002) also argued that the larger the switching costs are to the consumer, the more resistant they will be towards switching.

4.3.1. Test of moderating effects

In Table 5, Model 1 examines the relationship between attitude towards switching and behavioral intention to switch. The results indicated that attitude towards switching is positive and significant ($\beta = 0.762$; $p < 0.001$). These results thus support H5.

To examine the moderating effects of computer self-efficacy and perceived risk, a regression analysis was employed among the four variables, as shown in Table 5. The interaction terms of perceived risk and computer self-efficacy were added to Model 3. The interaction of attitude towards switching and computer self-efficacy ($\beta = 0.341$; $p < 0.001$) had a significant influence on the behavioral intention to switch; hence, H6 was supported. To further analyze the said relationship, the means of attitude towards switching and computer self-efficacy were clustered into two high and low groups and a graph of the interaction between the independent variable and the moderator variable was constructed.

Table 5
he moderating effects of computer self-efficacy and perceived risk.

Independent variables	Behavioral Model 1	Intention to switch Model 2	Model 3
Attitude towards switch	.762***	.595***	.350**
Computer self-efficacy		.224***	.201*
Perceived risk		−.693	−.124
Attitude towards Switching * computer self-efficacy			.341***
Attitude towards Switching * perceived risk			.178
R^2	.580	.606	.610
Adjusted R^2	.579	.602	.602
F-value	343.071***	126.303***	76.245***
Durbin–Watson	2.042	2.096	2.134

Note: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$

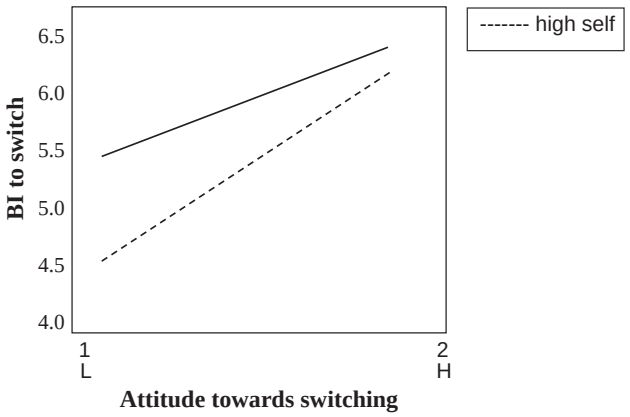

Fig. 3. The moderating effect of computer self-efficacy.

As shown in Fig. 3, the two regression lines are not parallel. The slopes of the regression lines between behavior and attitude are different for different categories of users' computer self-efficacy. This difference indicates that computer self-efficacy may influence the relationship between attitude and behavior towards switching. If computer self-efficacy is high and satisfactory, the relationship between attitude and behavior is strengthened. Conversely, if computer self-efficacy is insufficient to facilitate the switch, then the relationship may be weakened. In sum, computer self-efficacy will moderate the influence of attitude towards switching on the behavior towards switching.

As can be seen in the regression results, Perceived Risk was not significant. Previous studies have included background variables (age, gender, income and education) in the analysis of attitude and behavior and have shown that these can have moderating effects (see Venkatesh et al. 2002, 2003). However, these results can vary, have low explanatory power and are not generalizable due to factors that may also inhibit or stimulate behavior, such as the present technological environment, influence of organizational factors (Sun and Zhang 2005) and subjective norms (Wu and Chen 2005). This reasoning possibly explains why perceived risk is not empirically supported in this research.

5. Conclusions

5.1. Discussion

This study has discussed consumers' behavioral intentions to switch to online banking using the technology acceptance model (TAM), which has been extended to include new variables obtained from the online banking acceptance literature. The conceptualized model suggested that attitude towards and behavioral intention to switch to online banking can be developed using variables derived from TAM (PU and PEOU) and the variables referring to the physical market, including offline trust, offline loyalty and switching costs.

The empirical evidence revealed that PU and PEOU were significant in explaining consumers' attitude towards switching to online banking services. This result refers to the fact that consumers use online banking for the advantages it provides in contrast to using a physical bank. In addition, one variable related to offline banking, the trust in physical banks (offline trust), will enhance customers' attitude towards switching service from physical to online banking. On the contrary, the more the customer's loyalty

is to physical banking (offline loyalty), the lower their enthusiasm towards switching to online banking will be. These findings show that the dimensions related to physical banking would offer some explanatory power for the user's acceptance of online banking.

Further, the empirical findings also indicated that consumers take into account the switching costs they may face when switching from offline to online banking. The greater the switching costs, the less likely they are to engage in switching behaviors.

The interaction effects of computer self-efficacy and perceived risk were also tested using behavior towards switching as the dependent variable. The results indicated that the interaction between attitude towards switching and computer self-efficacy was significant, which further strengthens the hypothesis of computer self-efficacy's moderating effect on the behavioral intention to switch. This result could mean that individuals self-evaluate how comfortable they are in using information systems, such as an online banking platform, and thus, high and low ratings of computer self-efficacy can moderate the effect of attitude towards switching on the resulting behavioral intention to switch.

5.2. Theoretical contributions

While TAM has been extensively verified in the factors that affect users' intention to engage in virtual markets, prior research has mostly focused on the factors that might be effective in predicting attitude towards using and behavioral intention to use (Davis 1989, Adams et al. 1992, Gefen and Straub 1997, Tan and Teo 2000, Cheng et al. 2006). This paper's research provided a fresh perspective on the TAM model by stressing the aspect of switching to analyze the attitudes and behaviors of consumers in technology acceptance. The act of switching has been neglected in the TAM literature, as many studies have focused on acceptance behavior and not on switching behavior. Before a consumer accepts a technology, he or she performs a switch from one technology to another.

At first, the empirical results support the arguments in this study: users' acceptance and adoption of online banking reflects not only the acceptance behavior of the new technology, but also the switching behavior between the conventional and new technology. Although previous studies discussed the degree of users' acceptance of Internet technology, such as online banking, online stores and e-mail, most of these studies performed analyses by mainly focusing on the usage attitude and intention (Bhattacherjee 2001, Chau and Hu 2001, Verhagen et al. 2004, Lai and Li 2005, Chang and Tung 2008). The main contribution of this study was examining the potential substitution effect between old and new technologies. This study concentrated on the switching attitude and intention. Therefore, the results of this study are able to reflect the potential impact of an old technology when users accept or use a new technology. According to the literature, previous studies based on TAM did not review this point of view in depth. Thus, the viewpoints made in this study create another layer of thinking in this topic.

Second, this paper contributes by offering ideas about factors that influence switching to online banking by including variables related to the traditional, physical bank. Prior research, such as that of Cockrill et al. (2009) and Lee (2009), extended TAM by incorporating other variables like web security and reluctance to change channels. Other authors incorporated features of the new technology itself as variables, such as its PU or PEOU. Additionally, others focused on the characteristics of the users (personal creativity, professional background and online experience) or on social perspectives, such as trust and subjective norms (Bhattacherjee 2001, Chau and Hu 2001, Featherman and Fuller 2003, Gefen et al. 2003). These researchers extended the TAM model, but failed to consider the substitution effect between the physical and virtual markets and its potential effect on the physical market.

Third, background variables such as gender and age were found to have a relatively weak relationship with attitude towards switching, which is in contrast with previous studies of online banking such as Chau and Lai (2003), Sun and Xiao (2006) and Luarn and Lin (2005). However, Gefen and Straub (1997) proved in their research that the use of online banking varies across cultures. Table 6 summarizes the research contributions of this study.

5.3. Managerial implications

The implications that this study provides for managers are the following: if bank managers want to expand their business from offline to online banking, it may not be enough to consider only the benefits of online banking (i.e., the usefulness and ease of use). Managers must keep in mind that users' adoption of online banking is not just an acceptance of the new technology, but a behavioral switch from physical banking to online banking. Thus, the factors relating to physical banks will play an important part in the switching process. A first step for a corporation is to work on enhancing its customers' trust in its offline banking. In this way, it will help customers reduce their uncertainty in virtual banks, thereby improving their attitude towards switching from offline to online banking. Further, bank managers should also understand that offline loyalty will affect their customers' attitude towards switching. Managers can consider lowering their offline loyalty by offering incentives to customers who switch to online banking, such as discounts or bonuses for using online services. Finally, because switching costs provide a mental accounting for consumers, banks should not charge their customers for their online banking services. Users have to incur other non-monetary costs, such as learning and investing time. If it is not possible to provide free online banking, then bank managers should ensure that the costs of manual transactions do not go beyond the costs of offline banking. Only in this way can users' intentions to switch be effectively promoted and the behavior of using online banking be further enhanced.

5.4. Limitations and further research

The study has some limitations. In a recent study by Bagozzi (2007), he criticized TAM as a "theory" that lacks feasibility, has

Table 6
Summary of research contributions.

Aspect	Prior research contributions to the TAM literature	This study's contribution to the TAM literature
Focus	Attitude and behavioral intention to use virtual market (online technology)	Attitude and behavioral intention to switch form physical to virtual market Considering the potential effect of physical market
Variables included	a. TAM-related variables, perceived web security (Cheng et al. 2006, Adoption of Internet Banking in Hong Kong)	a. TAM-related variables
	b. Awareness, PEOU, Security, Cost, Reluctance to Change, Security (Alam et al. 2009. Customer's Adoption of Internet Banking: Malaysia Case)	b. Physical market related variables (Offline Trust, Offline Loyalty, Switching Costs) and Moderating variables (CSE and Perceived Risk)
Relationship of control variables (gender, age, education)	Significant relationship (Venkatesh and Morris 2000, Gefen and Straub 1997)	Weak relationship of demographic variables to attitude toward switching

questionable heuristic value and limited explanatory and predictive power. However, this study's framework changed from a highly parsimonious model to one that is a bit more complicated and is much more effective at predicting behavior intention towards switching. The empirical evidence also showed that the R^2 in this research is sufficient to explain the variance of the attitude and behavior intention towards switching.

Second, the survey was conducted only among Taiwanese consumers using the convenience method of sampling. This method is used to make the research procedure faster by obtaining a large number of completed questionnaires in a rapid and efficient fashion. This has an effect on the generalization of the findings. Sample bias might be present due to a flaw in the sample selection process; hence, it cannot speak for the entire population. This could affect the validity of the study. However, as shown in the non-response test, no significant differences were found among the demographic controls. This improves the external validity of the questionnaire.

Finally, another limitation is that other factors may affect the users' behavioral intention to switch. These other factors may include the web interface, such as the "look" and "feel" of the website. Hausman and Siekpe (2009) concluded that web design elements could affect the intentions of conducting the transaction and the intentions to repeat it. Furthermore, this may affect their PU and PEOU. These limitations are avenues of further research. Moreover, another area that could be investigated is the marketing strategy literature, such as that of consumer behavior, to further analyze the behavioral intention to switch. While the authors firmly believe that this work sheds new light on understanding the precedence of technology acceptance, more research considering the potential effect of the factors related to the physical market must be performed, both theoretical and empirical.

Table A.1
Question items used in the study.

Construct	Measure	Source
Perceived usefulness		
PU 1	Using online banking would improve my performance in conducting transactions	Davis et al. (1989), Venkatesh and Davis (2000), and Moon and Kim (2001)
PU 2	Using online banking would increase my productivity	
PU 3	Using online banking would enhance my effectiveness	
PU 4	I would find online banking useful	
PU 5	Internet banking gives me greater control over financial banking activities	
Perceived ease of use		
PEOU 1	It is easy for me to learn how to utilize online banking	Davis et al. (1989), Venkatesh and Davis (2000), and Suh and Han (2002)
PEOU 2	I find it easy to get online banking do what I want to do	
PEOU 3	It is easy to remember how to use online banking	
PEOU 4	My interaction with the online banking site is clear and understandable	
PEOU 5	I find online banking useful for my banking activities	
Offline trust		
OT 1	My bank has the ability to meet its promises	Dimitriadis and Kyrezis (2008)
OT 2	My bank would not do anything against my interests	
OT 3	My bank always treats me with goodwill	
Offline loyalty		
LO 1	I say positive things about the bank to other people	Ping (1993) and Jones et al. (2003)
LO 2	I intend to continue to do business with the present bank	
LO 3	I intend to do more business with the present bank	
Switch cost		
SC 1	This bank provides services that cannot be easily replaced by other banks	Eastin (2002) and Wang et al. (2003)
SC 2	It takes me a great deal of time and effort to get used to a new platform	
SC 3	In general, it would be a hassle switching to a new platform	
Attitude towards switch		
ATT 1	In my opinion, it is desirable to switch from offline to online banking	Davis et al. (1989), Venkatesh and Davis (2000), and Moon and Kim (2001)
ATT 2	I think it is good for me to switch from offline to online banking	
ATT 3	In my view, switching from offline to online banking is a wise idea	
ATT 4	I feel that switching from offline to online banking is pleasant	
Behavior intention to switch		
BTS 1	I would switch from offline to online banking for my banking needs	Davis et al. (1989), Venkatesh and Davis (2000), and Moon and Kim (2001)
BTS 2	Switching to online banking to handle my banking transactions is something I would do	
BTS 3	I can see myself switching from offline to online banking to handle my transactions	
BTS 4	I expect to switch from offline to online banking to handle my financial transactions in the future	
BTS 5	I will strongly recommend others to use Internet banking	
Perceived risk		
PR 1	I feel the risk associated with online transactions is low	Zeithaml et al. (1996)
PR 2	The bank will not misuse my personal information	
Computer self-efficacy		
CS 1	I am confident in using Internet banking if I have only the online instructions for reference	Yi and Hwang (2003) and Chan and Lu (2004)
CS 2	I am confident in using Internet banking even if there is no one around to show me how to do it	
CS 3	I am confident in using Internet banking even if I have never used such a system before	

Appendix

See Table A.1.

References

Adams, D. A., Nelson, R. R., and Todd, P. Perceived usefulness, ease of use, and usage of information. *MIS Quarterly*, 16, 2, 1992, 227–248.

Agarwal, R., and Prasad, J. Are individual differences germane to the acceptance of new information technologies? *Decision Sciences*, 30, 2, 1999, 361–391.

Alam, S., Musa, R., and Hassan, F. Corporate customers' adoption of Internet banking: case of Klang Valley business firm in Malaysia. *International Journal of Business and Management*, 4, 4, 2009.

Autzen, B. Quality of usage as neglected aspect of information technology acceptance. Working paper. Department of General Management and Information Systems, University of Mannheim, Germany, 2007.

Bagozzi, R. P. The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems*, 8, 4, 2007, 244–254.

Bhattacherjee, A. Understanding information systems continuance: an expectation–confirmation model. *MIS Quarterly*, 25, 3, 2001, 351–370.

Burnham, T. A., Frels, J. K., and Mahajan, V. Consumer switching costs: a typology, antecedents, and consequences. *Journal of the Academy of Marketing Science*, 31, 2, 2003, 109–126.

Chan, S., and Lu, M. Understanding Internet banking adoption and use behavior: a Hong Kong perspective. *Journal of Global Information Management*, 12, 3, 2004, 21–43.

Chang, H. H., and Chen, S. W. The impact of customer interface quality, satisfaction and switching costs on E-loyalty: Internet experience as a moderator. *Computers in Human Behavior*, 24, 6, 2008, 2927–2944.

Chang, S. H., and Tung, F. C. An empirical investigation of students' behavioral intentions to use the online learning course websites. *British Journal of Educational Technology*, 39, 1, 2008, 71–83.

Chau, P. Y. K., and Hu, P. J. H. Information technology acceptance by individual professionals: a model comparison approach. *Decision Sciences*, 32, 4, 2001, 699–719.

Chau, P. Y. K., and Lai, V. S. K. An empirical investigation of the determinants of user acceptance of Internet banking. *Journal of Organizational Computing and Electronic Commerce*, 13, 2, 2003, 123–145.

Chen, B.S., and Chen R.Y. The structure–performance relationship for Taiwan's domestic banking industry. In *WEA Pacific Rim Conference*, Taipei, Taiwan, 2003.

Chen, P. Y., and Hitt, L. M. Measuring switching costs and their determinants in internet enabled businesses: a study of the online brokerage industry. *Information Systems Research*, 13, 3, 2002, 255–276.

Cheng, T. C. E., Lam, D. Y. C., and Yeung, A. C. L. Adoption of Internet banking: an empirical study in Hong Kong. *Decision Support Systems*, 42, 2006, 1558–1572.

Cho, V. A study of the roles of trusts and risks in information-oriented online legal services using an integrated model. *Information and Management*, 43, 4, 2006, 502–520.

Cockrill, A., Goode, M. H., and Beetles, A. The critical role of perceived risk and trust in determining customer satisfaction with automated banking channels. *Services Marketing Quarterly*, 30, 2, 2009, 174–193.

Compeau, R. D., and Higgins, A. C. Computer self-efficacy: development of a measure and initial test. *MIS Quarterly*, 19, 2, 1995, 189–211.

Davis, F. D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 1989, 319–340.

Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35, 8, 1989, 982–1003.

Dimitriadis, S., and Kyrezis, N. Does trust in the bank build trust in its technology-based channels? *Journal of Financial Services Marketing*, 13, 1, 2008, 28–38.

Eastin, M. Diffusion of E-commerce: an analysis of the adoption of four E-commerce activities. *Telematics and Informatics*, 19, 2002, 251–267.

Featherman, M., and Fuller, M. Applying TAM to e-services adoption: the moderating role of perceived risk. In *36th Annual Hawaii International Conference on System Sciences*, 2003.

Featherman, M., and Pavlos, P. Predicting E-services adoption: a perceived risk facets perspective. *International Journal of Human–Computer Studies*, 59, 4, 2003, 451–474.

Fenech, T. Using perceived ease of use and perceived usefulness to predict acceptance of the world wide web. *Computer Networks and ISDN Systems*, 30, 1998, 629–630.

Floh, A., and Treiblmaier, H. What keeps the e-banking customer loyal? A multi-group analysis of the moderating role of consumer characteristics on e-loyalty in the financial service industry. *Journal of Electronic Commerce Research*, 7, 2, 2006, 97–110.

Ganesh, J., Mark, J. A., and Kristy, E. R. Understanding the customer base of service providers: an examination of the differences between switchers and stayers. *Journal of Marketing*, 64, 3, 2000, 65–87.

Gefen, D., and Straub, D. W. Gender differences in the perception and use of e-mail: an extension to the technology acceptance model. *MIS Quarterly*, 21, 4, 1997, 389–400.

Gefen, D., Karahanna, E., and Straub, D. W. Trust and TAM in online shopping: an integrated model. *MIS Quarterly*, 27, 1, 2003, 51–90.

Hair, J. F., Anderson, R. E., Tatham, R. L., and Black, W. C. *Multivariate Data Analysis*, 5th edition. Prentice-Hall, Upper Saddle River, NJ, 1998.

Hausman, A., and Siekpe, J. S. The effect of web interface features on consumer online purchase intentions. *Journal of Business Research*, 62, 1, 2009, 5–13.

Hirschman, E. Innovativeness, novelty seeking and consumer creativity. *Journal of Consumer Research*, 7, 3, 1980, 283–295.

Hsu, M. H. Internet self-efficacy and electronic service acceptance. *Decision Support System*, 38, 3, 2004, 369–381.

Hsu, C. M. H., Kang, S. K., and Lam, T. Reference group influence among Chinese travelers. *Journal of Travel Research*, 44, 4, 2006, 474–484.

Igbaria, M., and Iivari, J. The effects of self-efficacy on computer usage. *Journal of Management Science*, 23, 6, 1995, 587–605.

Im, I., Kim, Y., and Han, H. The effects of perceived risk and technology type on users' acceptance of technologies. *Information and Management*, 45, 2008, 1–9.

Johnson, R. D. An empirical investigation of sources of application-specific computer-self-efficacy and mediators of the efficacy-performance relationship. *International Journal of Human–Computer Studies*, 62, 2005, 737–758.

Jones, H., and Farquhar, J. D. Contact management and customer loyalty. *Journal of Financial Services Marketing*, 8, 1, 2003, 71–78.

Jones, A. B., and Hubona, G. S. The mediation of external variables in the technology acceptance model. *Information and Management*, 43, 2006, 706–717.

Jones, M. A., David, L., Mothers, B., and Sharon, E. B. Switching barriers and repurchase intentions in service. *Journal of Retailing*, 76, 2, 2000, 259–274.

Kim, K., and Prabhakar, B. Initial trust, perceived risk, and the adoption of Internet banking. In *Proceedings of the Twenty-first International Conference on Information Systems*, Brisbane, Queensland, Australia, 2000, 537–543.

Lai, V. S., and Li, H. Technology acceptance model: an invariance analysis. *Journal of Information and Management*, 42, 2, 2005, 373–386.

Lee, M. C. Factors influencing the adoption of Internet banking: an integration of TAM and TPB with perceived risk and perceived benefit. *Electronic Commerce Research and Applications*, 8, 2009, 130–141.

Lee, J., and Feick, L. The impact of switching cost on the customer satisfaction–loyalty link: mobile phone service in France. *Journal of Service Marketing*, 15, 1, 2001, 35–48.

Lee, E., and Lee, J. Consumer adoption of Internet banking: need-based and or skill-based? *Marketing Management Journal*, 11, 4, 2001, 101–113.

Lee, K. C., Kang, I., and McKnight, D. H. Transfer from offline trust to key online perceptions: an empirical study. *IEEE Transactions on Engineering Management*, 54, 4, 2007.

Lin, A. The acceptance and use of a business-to-business information system. *International Journal of Information Management*, 26, 5, 2006, 386–400.

Lin, S.P., and Qiu, Y.B. The Main Effects and Moderating Effects of Gender in the Formation of Online Purchase Intentions: An Extension to the Technology Acceptance Model. Unpublished article, 2004.

Lu, J., Yu, C. S., Liu, C., and Yao, J. E. Technology acceptance model for wireless Internet. *Internet Research: Electronic Networking Applications and Policy*, 13, 3, 2003, 206–222.

Luarn, P., and Lin, H. Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, 21, 6, 2005, 73–91.

Mcilroy, D., Sadler, C., and Boojawon, N. Computer phobia and computer self-efficacy: their association with undergraduates' use of university computer facilities. *Computers in Human Behavior*, 23, 3, 2007, 1285–1299.

Mitchell, V. W. Consumer perceived risk: conceptualizations and models. *European Journal of Marketing*, 33, 2, 1999, 163–195.

Miyazaki, A. D., and Fernandez, A. Internet privacy and security: an examination of online retailer disclosures. *Journal of Public Policy and Marketing*, 19, 1, 2000, 54–61.

Moon, J. W., and Kim, Y. G. Extending the TAM for a world-wide-web context. *Information and Management*, 38, 4, 2001, 217–230.

Mukherjee, A., and Nath, P. A model of trust in online relationship banking. *International Journal of Bank Marketing*, 21, 1, 2003, 5–15.

Perera, N., and Kim, H.W. The Effect of Switching Costs on Resistance to Change in the Use of Software. Department of Information Systems, National University of Singapore, 2002.

Peterson, R. J. A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research*, 21, 1994, 381–391.

Ping, R. A. The effects of satisfaction and structural constraints on retailer exiting, voice, loyalty, opportunism, and neglect. *Journal of Retailing*, 69, 3, 1993, 320–352.

Porter, C. E., and Donthu, N. Using the technology acceptance model to explain how attitudes determine Internet usage: the role of perceived access barriers and demographics. *Journal of Business Research*, 59, 9, 2006, 999–1007.

Rayport, J. F., and Sviokla, J. Managing in the marketspace. *Harvard Business Review*, November–December, 1994, 141–150.

Rayport, J. F., and Sviokla, J. Exploiting the virtual value chain. *Harvard Business Review*, November–December, 1994, 75–85.

Sejin, H., and Leslie, S. Consumer E-shopping acceptance: antecedents in a technology acceptance model. *Journal of Business Research*, 62, 5, 2009, 565–571.

Shankar, V., Smith, A. K., and Rangaswamy, A. Customer satisfaction and loyalty in online and offline environments. *International Journal of Research in Marketing*, 20, 2, 2003, 153–175.

Shih, H. P. An empirical study on predicting user acceptance of e-shopping on the web. *Information and Management*, 41, 3, 2004, 351–368.

Shoemaker, S., and Lewis, R. C. Customer loyalty: the future of hospitality marketing. *Hospitality Management*, 18, 1999, 345–370.

Srinivasan, S. S., Anderson, R., and Ponnavolu, K. Customer loyalty in e-commerce: an exploration of its antecedents and consequences. *Journal of Retailing*, 78, 1, 2002, 41–50.

Suh, B., and Han, I. Effect of trust on consumer acceptance of online banking. *Electronic Commerce, Research, and Application*, 1, 2002, 247–263.

Sun, H., and Xiao, X. *User Acceptance of Virtual Technologies*. Idea Group, Harrisburg, PA, 2006.

Sun, H., and Zhang, P. The role of moderating factors in user technology acceptance. *International Journal of Human–Computer Studies*, 64, 2005, 73–78.

Tan, M., and Teo, T. S. H. Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, 1, 5, 2000, 1–42.

Taylor, S., and Todd, P. A. Understanding information technology usage: a test of competing models. *Information Systems Research*, 6, 2, 1995, 144–176.

Torkzadeh, G., Chang, J. C. J., and Hansen, G. W. Identifying issues in customer relationship management at Merck-Medco. *Decision Support Systems*, 42, 2006, 1116–1130.

Van der Heijden, H. Factors influencing the usage of websites: the case of a generic portal in the Netherlands. *Information and Management*, 40, 6, 2003, 541–549.

Venkatesh, V., and Davis, F. D. A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 46, 2000, 186–204.

Venkatesh, V., and Morris, M. G. Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, 24, 1, 2000, 115–139.

Venkatesh, V., Speier, C., and Morris, M. G. User acceptance enablers in individual decision making about technology: toward an integrated model. *Decision Science*, 33, 2, 2002, 297–316.

Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27, 3, 2003, 425–478.

Verhagen, T., Tan, Y., and Meents, S. An empirical exploration of trust and risk associated with purchasing at electronic marketplaces. In *Proceedings of the 17th Bled Ecommerce Conference*, June 21–23, Bled, Slovenia, 2004.

Wang, Y. D., and Emurian, H. H. Trust in E-commerce: consideration of interface design factors. *Journal of Electronic Commerce in Organizations*, 3, 4, 2005, 42–60.

Wang, Y., Wang, Y., Lin, H., and Tang, T. Determinants of user acceptance of internet banking: an empirical study. *International Journal of Service Industry Management*, 14, 5, 2003, 501–519.

Wu, L. L., and Chen, J. L. An extension of trust and TAM Model with TPB in the initial adoption of online tax: an empirical study. *International Journal of Human–Computer Studies*, 62, 6, 2005, 784–808.

Yanga, H. D., and Yoo, Y. It's all about attitude: revisiting the technology acceptance model. *Decision Support Systems*, 38, 2004, 19–31.

Yeow, P. H., and Yee, Y. Y. *User acceptance of Internet banking service in Malaysia. Lecture Notes in Business Information Processing*, Vol. 18). Springer, New York, NY, 2008.

Yi, M. Y., and Hwang, Y. Predicting the use of web-based information systems: Self-efficacy, enjoyment, learning goal orientation and the technology acceptance model. *International Journal of Human–Computer Studies*, 59, 4, 2003, 431–449.

Yoon, C., and Kim, S. Convenience and TAM in a ubiquitous computing environment: the case of wireless LAN. *Electronic Commerce Research and Applications*, 6, 1, 2007, 102–112.

Zeithaml, V. A., Berry, L. L., and Parasuraman, A. The behavioral consequences of service quality. *Journal of Marketing*, 60, 2, 1996, 31–46.