

CONSUMER ADOPTION OF INTERNET BANKING: NEED-BASED AND/OR SKILL BASED?

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The authors of this study investigate whether consumers' decisions to adopt Internet banking are need-based or skill-based by employing structural equation modeling. Specifically, the effects of consumers' prior use of banking services, Internet purchasing experience, use of personal computers, and demographic characteristics on their likelihood to adopt Internet banking in the future are examined. Results show that adoption of Internet banking is both a need- and skill-based decision. In addition, the impact of demographic factors on non-adopters' likelihood of Internet banking is found to be negligible. Implications are discussed for diffusion agents who offer Internet-based financial services.

INTRODUCTION

Recent advances in information technology are changing the nature of financial services delivered to consumers (Federal Reserve Board 1997; Lee and Lee 2000; White 1998). Inspired by the technological development, many financial industry analysts predict that the rise of electronic banking will lead to a decrease in paper-based banking and that future financial transactions will be dominated by electronic banking technologies. Recent examples of Wells Fargo's closing of traditional branches and First Chicago's instituting fees for completing transactions with human tellers show that automation in financial services is already a prevalent trend. Of the many electronic banking technologies, Internet banking is expected to grow most rapidly in the near future (ABA Banking Journal 1999).

Although Internet banking appears to be inevitable, widespread consumer adoption of this technology has yet to become a reality. After an extensive review of the diffusion of innovation literature, Gatignon and Robertson (1985) suggested that examining non-adopters can be particularly helpful for marketers. Considering that the diffusion of Internet banking is still at its early stage, current non-adopters include

not only laggards, but also those who will soon embrace this new innovation. Therefore, an understanding of the factors that encourage current non-adopters' adoption decisions will facilitate marketers' formation of a successful diffusion strategy. The purpose of this study is to examine those factors, specifically need- and skill- based factors.

Early models of diffusion of innovations, including the Bass model (1969), assume that diffusion of a product occurs independently of other products. However, a consumer's willingness to adopt a new technology is affected by his or her prior pattern of adopting related technologies. The influence of one technology on the next generation of that innovation is expected to be positive especially when the relationship between the two technologies is complementary (Bayus 1987; Norton and Bass 1987).

When examined closely, a consumer's use of Internet banking involves using a set of complementary technologies. Consumers need to be familiar with computers in general, and should be, to some extent, proficient in the use of Web browsers, to engage in computer-mediated communications and transactions. Having *skills* in these two areas (computers and the Internet), will thus increase a consumer's likelihood of adopting Internet banking. Therefore, when a consumer's

adoption of Internet banking is facilitated by his/her existing skills, we refer to this type of adoption as skill-based adoption.

However, does having skills in computers and Internet invariably guarantee that a consumer will adopt Internet banking? Perhaps it is necessary to consider consumers' motivation for using electronic technologies to more accurately predict whether non-adopters will adopt Internet banking in the future. For example, if a consumer's main purpose for using computers centers on entertainment and fun and is remote from banking, the probability of his or her adopting Internet banking might be low. In such case, having computer skills does not necessarily lead to actual adoption of Internet banking, because the consumer's motivation for using computers is not relevant to Internet banking.

On the other hand, non-adopters' decisions to adopt can be influenced by whether they have a *need* for convenient banking services. When a consumer has the need for banking services -- and this need can be better fulfilled through Internet technology -- his or her future adoption of Internet banking will be facilitated. We refer to a decision to adopt Internet banking motivated by the need for banking services as need-based adoption.

The purpose of this paper is to investigate how non-adopters' computer and Internet skills and their need for banking services affect their future intention to adopt Internet banking. For that purpose, we examine three factors that may affect consumers' decision, including their use of banking services, prior Internet purchasing experience, and personal use of computers. Specifically, consumers' use of banking services is employed as a proxy variable indicating their need for banking services. Their prior Internet purchasing experiences represent skills relevant to Internet banking; and their personal use of computers for fun or play represents skills irrelevant to Internet banking. In addition, we examine the effects of age, income, and education on consumers' future adoption of Internet banking. Through this examination, we investigate whether the decision to adopt Internet banking is need- or skill-based, as well as the impact of demographic factors on non-adopters' future adoption. Addressing consumers'

likelihood of adopting Internet from need- or skill-based perspectives will provide strategic guidance to diffusion agents about who the future adopters will be.

BACKGROUND

Advantages of Internet Banking

Electronic banking provides a clear advantage for financial institutions -- low cost. For example, the transaction cost of electronic banking is only a fraction of human teller banking (Sheth and Sisodia 1999; Talmor 1995). Considering that processing checks costs the nation approximately \$181 billion a year (*Consumers' Research Magazine* 1999), the low cost of electronic banking is an attractive incentive for financial institutions.

For consumers, Internet banking provides a convenient alternative to the traditional bank visit. Internet banking is an attractive option for time-pressured consumers since it saves trips to the bank branch office (*US Banker* 1997). Other advantages of Internet banking include giving customers more access to information about their bank accounts and making it easier to inquire about daily balances, transfer funds, and thus effectively manage personal finances. In addition, Internet banking incurs lower service charges compared to traditional banking. To summarize, Internet banking offers convenience, increased control over account information, and cost effectiveness to customers.

Are Consumers Ready for Internet Banking?

Because of many convenient features of Internet banking, consumer acceptance of this new technology is often considered a "given" part of the growing trend toward automation in general (*Future Banker* 1999). However, for Internet banking to be adopted by the general population and be successfully diffused across society, several roadblocks must be overcome. First, consumers must be made aware of this new, alternative banking option. Surprisingly, Barzar, Ellen, and Pilling's 1997 study found that a considerable number of consumers were not even aware of the option of Internet banking. The number of households using

Internet banking in 1999 was less than 10 % of all U.S. households (*Bank Controllers Report 2000*; Giesen 1999).

Presently, Internet banking is at the early stage of the diffusion process. The non-adopter of Internet banking pool consists of approximately 90 % of all bank customers, according to the 1999 University of Michigan Survey of Consumers (Lee and Lee 2000). This large non-adopter of Internet banking population includes heterogeneous consumer segments, ranging from individuals who are ready to embrace Internet banking to those who refuse to embrace the new technology that replaces their familiar practice of human-teller banking. Furthermore, within the non-adopter populations, there are significant variations in the extent to which non-adopters need convenient banking services, and in the degree to which individuals can use a computer and the Internet skillfully. If so, how does having computer skills and banking needs relate to non-adopters' decision to adopt Internet banking? In the next section, we turn to extant literature to answer this question.

LITERATURE REVIEW

Consumer Adoption of Internet Banking

In this study, we focus on skill- and need-based factors that may differentiate between those who will soon adopt Internet banking from the large non-adopter population. As discussed earlier, a consumer's decision to adopt Internet banking can be categorized two ways based upon underlying motivations: need and skills. Need-based adoption refers to a consumer's decision to adopt Internet banking because he/she has the need for electronic banking services. Since Internet banking can fulfill his/her banking needs with ease and convenience, the consumer is motivated to adopt Internet banking. In this study, a consumer's current use of existing banking services, such as ATMs and phone banking, is used as a proxy variable to indicate for his/her need for banking services.

Skill-based adoption occurs when consumers are familiar with the Internet and computer technologies. Because Internet and computer skills are required for Internet banking, having these skills facilitates

consumers' adoption of Internet banking. However, the relevance of these skills to consumers' decision to adopt Internet banking can vary depending on consumers' reason for using computer technologies. In this study, consumers' prior Internet purchase experiences represent the skills relevant to Internet banking, whereas consumers' personal use of computers for fun/play represent less relevant skills.

In the following subsections, we develop research hypotheses regarding the effects of the use of banking services, personal computers, and experience purchasing through the Internet on non-adopters' future intention to adoption Internet banking. Through investigation of these three factors, we gain insights into whether non-adopters' adoption of Internet banking is a need-based decision and/or skill-based decision.

Need-Based Adoption of Internet Banking

In need-based adoption, consumers' underlying motives are the internal forces that drive them to adopt innovation (Peltier and Schriabrowsky 1992). Need-based adoption of Internet banking refers to the decision to adopt Internet banking for its convenience. Consumers who conduct banking business frequently through ATMs may realize that Internet banking is another convenient way to meet their banking needs. The consumers who visit the bank office frequently or use telephone banking extensively, may also be attracted to the new, convenient option that can save them time and effort. Therefore, it is hypothesized that current bank customers, especially heavy users of banking services, will respond positively to Internet banking. The need-based adoption supports the logic that heavy usage of banking services positively affects non-adopters' future decision to adopt Internet banking.

H₁: (*Need-Based*): Heavy usage of banking services will be positively related to likelihood of adopting Internet banking.

Skill-Based Adoption of Internet Banking

The most widely known diffusion model in marketing, the Bass forecasting model (Bass 1969),

assumes that diffusion of an innovation occurs independently of other innovations (Peterson and Mahajan 1978). However, it would be more realistic to assume that the diffusion process of one innovation occurs simultaneously with that of other innovations. This consideration of simultaneous diffusion of related products becomes critical when the diffusion of one innovation complements the diffusion of another innovation (Mahajan, Muller and Bass 1990). Bayus (1987), for example, demonstrated that diffusion of one product (compact disc software) was contingent upon diffusion of a complementary product (compact disc hardware).

That is, consumers' adoption of one product or service can be influenced by their prior experiences with related products or services. Therefore, it is logical to assume that consumers' adoption of Internet banking is related to their prior experience with the Internet and computer technologies.

Past consumer behavior research has also shown that prior experience with technologies may influence consumers' future adoption of similar technologies (Dabholkar 1992; Dickerson and Gentry 1983; Hirschman 1980). When learning is involved in the adoption of innovations, the probability that an innovation will be adopted is inversely related to the amount of cognitive effort required for a consumer to understand it (Hirschman 1980). The familiarity with a product class that is obtained through experience can greatly reduce this cognitive effort (Dickerson and Gentry 1983). Consequently, a consumer's adoption of a new technology is facilitated if he or she is proficient in the use of similar technologies.

Because adoption of Internet banking requires a consumer to use computers and the Internet, we initially conceptualize that skill-based adoption of Internet banking is likely to occur when the consumer has Internet skills and computer skills.

Relevance of Skills

Internet skills, including the capability to use Web browsers appropriately to engage in computer-mediated communication, are required for consumers to adopt Internet banking. The skills required for Internet shopping, such as reading information and conducting financial transactions, are fairly relevant to the skills needed for Internet banking. Thus, it is

expected that consumers with experience purchasing through the Internet are more likely to feel comfortable about online financial transactions, and therefore more likely to adopt Internet banking. Furthermore, prior experiences with relevant technologies can reduce consumers' perceived risks related to adopting a new technology. In order for a consumer to adopt Internet banking, he/she needs to be comfortable about doing business involving financial transactions over the Internet and be willing to provide financial information online.

Since consumers' concern about the security of transactions is often the major obstacle for the diffusion of electronic banking technology (O'Connell 1999), successful prior Internet purchase experience will reduce their security concerns and thus will increase their likelihood of adopting Internet banking. Because the decision to adopt Internet banking is contingent upon relevant Internet-skills, consumers who have prior Internet purchase experience are more likely to adopt Internet banking. Thus:

H₂: (*Relevant Skills*): Prior Internet purchase behavior is positively related to consumers' likelihood of adopting Internet banking.

If consumers' decision to adopt Internet banking is based solely on skills, we could expect that consumers experienced with the Internet or with computer skills are invariably more likely to adopt Internet banking than those who are inexperienced with computer and Internet technology. In fact, consumers who are heavy users of computers tend to be familiar with computer technology and have more opportunities to be exposed to promotional messages for Internet banking compared to their computer-illiterate counterparts. However, possessing computer skills irrelevant to Internet banking does not necessarily lead to a consumer's adoption of Internet banking. For example, a consumer can spend numerous hours using his/her computer to play games or for other personal uses. However, the motivation for such computer usage is generally irrelevant to Internet banking. Therefore, we hypothesize that irrelevant skills, such as use of computers for fun or play, is not positively

associated with the likelihood of Internet banking adoption.

- H₃:** (*Irrelevant Skills*): Personal use of computers for fun/play is not positively associated with consumers' likelihood of adopting Internet banking.

Demographic Characteristics of Adopters

A set of general characteristics of adopter/non-adopters has emerged from diffusion research. Adopters tend to have the following characteristics compared to non-adopters (Dickerson and Gentry 1983; Gatignon and Robertson 1985; Gilly and Zeithaml 1985; Kennedy 1983; Midgley and Dowling 1978; Rogers 1995; Zeithaml and Gilly 1987): more educated and higher level of cognition and intelligence; more affluent; and younger.

Lee and Lee's (2000) recent study shows that these general characteristics also apply to adopter of electronic banking profile. Specifically, adopters of ATMs, bill payment, debit cards, and smart cards tend to be more highly educated, more affluent, and younger. In fact, financial institutions frequently use demographics as a basis for segmenting the market for technology-based services. Studies suggest that financial institutions use segmentation strategies for technology-based services, based on customers' income (Burnett 1990; Raddon 1996), education (Hefter 1987), and age (Murphy and Rogers 1986; Raddon 1996; Stanley, Ford, and Richards 1985).

Therefore, it is expected that potential adopters of Internet banking will also be highly educated, affluent, and young.

METHODS

Data

For this study, we employed the ninth WWW User Survey, collected by the Graphic, Visualization, & Usability Center's (GVU) and Georgia Tech Research Corporation. The data are available online at http://www.gvu.gatech.edu/user_surveys/survey-1998-04/. The ninth Survey was conducted over one-month period, from April 10, 1998 through May 15, 1998. Approximately 1,600 subjects participated in

the Internet banking section of this Web-based survey. Cash prizes of \$100 were promised as an incentive to participate in the Survey. This GVU data set is unique because the entire survey was conducted over the Internet. However, the inherent drawback of the Internet survey is its limited reach and self-selection bias. The subject pool may have excluded those consumers who did not have access to computers and the Internet. In addition, the sampling plan invited only those who volunteered for the Internet survey. Despite these drawbacks, this data set includes many computer- and Internet-literate consumers who are likely to be potential adopters of Internet banking. Therefore it is a reasonable sample for exploring non-adopters' future adoption of Internet banking.

Measurement

The primary focus of this study is to investigate the factors affecting non-adopters' likelihood of adopting Internet banking. Consequently, current Internet banking users were excluded from our analysis. In order to select the non-adopters, the following screening question was asked to each respondent: "Do you have a bank account which you interact with your bank mostly through a WWW browser?" Only those consumers who answered "no" to this question (N=1,122) were asked about their likelihood of adopting Internet banking in the near future. A five-point Likert scale was used for each question except the dependent variable, likelihood of adopting Internet banking. A seven-point Likert scale was employed for the dependent variable in order to amplify discrimination among the large non-adopter population. Table 1 presents the measurement scales used in the analysis.

Dependent Variable

The respondents who did not currently have an Internet banking account were subsequently asked the following question, "How likely is it that you will open an Internet bank account within the next 12 months?" The responses were recorded on a seven-point Likert scale from "very unlikely (1)" to "very likely (7)."

TABLE 1
Measurement Scales

Latent Factors	Manifest Variables	Squared Multiple Correlations
Personal Use of Computer	How many hours do you use your computer for fun/play? (C_Fun)	0.542
Reliability = 0.75*	How many hours do you use your computer for personal reasons? (C_Persnl)	0.680
Use of Banking Services	How frequently do you visit your bank branch per month? (F_Branch)	0.018
	How frequently do you use telephone-banking services per month (for example, balance inquiry, fund transfer between accounts)? (F_Tele)	0.277
Reliability = 0.30	How frequently do you use an Automated Teller Machine (ATM) per month? (F_ATM)	0.149
Internet Purchase Experience	Approximately how many times have you purchased any product through the Internet in the last 12 months? (T_Freq)	0.329
Reliability = 0.47*	How willing are you to provide credit card information and purchase information through WWW/e-mail (Infoweb)	0.283
Likelihood to Use Internet Banking	How likely is it that you will open an Internet account within the next 12 months? (Likelihood).	0.329

* Guttman's Split half was used for assessing reliability instead of Chronbach's alpha for the factors with two-item measures.

Independent Variables

Use of Banking Services. The following three measures indicated the respondent's use of banking services: (1) how frequently s/he visits bank branch per month (F_Branch); (2) how frequently s/he uses telephone banking per month for balance inquiry, fund transfer between accounts, etc. (F_Tele); and (3) how frequently s/he uses automated teller machines (ATMs) per month (F_ATM).

Personal Use of Computer. Two different uses of personal computer were included: (1) how many hours the respondent used his/her computer for fun/play (C_Fun), and (2) how many hours the respondent used his/her computer for personal reasons (C_Persnl).

Internet Purchase Behavior. Internet purchase behavior was identified based on the following two factors: (1) how many times the respondent had

purchased products through the Internet in the last 12 months (T_Freq), and (2) how willing the respondent was to provide credit card and purchase information through WWW/e-mail (Infoweb).

Age. Each respondent's age was recorded on the following five categories: (1) under 20, (2) 21-30, (3) 31-40, (4) 41-50, and (5) over 50.

Income. Seven categories were used to identify the respondents' annual income level ranging from (1) less than \$20,000, (2) \$20,000-29,999, (3) \$30,000-39,999, (4) \$40,000-49,999, (5) \$50,000-59,999, (6) \$60,000-\$69,999, to (7) over \$70,000.

Education. The respondents' education was measured through the following four categories: (1) completion of grammar school and high school diploma, (2) some college education, (3) bachelor's degree, and (4) graduate degree.

Analysis

First, we adopted a structural equation modeling approach to investigate non-adopters' future adoption of Internet banking is need-based and/or skill-based. Because the data did not indicate any problems in multivariate normality, the maximum likelihood estimation method in AMOS software version 4.0 was employed. Next, a set of regression analysis was used (1) to verify whether the effects found in the structural model were real and (2) to assess the impacts of respondents' demographic characteristics on their likelihood of adopting Internet banking in the future.

RESULTS

Overall Model Fit

Overall, the estimated structural equation model had a good fit (see Figure 1). Fit indices, CFI (0.956), GFI (0.989), and AGFI (0.974) showed that the model had a desirable fit. Considering that a RMSEA value of less than 0.05 suggested a close fit (Joreskog 1993; Ping 1999), the RMSEA of the estimated model (0.044) and its P-close value (0.747) appeared to be acceptable.

Reliability (internal consistency) of each factor is reported in Table 1. Guttman's split half method was used to assess the reliability of factors with only two items. Chronbach's alpha was used for the factor with a three-item measure. We found that the alpha for the use of bank services factor turned out to be low because of the frequency of bank visit variable. While low reliability was expected to have a negative effect on the overall model fit, the present model still showed a desirable overall fit (see Table 2). In addition, because for many consumers bank visits are the major method of conducting personal banking businesses, it would not be appropriate to drop this variable.

Although the structural equation model demonstrated a good overall fit, it was questionable whether the estimated effects would be robust compared to other analytical methodologies, particularly because some of reliability indices were smaller than expected. In order to validate the

effects found in the structural equation model, we fit a set of regression models using the same independent variables. The regression analysis also included the respondents' demographic characteristics.

Parameter Estimates and Testing Hypotheses

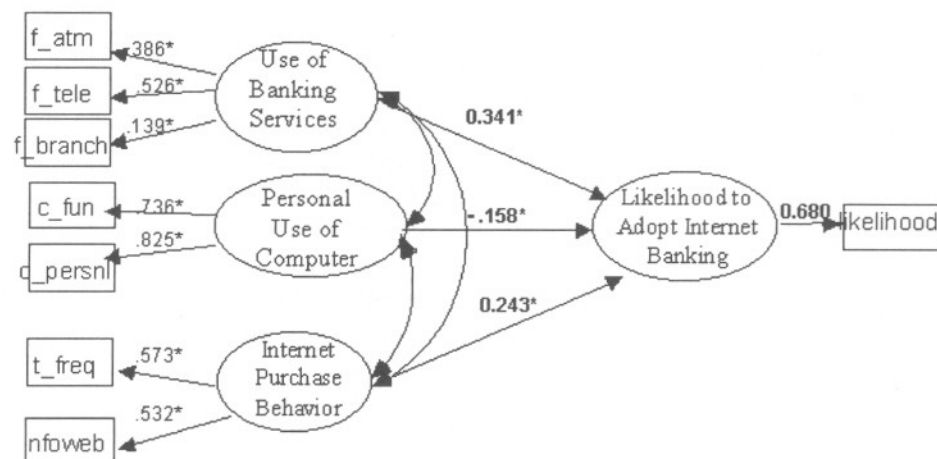
Every path from the manifest variables to the latent variables is significant in the final model, indicating a good simple structure (see Table 2). All three hypothesized relationships, H1-H3, were supported.

Specifically, frequent use of banking services (visiting bank branch, and using ATM and telephone banking) was found to increase non-adopters' future likelihood of adopting Internet banking ($t = 3.899$, $p < 0.05$; H1 supported). No positive relationship was found between consumers' personal use of computers and their likelihood of adopting Internet banking ($t = -3.038$, $p < 0.05$). Previous Internet purchase behavior positively affected consumers' likelihood of adopting Internet banking ($t = 3.129$, $p < 0.05$; H3 supported).

The personal use of computers (for fun and play), which was conceptualized as a skill irrelevant to Internet banking, had a negative impact on consumers' likelihood of adopting Internet banking ($t = -3.038$, $p < 0.05$). This negative impact indicates that a consumer's use of computers primarily for entertainment and fun can, in fact, interfere with his/her likelihood of using of computers for Internet banking.

Regarding the relationships among the factors, it was found that prior Internet purchase experience and the personal use of computers (for fun and play) were positively correlated ($t = 4.630$, $p < 0.05$). The Internet and computers are thought of as complementary technologies in using Internet banking. Therefore, this significant correlation supports the logic that consumer adoption of one technology is associated with another, complementary technology (Bayus 1987). In addition, Internet purchase behavior was found to be positively correlated with frequent use of banking services ($t = 2.302$, $p < 0.05$), indicating that consumers with more financial resources are more likely to use banking services and make Internet

FIGURE 1
Non-Adopters' Likelihood of Adopting Internet Banking: A Structural Equation Model



Chi Square= 50.546 @ df 16, p=.000
 GFI= .989, AGFI= .974
 CFI= .956, RMSEA= .044, P close=0.747

TABLE 2
Structural Equation Modeling Estimation Results

Path	Regression Weights ^a	Standardized Coefficient	t-value
Likelihood to adopt Internet banking <- Use of Banking Services	0.320	0.341	3.899*
Likelihood to adopt Internet banking <- Internet Purchase	0.229	0.243	3.129*
Likelihood to adopt Internet banking <- Personal Use of Computer	-0.148	-0.158	-3.038*
F_ATM <- Use of Banking Services	0.472	0.386	6.549*
F_Tele <-Use of Banking Services	0.661	0.526	7.195*
F_Branch <-Use of Banking Services	0.132	0.139	2.836*
T_Freq <-Internet Purchase	0.713	0.573	7.367*
infoWeb <-Internet Purchase	0.738	0.532	7.280*
C_Persnl <-Personal Use of Computer	0.880	0.825	12.611*
C_Fun <-Personal Use of Computer	0.880	0.736	12.611*
Internet Purchase <- Personal Use of Computer		0.341 ^b	4.630*
Use of Banking Services <-Internet Purchase		0.135 ^b	2.302*
Use of Banking Services <- Personal Use of Computer		0.069 ^b	1.219

^a Maximum Likelihood Estimates

* : significant path, $p < 0.05$

^b correlation estimates

purchases than less affluent consumers. However, there was no significant relationship between use of banking services and personal use of computer.

Model Validation with Regression Analysis

The effects within the structural equation model were put to a test using another analytical method (regression analysis) in order to verify that these effects were not biased by a specific methodology. The results of the regression analysis are presented in Tables 3 and 4.

We found that the effects of ATM use ($b=0.091$, $p=0.004$) and telephone banking use ($b=0.101$, $p=0.001$) on consumers' likelihood of adopting Internet banking were significant, whereas frequency of bank visits was not significantly associated with consumers' likelihood of adopting Internet banking (see Table 3). Internet purchase behavior was

positively associated with consumers' likelihood of adopting Internet banking. Specifically, consumers who frequently purchased products online in the past 12 months ($b=0.068$, $p=0.003$), and those who were willing to provide information via the Internet ($b=0.108$, $p=0.001$) were likely to adopt Internet banking in the next 12 months. These patterns of effect are consistent with the findings from the structural model.

However, the effects of the two variables from the personal use of computer factor -- use of computer for fun/play ($b= -0.005$, $p=0.616$), and use of computer for personal reasons ($b= -0.058$, $p=0.138$) -- on consumers' likelihood of adopting Internet banking were found to be insignificant. The insignificance of the personal use of computers in the regression model shows a difference from the significant negative relationship found in the structural equation model. However, an

examination of diagnostic statistics revealed that these two variables of the personal use of computer are collinear, as indicated by the high reliability alpha and the multicollinearity index. Gutman's split alpha between these two variables was 0.79. In addition, the variance inflation factors (VIF) were 1.624 and 1.667, for C_Fun and C_Persnl, respectively. Therefore, an additional regression model was fit by dropping one variable (C_Fun), while keeping all the other independent variables (see Table 4).

TABLE 3
Regression Estimation Results

Variables	Regression Weights	Standardized Coefficient	p-value
F_ATM	.103	.091	.004*
F_Tele	.109	.101	.001*
F_Branch	.018	.013	.670
T_Freq	.075	.068	.038*
infoWeb	.107	.108	.001*
C_Persnl	-.070	-.058	.138
C_Fun	-.006	-.005	.616
Age	-.016	-.014	.669
Education	.021	.014	.670
Income	.037	.050	.128

* : significant path, $p < 0.05$

Significance of the Regression Model: $F = 6.395$, @ $df = 10$, $p = 0.000$
 $R = 0.242$, $R^2 = 0.059$

TABLE 4
Regression Estimation Results

Variables	Regression Weights	Standardized Coefficient	p-value
F_ATM	.103	.091	.004*
F_Tele	.109	.101	.001*
F_Branch	.018	.013	.674
T_Freq	.075	.068	.038*
infoWeb	.107	.108	.001*
C_Persnl	-.074	-.061	.054
Age	-.016	-.014	.669
Education	.021	.014	.664
Income	.037	.050	.128

* : significant path, $p < 0.05$

Significance of the Regression Model: $F = 7.110$, @ $df = 9$, $p = 0.000$
 $R = 0.242$, $R^2 = 0.059$

The effect of personal use of computers on consumers' likelihood of adopting Internet banking was significant at a level of 0.10 ($b = -0.061$, $p = 0.054$). It was the same negative effect pattern as that of the structural equation model. In addition, all the other effects remained the same as the first regression analysis (see Table 4). Therefore, we

concluded that three effects (use of banking services, Internet purchase experiences, and personal use of computers) within the structural equation model were not plagued with a specific method bias.

Interestingly, none of the demographic variables were found to have significant impacts on consumers' likelihood of adopting Internet banking. Since financial institutions use segmentation strategies based on demographics, these results suggested that developing adopter profiles of Internet banking solely based on age, income, and education would be ineffective. Unlike findings from previous diffusion studies, our results suggest that the most likely prospective adopters of Internet banking exist among current users of ATMs, telephone banking, and among the Internet purchasers, and cannot be captured by the traditional demographic profiles.

DISCUSSION

This study investigated whether consumers' adoption of Internet banking is need-based or skill-based. Specifically, structural equation modeling was used to test three hypotheses regarding the impacts of use of banking services (banking need), Internet purchase behavior (relevant skills), and personal use of computers (irrelevant skills) on current non-adopters' likelihood of adopting Internet banking technology in the near future (within 12 months). The effects of these need- and skill-based factors found within the structural equation model were then verified by regression analysis.

The results indicated that consumers who used banking services frequently were the most prospects for future adoption of Internet banking. Heavy users of banking services have a strong need for the convenience of Internet banking service. Non-adopters' adoption of Internet banking is, therefore, primarily motivated by their needs for convenient banking services. Based on these results, we suggest financial institutions should first promote Internet banking to their existing customers. Banks would be better off by communicating the advantages of Internet banking to their existing

customers than marketing these services to tech-savvy consumers who are not current customers.

The fact that a sizable number of households now have Internet access and are buying goods and services on the Internet indicates an optimistic future for Internet banking. This increasing number of Internet shoppers will widen the population of future Internet banking users, because Internet shoppers are likely to add banking to their list of online activities in the future. This study demonstrates that consumers who have purchased products or services over the Internet are also likely to adopt Internet banking as well. Acquired expertise and reduced perceived risk may explain this synergistic adoption effect. If a consumer uses the Internet to buy products/services, in doing so he/she acquires knowledge and skills to conduct financial transactions over the Internet. In addition, successful Internet purchase experiences seem to reduce consumers' perceived risks with regard to adopting Internet banking in the future.

This study also found that the casual users of computers (consumers who use computers primarily for personal reasons and for fun or play) might not be a profitable target segment for institutions who offer Internet banking. Although casual computer users may have computer skills, their motivation for using computers is not particularly relevant to Internet banking. Therefore, this class of computer users is not necessarily more likely to adopt Internet banking.

CONCLUSIONS AND IMPLICATIONS

This study examined the need- and skill-based factors as well as demographic characteristics affecting the non-adopters' future adoption of Internet banking. We found that adoption of Internet banking is both need- and skill-based decision because the non-adopters' future adoption of Internet banking is guided by their existing banking needs, and will be significantly facilitated by having relevant skills.

The need-based adoption of Internet banking demonstrates the importance for bank marketers who seek widespread diffusion of Internet banking to focus on the existing bank customers within the large

non-adopter populations. Furthermore, the skill-based nature of adoption of Internet banking emphasizes the importance of customer education particularly for those who have the needs for banking services yet are technically not so savvy, and consequently cannot adopt Internet banking.

Finally, we found that the impacts of consumer demographic factors on the future adoption, such as age, education, and age, are not as strong as the effects of the skill- or need-based factors. Marketers are warned against depending solely on consumer demographics to predict the non-adopters' future adoption of Internet banking.

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