AN EMPIRICAL INVESTIGATION OF INTERNET BANKING IN TAIWAN

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ABSTRACT

This paper investigates Internet banking adoption among Taiwanese bank customers. The paper examines the affect of involvement using TAM (technology acceptance model). From the PII (Personal Involvement Inventory) scales, the results indicate that involvement is significantly influenced by the characteristics of the person, stimulus and the situation. Two sets of regression analysis were conducted for the current study. The first analyze the direct influence of two factors, belief of perceived usefulness and perceived ease of use. The second set investigates the affect of involvement on perceived usefulness and perceived ease of use in determining behavioral intention. The study found perceived usefulness is strongly influenced by high involvement. Likewise, the study found that low involvement is strongly related to perceived ease of use. In determining behavioral intention, both high and low involvement significantly influence perceived usefulness and perceived ease of use, respectively.

JEL: M30, M31

KEYWORDS: Internet Banking, Technology Acceptance Model, High Involvement, Low Involvement, Taiwan

INTRODUCTION

Prior to the Internet revolution, traditional brick and mortar banking was been the mainstay for years in the banking industry. Today, the emergence of Internet banking offers a self-service channel. To some extent, the acceleration of Internet banking can be attribute to consume dissatisfaction with the time and effort required for conventional banking (Karjaluoto, Koivumaki and Salo, 2003). At present banks' use Internet banking as ways to (1) lowering their operating costs, and (2) for market penetration (Cheng, Lam and Yeung, 2006; Pikkarainen, Pikkarainen, Karjaluoto, and Pahnila, 2004). Moreover, by offering Internet banking, banks' are capable of using cheaper delivery channels in their banking products, and reducing the operation of having physical branch networks. To realize these benefits, the banking industry is investing billions of dollars in providing and improving the Internet banking system for its customers (Bauer, Hammerschmidt and Falk, 2005). However, because of problems with connectivity and difficulties in cultivating awareness (Mols, Bukh, and Nielsen, 1999; Sathye, 1999), banks are facing difficulties in educating their customers to accept this new medium of banking. Robinson (2000), found that half of the people that have tried Internet banking services do not become an active user. Earlier studies on online adoption show risk concerns have been the main factor hindering consumers from using Internet banking. There is also evidence indicating that lacking elements of social dimension delay consumers shifting from the conventional to internet banking (Mattila, Karjaluoto and Pento, 2003).

In 2006, approximately 15.4 million people were using the Internet in Taiwan (Investin Taiwan.nat.gov.tw). Out of this, only 53 percent of users use the Internet for their banking transaction (ithome.com, 2008) with information enquiries on bill payments and account transactions accounting for the largest portion of the usage (86 percent). However, this is still marginal compared to the total numbers of Internet users in Taiwan. The current study posits that involvement may have direct influence on the Internet banking adoption.

Earlier studies have extensively investigated both the usefulness and ease of use as main factors influencing technology adoption. Conversely, only few studies have investigated TAM in conjunction with involvement. This study measures involvement as three characteristics involving the person, situation and the stimulus. We develop the following three research questions to facilitate the current study: (1) what are the antecedents of involvement in the Internet banking adoption? (2) to what extent the involvement with Internet banking influences perceived usefulness and perceived ease of use? (3) What are the affects of involvement on both the perceived usefulness and perceived ease of use in determining behavioral intention? Given these important elements, the main objective of this study is to (1). Investigate the influence of involvement on TAM in the adoption of Internet banking in Taiwan; and (2) extends "consumer involvement" into TAM. The discussion is organized as follows: First the theoretical background and research hypotheses are presented. Second, the paper explains the research design and methodology used for this study. The third and fourth sections discuss the results and analysis, and the conclusion and managerial implications.

THEORETICAL BACKGROUND

The literature has used a variety of theoretical frameworks to explain online behavior in a range of online contexts (McKechnie, Winklhofer and Ennew, 2006; Wang et al., 2003). Among these different contemporary models, the technology acceptance model (TAM) (Davis, 1989) has been widely used. Adopted from the theory of reasoned action (TRA) (Ajzen, 1985), TAM offers a parsimonious wealth of empirical evidence to support its core argument. TAM posits that the adoption behaviors are determined by the intention to use a particular system, which is based on two key beliefs of (1) perceived usefulness and (2) perceived ease of use. By perceived usefulness, a person believes that using a particular technology would help increase his/her performance. Whereas, perceived ease of use focuses on if a person perceives the technology is easy to use and useful for him/her.

Along the same line, an important construct that has received less attention in the domain of technology adoption is "involvement". We believe understanding the effect of involvement on TAM in Internet banking adoption will offer valuable insights both theoretically and practically. The current study presumes that inherent differences in the characteristics of a person, situation and the stimulus may influence the involvement level. Moreover, the level of involvement also relates with personal relevance, which entails different manifestation of need, values and interest (Howcroft and Hamilton, 2005; Petty, Cacioppo and Schumann, 1983; Zaichkowsky, 1994)

Factors Influencing Level of Involvement

The current study defines "involvement" as *"a person's perceived relevance of the object based on inherent needs, values and interest"* (Zaichkowsky, 1985, 1994), with the antecedents of (1) characteristics of the person and (2) characteristics of the stimulus and (3) situation all being influential in causing change.

We found previous studies on "demographics" offer many valuable explanations for the "characteristics of a person." From gender studies, men were found to exhibit masculinity (Bem, 1981), and prone to be more task oriented (Minton and Schneider, 1980) than women. Moreover, studies also indicate males have higher technology interests and are more willing to experiment with new ideas on the web (Sorce, Perotti and Widrick, 2005). In the mental processing method, men are likely to used schema-based processing (Meyers-Levy and Maheswaran, 1991). In comparison, females are more comfortable in using detail mental processing and exhibit greater sensitivity in making their judgments (Meyers-Levy & Sternthal, 1991). Other factor that may also influence the involvement level in technology adoption is "age". Studies show that internet technology is commonly used by younger people (Donthu and Garcia, 1999; Joines et al., 2003; Korgaonkar & Wolin, 1999). Another interesting finding by Howcroft and

Hamilton (2005) is that people who are both earning more income and highly educated are likely to demonstrate confidence when using financial services. The current study theorizes that gender differences, age, IT literacy, mental processing, income and education level may have profound influence on the characteristics of a person (Balabanis & Vassileiou, 1999; Devlin & Yeung, 2003).

For the "characteristics of the stimulus", studies indicate consumer involvement levels with financial services vary on the type of activities involved. This is because the customer will have different perception of risks for different types of financial products and services (Black et al., 2002; Howcroft et al., 2002). Similarly, internet use was also found to be closely associated with security and risks issues (Howcroft et al., 2002). Therefore, we expect both these factors will influence customer adoption of internet banking. The final factor that we assume to influence the level of involvement is the "situation". Joines et al., (2003) found that internet access points influence the length of usage. For instance, a user accessing internet banking from home may feel more convenience and secure in comparison to places like work or a public access point. Places that offer convenience are likely to influence the length of usage; thus, influencing the involvement level with Internet banking. In line with these discussions, we develop the following hypotheses:

H_1: *Characteristics of a person, stimulus and situation will significantly influence the consumer level of involvement.*

Technology Acceptance Model

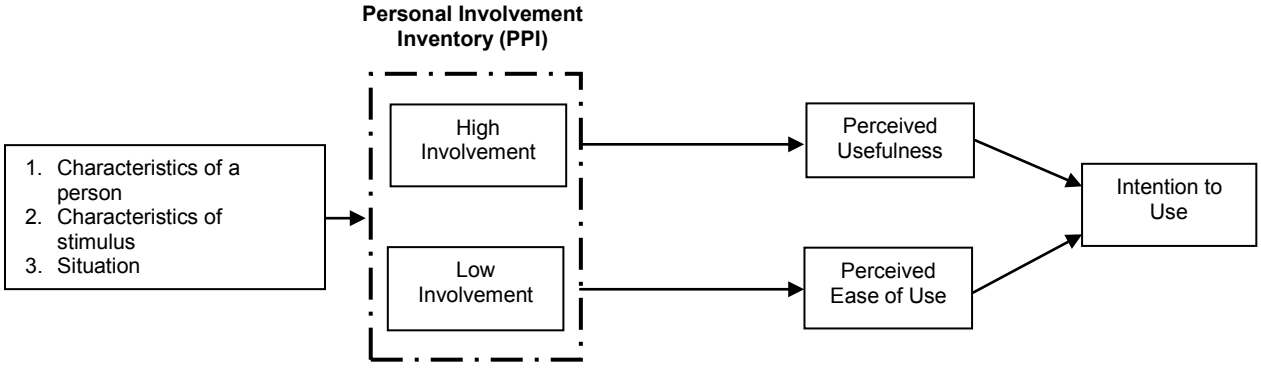
Research relative to the theories of involvement has viewed people behavior as a two-fold dichotomy of low and high involvement (Petty et al., 1983; Zaichkowsky, 1985, 1994). From the elaboration likelihood model (ELM), a person who is high in involvement will make an inference using the central route of persuasion. In contrast, the peripheral route will be more influential for a person who is low in involvement. By central route, a person promotes high elaboration, and involve giving careful scrutiny to determine the salient merits on the context that is under consideration. For the peripheral route, on the other hand, a person is assumed to make a simple inference based on various simple cues. In the same manner, the current study expects a person who is "high involvement" will value the overall "usefulness" of internet banking (e.g. increase efficiency or better performance). Likewise, a person who is "low involvement" will value the "ease of use" associated with internet banking (e.g. easy to use or less mental effort). Along the same lines, we posit perceived usefulness positively influences behavioral intentions strongly by high involvement. Whereas, the perceived usefulness positively influences behavioral intention for low involvement. Following this discussion, the study hypotheses are proposed:

H_2: *High involvement will strongly relate with perceived usefulness.*
H_3: *Low involvement will strongly relate with perceived ease of use.*
H_4: *Perceived usefulness positively influences the behavioral intention strongly by the high involvement.*
H_5: *Perceived ease of use will positively influence behavioral intention strongly by the low involvement.*

MODEL FRAMEWORK

Figure 1 shows the study model framework. To fit the current study, we modify the original elements in the TAM model to accommodate the present study. The characteristics of a person, characteristics of a stimulus and situation were used to measure the level of customer involvement in internet banking. The high involvement group is assumed to have strong relationship with perceived usefulness. Similarly, the low involvement group has a strong relationship with perceived ease of use. The current study excluded the "attitudes" construct to simplify the model (Venkatesh and Morris, 2000; Venkatesh and Davis, 2000; Wang et al., 2003). Finally, using the consumer's level of involvement, we test the relationship between perceived usefulness and perceived ease of use in determining behavioral intention.

Figure 1: Model Framework



The figure shows the three antecedents influencing the level of involvement. High involvement influences perceived usefulness and low involvement influences perceived ease of use.

RESEARCH DESIGN AND METHOD

Survey Measures

Employing items from the TAM and PII, provides the content reliability and validity for the current study (Peter and Churchill, 1986). All items are originally developed in the English language, and we later translated these items into the Chinese language using three local translators. We performed another back-translation on the items to ensure translation accuracy. A pre-test was conducted on ten English teachers in Taiwan. Based on the feedback, we made minor modifications to the questionnaire to improve its overall readability. A satisfactory result was achieved with factor loadings ranging from 0.6 to 0.9 and Cronbach alpha exceeding 0.80 for the PII 20 items scale and the three construct of TAM (perceived usefulness, perceived ease of use and behavioral intention).

The consumer state of involvement was measured using a 20 items scale developed by Zaichowsky's (1985). The scale is a seven-point semantic differential scale that measures three constructs: (1) interests, (2) needs and (3) values (Aldlaigan and Buttle, 2001). For the PII questions, we asked the respondent to rate their level of involvement with internet banking. A breakdown of scores from low (20) to high (140) is used to indicate the level of consumer involvement. To fit the current study, cluster analysis was performed to categories between low and high involvement. A cut-off point with scores of 89.55 is used as a mean for the categorization. A score between the ranges of 20 to 89.54 was categorized as low involvement. Score between the ranges of 89.56 to 140 were categorized as high involvement (Zaichkowsky, 1985). Table 1 shows the distribution of the scores. Items for perceived usefulness, perceived ease of use and behavioral intention were adapted from previous studies. These items were later modified to fit with the study. All the items were measured by likert scales, with anchors ranging from 1 "strongly disagree" to 7 "strongly agree".

Sample

In total, 220 questionnaires were distributed using Taiwanese respondents as sample for the study. Seventeen were found to be faulty, leaving 203 usable respondents with an effective response rate of 92.3 percent. Of the 203 respondents, 56 percent were female and the majority of the respondents were between the ages of 30 to 43 (74 percent). Four percent had completed high school and 68 percent and 28 percent had finished the bachelor and postgraduate level respectively. Seventy-five percent of the respondents were from the high-income group (USD 1, 500 and higher). A majority of the respondents indicated having no difficulty with internet technology, with 40 percent having more than 5 years of

experience. As access point, a majority of our study sample indicated accessing the Internet from either their home (49 percent).

Table 1: Low and High Involvement

Involvement score	*Number (N=203)*	*Percentage*	*Involvement degree*
20 – 89.54*	76	37.4	Low
89.56 -140**	121	62.6	High

*The total scores were calculated using 20 items (seven-point semantic differential scale) *low involvement, **high involvement*

DATA ANALYSIS AND RESULTS

The study first sought to determine the influence of a person's characteristics, stimulus, and situation on consumer internet banking involvement. The study used internet banking as the stimulus, and both the characteristics of a person and situation measured using the demographic variables and the access point respectively. From the chi-square analysis, consumer level of involvement with internet banking was significantly related to (1) gender, (2) age group, (3) education (4) income (5) computer literacy and (6) access point. Thus, H1 was supported (Table 2). The results show the low involvement members were females, between the ages of 44 and 62, lower levels of education, lower income levels and a beginner with internet technology. In comparison, the members for the high involvement are males, between the ages of 30 to 43 years old, well educated, high income levels and familiar with the Internet technology.

Table 2: Chi-square Analysis

	Degree of involvement with Internet banking		
Demographic item	Chi-Square (p)	Low	High
Gender	4.577*	Female	Male
Age group	20.958*	44–62 years old	14 – 29 years old 30 – 43 years old
Education	5.519***	Senior high school	University/Bachelor Postgraduate
Income	33.709*	Low	Medium High
Computer literacy	16.765*	Beginner	Advance Intermediate
Access Point	23.575**	Work	Home Both

*The table shows the group of consumers under the low and high involvement. *p < 0.05, **p<0.01, ***p<0.001*

To purify the measurement scales and to identify their dimensionality for the TAM constructs, the study used the principal components factor analysis with varimax rotation. Item-to-total correlation and internal consistency analysis (Cronbach alpha) were employed to confirm the reliability of each factor. Factor loadings of .60 were used for every item to identify correlation. The Cronbach alpha (Hair, et al. 2006; Nunnally, 1978) and item-to-correlation of 0.70 and 0.50 respectively were used as a general guidelines throughout the computation. As result in Table 3, all variables within a factor tend to have a high coefficient of item-to-total correlation and the high coefficient of Cronbach alpha on each factor further confirms the reliability of the measurement items.

Two sets of regression analysis were performed for the study. On the first set of the regression analysis, the study found significant differences on all the constructs of TAM for perceived usefulness and perceived ease of use with consumer levels of involvement (low and high). As the results show, there is a significant relationship between high involvement and the perceived usefulness. (β = .563, p 0.01) supporting *H2*. In addition, the low involvement consumers are also significantly related with perceived ease of use (β = .458, p 0.01); thus, supporting *H3* (see, Table 4).

Table 3: Factor Analysis and Cronbach Alpha

Research constructs	*Research items*	*Factor loading*	*Item to total correlation*	*Cronbach's α*
				.968
Perceived usefulness	I find the system to be useful in my job.	.971	.947	
	Using the system enhances my effectiveness in my job	.970	.946	
	Using the system improves my performance in my job	.960	.927	
	Using the system in my job increases my productivity.	.921	.864	
				.853
Perceived ease of use	I find it easy to get the system to do what I want it to do.	.884	.770	
	I find the system to be easy to use.	.867	.732	
	My intention with the system is clear and understandable.	.838	.703	
	Interacting with the system does not require a lot of my mental effort.	.750	.587	
				.987
Intention to use	Given that I have access to the system, I predict that I would use it.	.993	.974	
	Assuming I have access to the system, I intend to use it.	.993	.974	

The table shows exploratory factor analysis on TAM three construct of (i) perceived usefulness, (ii) perceived ease of used and (iii) intention to use Indices used for the EFA were (i) factor loading of more .60, (ii) item-to-total correlation of .70 and (iii) Cronbach alpha of .50.

Table 4: Consumer Involvement on Perceived Usefulness and Perceive Ease of Use

Dependent factors	Perceived Usefulness		Perceived Ease of use	
	M1	M2	M3	M4
Independent factors				
Consumers involvement (Low level of involvement)	.505*		.458*	
Consumers involvement (High level of involvement)		.563*		.417*
R^2	.544	.785	.696	.411
F	25.324	58.096	19.671	26.301
P	.000	.000	.000	.000
D-W Stats	2.236	1.693	2.198	1.973

*The table shows the result of analysis on TAM key belief with the low and high involvement. M1 indicates the correlation between low involvement with PU, M2 (correlation between high involvement with PU), M3 (correlation between low involvement with PEOU), M4 (correlation between high involvement with PEOU). * p < 0.01, ** p < 0.05; ***p<0.1*

The study developed a second set of regression analysis to conduct a test on the TAM measurement model (Table 5). The result supported both H4 (β = .861, p 0.01) and H5 (β = .542, p 0.01) as both low and high consumer involvement influence the two key beliefs of perceived usefulness and perceived ease of use in determining behavioral intention.

DISCUSSION

From a theoretical standpoint, the current study offers a new perspective for explaining the factors affecting TAM models. This study addresses the questions of (1) what are the antecedents of involvement in Internet banking adoption? (2) To what extend the involvement with Internet banking influence perceived usefulness and perceived ease of use? (3) What are the affects of involvement on the both the perceived usefulness and perceived ease of use in determining behavioral intention? The current study found members with high internet banking involvement to be males between 30 and 43 years old, highly educated, high income and already familiar with the Internet technology.

This study further tested the influence of involvement on TAM's two key beliefs of (1) perceived usefulness and (2) perceived usefulness. The study found high involvement consumers emphasize the overall "usefulness" of Internet banking (e.g. increase efficiency or better performance). In comparison,

low involvement consumers value the "ease of use" associated with internet banking (e.g. easy to use or less mental effort). Similarly, the study found both the perceived usefulness and perceived ease of use positively influence the behavioral intention s by high (for PU) and low (for PEOU) involvements, respectively.

Table 5: Determining Behavioral Intention

Dependent factors--Intention to use	M1	M2	M3	M4
Independent factors				
Perceived usefulness (Low level of involvement)	.604*			
Perceived usefulness (High level of involvement)		.861*		
Perceived ease of use (Low level of involvement)			.542*	
Perceived ease of use (High level of involvement)				.357*
R^2	.488	.741	.633	.417
F	42.482	356.986	11.517	38.621
P	.000	.000	.000	.000
D-W Stats	2.122	2.106	1.989	1.996

M1 denotes the relationship between PU (low involvement group) with behavioral intention, M2-- relationship between PU (high involvement group) with behavioral intention, M3-- relationship between PEOU (low involvement group) with behavioral intention, M4-- relationship between PEOU (high involvement group) with behavioral intention.
** p < 0.01, ** p < 0.05; ***p<0.1*

Managerial implications and future research

The current study offers new insights on the influence of consumer involvement in Internet banking adoption. From the results of the demographic characteristics, the results suggest a differentiation strategy targeting specific groups may positively attract potential bank customers. Instead of treating the consumers homogenously, the bank should try to specifically cater their promotions based on consumer involvement levels. Noteworthy, is that the majority of low involved consumers are also baby boomers, which also happen to be the most affluent in comparison to the others group of consumers. Furthermore, banks may also want to re-evaluate its approach to the female market segment, since females were found to be less involved with internet banking. For example, offering information on "how to use the system" using step-by-step procedures would be practical. For managers, the high involvement group also offers the potential to be a focus group for the bank's new products and services.

One potential limitation of this study is the exclusion of other factors in measuring consumer involvement. Future study should include other factors in predicting consumer levels of involvement. In particular, how different internet banking products or services affect the level of involvement? For instance, on some specific products or services such as opening an account online, applying for loan online or investing in stocks online. Furthermore, this study was conducted in Taiwan. More study is needed in generalizing and validating the findings of this study.

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