EXAMINING THE DETERMINANTS OF INTERNET BANKING USAGE INTENTION USING THE EXTENDED TECHNOLOGY ACCEPTANCE MODEL

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DECLARATION

The materials in this thesis are original except for quotations, excerpts, summaries and references, which have been duly acknowledged.

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ABSTRAK

KAJIAN TENTANG FAKTOR-FAKTOR PENENTU TERHADAP KEINGININAN UNTUK MENGGUNAKAN PERBANKAN INTERNET DENGAN MENGGUNAKAN MODEL LANJUTAN PENERIMAAN TEKNOLOGI

Peningkatan dalam penggunaan Internet yang mendadak dan tumpuan untuk mengagihkan peruntukan besar kepada pembangunan bank elektronik telah mengamit perhatian para pengkaji dalam bidang perbankan Internet. Pada masa dahulu, tumpuan kajian terhadap perbankan Internet biasanya menjurus kepada pembangunan teknologi sahaja, tetapi sekarang ia telah menumpuh kepada penggunanya. Para pengkaji dalam bidang ini telah menunjukkan bahawa para pengguna tidak mungkin menggunakan khidmat perbankan Internet walaupun kemudahan ini disediakan. Keadaan ini menunjukkan keperluan untuk mengadakan kajian tentang faktor-faktor penentu terhadap keinginan untuk menggunakan perbankan Internet. Berdasarkan Model Penerimaan Teknologi (TAM), persepsi mudah pakai dan persepsi perlu pakai merupakan faktor-faktor asas dalam menentukan penerimaan dan penggunaan pelbagai jenis teknologi maklumat (IT). Walaubaimanapun, keadaan ini tidak dapat menjelaskan gelagat pengguna terhadap penerimaan kewujudan IT baru, seperti perbankan Internet. Kajian ini menggunakan Model Lanjutan Penerimaan Teknologi sebagai kerangka teori di mana "persepsi kredibiliti" diguna sebagai satu angkubah tambahan untuk menerangkan keperluan menjaga keselamatan dan kesulitan maklumat peribadi bagi seseorang pengguna dalam perkhidmatan perbankan Internet. Kajian ini juga meninjau kesan faktor-faktor kecekapan diri dalam menggunakan komputer dan pengalaman umum terdahulu menggunakan komputer terhadap gelagat keinginan untuk menggunakan khidmat perbankan Internet. Berdasarkan 133 bilangan sampel yang telah dikumpul secara rawak melalui soal selidik, hasil kajian menyokong penuh kemampuan lanjutan TAM dalam meramalkan gelagat keinginan para bukan pengguna perbankan Internet untuk menerima kemudahan tersebut. Hasil kajian menunjukkan persepei mudah pakai dan persepsi perlu pakai merupakan faktor-faktor penentu utama untuk menerima penggunaan perbanbkan Internet, dan persepsi kredibiliti tidak mempengaruhi keinginan secara langsung. Kecekapan diri dalam menggunakan komputer adalah faktor pengantara hubungan persepsi perlu pakai, persepsi mudah pakai dan persepsi kredibiliti dengan gelagat keinginan. Pengalaman umum terdahulu menggunakan komputer bukanlah faktor penentu langsung kepada gelagat keinginan.

ABSTRACT

EXAMINING THE DETERMINANTS OF INTERNET BANKING USAGE INTENTION USING THE EXTENDED TECHNOLOGY ACCEPTANCE MODEL

The rapid increase of Internet usage and the huge funding allotted to electronic banking have drawn the attention of researchers towards Internet banking. In the past, the conventional concentration of Internet banking research has been on technology development, but this is now shifting to user-focused research. Researchers in this field have indicated that potential users may not adopt the systems even if they are available. This shows the need for research to examine the factors that determine usage intention of Internet banking in banking transactions. According to the Technology Acceptance Model (TAM), perceived ease of use and perceived usefulness factors are considered to be fundamental in determining the acceptance and use of various information technology (IT). However, these beliefs may not fully clarify the user's behaviour toward newly emerging IT, such as Internet banking. This study therefore employs the extended technology acceptance model as the theoretical framework where it introduces "perceived credibility" as a new variable that expresses the non-user's concern for security and privacy in Internet banking systems. This research also scrutinises the effect of computer self-efficacy and prior general computing experience on the intention to use Internet banking. Based on a sample of 133 non-users of Internet banking collected through a personally administered questionnaire, the results strongly support the extended TAM in predicting the intention of non-users to adopt Internet banking. The result of the study indicates perceived usefulness and perceived ease of use as strong determinants of behavioural intention to adopt Internet banking, while perceived credibility has no direct relationship with intention. However, perceived credibility has a mediator effect between computer self-efficacy and intention. There is also a significant indirect effect of computer self efficacy on behavioural intention through perceived usefulness, perceived ease of use and perceived credibility. Prior general computing experience only affects behavioural intention indirectly via perceived usefulness. The study shows the appropriateness of TAM in understanding the way of consumers' intention in the adoption of Internet banking.

CHAPTER 1

INTRODUCTION

1.1 Overview

About a decade ago, Internet was relatively alien to the majority population of the world. However, at the turn of the new millennium millions of Web sites were found in place (O'Connor & Galvin, 2001:14). The rapid development of information technology had brought unprecedented influence on the life of millions of people around the globe. Various activities were handled electronically through the adoption of IT in the workplace or at home, for example, e-mail, e-commerce and e-government. The Internet had become a significant part of daily life for both consumers and business enterprises especially in developed countries such as the U.S.A., Europe and Japan.

The Internet had shrunk time and distance to many transactions. Internet marketing tended to become common phenomena in developed economies, and the developing countries found no alternative but to struggle to keep abreast with the development and usage of new IT. Internet banking is an area that needs to be developed fast in developing economies. A consolidation exercise of Malaysia's banks and other financial institutions in year 2000 had transformed the Malaysian banking landscape. In 2001, the Malaysian Financial Sector Masterplan was launched. This would chart the development of the country's financial sector over the next decade. Malaysia now has just ten large banking groups comprising ten commercial banks, nine merchant banks and eleven finance companies.

ASLI (2002:81-82) reported that in response to increased competition, the larger banks in Malaysia had aggressively leveraged the Internet. Local banks were given 18-month head start over foreign banks to launch online banking. With the

authorities pushing domestic banks to invest in technology to compete with global players, Internet banking is expected to expand strongly in the near future. Hong Kong and Shanghai Banking Corporation (HSBC) Bank Malaysia commented in ASLI (2002:81) that "Internet banking is definitely getting hot in Malaysia". HSBC Bank Malaysia was the first foreign-controlled bank to launch a fully transactional Internet banking service starting in January 2002 when regulations permitted foreign banks to do so.

Despite the authorities' encouragement to adopt technology in banking, traditional branch-based retail banking still remains the most common method for conducting banking transactions in Malaysia as well as in any other country. However, Internet technology is rapidly changing the way personal financial services are being designed and delivered. This reflects an encouragement to adopt Internet banking as well.

In general, the explosion of Internet usage and the huge funding initiatives in electronic banking had drawn the attention of researchers towards Internet banking. In the past, the conventional concentration of Internet banking research had been on technology development, but this is now shifting to user-focused research. Wang *et al.* (2003) indicated that although millions of dollars had been spent on the setting up of Internet banking systems worldwide, potential users might still be sceptical to adopt the systems even if they were available. This indicates the need for research to examine the factors that determined usage intention of Internet banking. Based on the Technology Acceptance Model (TAM) (Davis, 1989; Davis *et al.,* 1989), Wang *et al.* (2003) adopted it and introduced *perceived credibility* as a new mediator that expressed the user's concern for security and privacy in the acceptance of Internet banking. This was in addition to the original TAM's intervening variables, the *perceived ease of use* and *perceived usefulness* used, which were considered to be fundamental in determining the acceptance and use of various information technology

(IT). However, these beliefs might not fully clarify the user's behaviour toward newly emerging IT, such as Internet banking.

Using the extended technology acceptance model (TAM) developed by Wang et al. (2003), the author in this research introduced *prior general computing experience* as a new independent variable in addition to *computer self-efficacy* in the theoretical framework. This model scrutinised the effect of computer self-efficacy and prior general computing experience on the intention to use Internet banking.

This study was a modified version of the research conducted on Internet banking in Taiwan by Wang *et al.* (2003). Their article was entitled "Determinants of User Acceptance of Internet Banking: An Empirical Study". Based on a random survey of 200 non-Internet bank customers in Sabah, Malaysia using validated questionnaires, the results were expected to strongly support the extended TAM in predicting the intention of users to adopt Internet banking. It also showed the significant effect of computer self-efficacy and prior general computing experience on behavioural intention through perceived ease of use, perceived usefulness, and perceived credibility.

1.2 Research Problem

Tan and Teo (2000) pointed out the case of Singapore whereby at as of March 1997, only five local banks in Singapore had their own corporate Web sites on the Internet. They were Development Bank of Singapore (DBS Bank), Overseas-Chinese Banking Corporation (OCBC), Overseas Union Bank (OUB), Post Office Savings Bank POSBank), and United Overseas Bank (UOB). However, with respect to providing Internet services, these banks adopted a somewhat conservative stance. According to Ng (1996), while local banks agreed that Internet banking services could take over routine banking transactions, customer contact was still important in value-added services such as investment advice. None of the banks would take the lead to offer

Internet banking services as they felt it might precipitate a change in the basis for competition. Moreover, customers were not really pressuring them to offer Internet banking services as yet (Tan and Teo, 2000).

In Taiwan, Wang et al. (2003) reported that in 2002, only about 1-3 percent of banking transactions in Taiwan were conducted via the Internet. Further, only a total of 1.25 million Taiwanese people reported having ever visited the Internet banking sites in May 2002 (Net Value, 2002) The figure represented only 19.6 percent of the Internet population in Taiwan.

In Malaysia, ASLI (2002:81), showed that Hong Kong and Shanghai Bank Corporation (HSBC) Bank Malaysia was the first foreign-controlled bank to launch a fully transactional Internet banking service in January 2002 when regulations by Bank Negara permitted foreign banks to do so. As a result, about one percent of HSBC Bank's retail customers had signed up to use its Internet banking service. The bank expected five percent of its customers to use the service by the end of 2002. Meanwhile, local banks were given an 18-month head start over foreign banks to launch online banking (ASLI, 2002:82). This implies that Internet banking service is still at the infant stage in Malaysia.

Despite the large financial expenditures spent on building the systems as commented by Wang *et al.* (2003), the potential users were still not prone to accept Internet banking (e.g. Malaysia). Efforts in Internet banking research had been bountiful with the conventional concentration on technology development. Today, researchers in this field are shifting to user-focused research. Wang *et al.* (2003) also indicated that potential users might not adopt the systems even if they had access to them. Interestingly, by January 1998, the conservative attitude toward offering Internet banking services took a more positive direction in Singapore (Tan and Teo, 2000). For example, United Overseas Bank and DBS Bank were already providing Internet Banking services. The researchers added that the banks in Singapore were

beginning to view Internet banking services as a strategic move to provide total distribution networks to their customers. In addition, by providing Internet banking services early, they would be able to position themselves as movers in the market. Internet banking in Singapore primarily offers traditional services (e.g. checking account, transfer funds) rather than enhanced services (e.g. brokerage) (Tan and Teo, 2000).

According to Teo and Tan (2000), it is apparent that the local banks in Singapore are jumping onto the wagon of Internet technology by providing Internet banking services. Despite the numerous studies conducted to investigate the acceptance of Internet banking and its impact on the banking industry (e.g. Booz-Allen & Hamilton, 1997; Seitz & Stickel, 1998), few were conducted from the perspective of consumer acceptance. As consumer acceptance is important in determining the feasibility and successful implementation of new, technology-based banking services (Dover, 1993). It is timely to undertake this study to provide greater insight into the consumer intentions to adopt Internet banking services.

The focus of this study is to understand the potential users' acceptance of Internet banking, and a need to identify the factors that can affect their intention to use Internet banking. The prime considerations include the extent the perceived usefulness, perceived ease of use and perceived credibility determined the intention of users to adopt Internet banking. It also demonstrated the significant effect of computer self-efficacy and computing experience on behavioural intention via perceived usefulness, perceived ease of use, and perceived credibility. Hence, the problem statements presented in this study are:

a) to what extent do perceived ease of use, perceived usefulness, and perceived credibility determine the intention of users to adopt Internet banking; and

b) to what extent do computer self-efficacy and prior general computing experience significantly influence behavioural intention through perceived usefulness, perceived ease of use, and perceived credibility.

1.3 Research Objectives

The primary objectives of this research are:

a) to examine the predictive power of the technology acceptance model (TAM) dimensions on the intentions to use Internet banking;

b) to understand the relationship between perceived usefulness, perceived ease of use, and perceived credibility in one hand and behavioural intention in the other;

c) to examine the influence of computer self-efficacy, prior general computing experience and (i) perceived usefulness, (ii) perceived ease of use, and (iii) perceived credibility; and

d) to investigate the mediation effects of perceived usefulness, perceived ease of use, and perceived credibility in the relationship between computer self-efficacy and prior general computing experience in one hand and behavioural intention in the other.

1.4 Scope of Study

The study attempted to evaluate the factors that determined the acceptance of Internet banking using the extended technology acceptance model (TAM). The scope of the study was to reveal the behavioural intention of an individual's acceptance of Internet banking. This research also identified critical individual's difference variables that included computer self-efficacy and computing experience that had significant effect through the TAM framework. The survey conducted in this study would include the users of banking services in Kota Kinabalu City, Sabah, Malaysia.

1.5 Significance of Study

This study has significant effects to the following individuals:

a) Policy makers;

b) Bankers; and

c) Potential users of Internet banking.

Generally, the government acts as the policy makers in setting direction for the economic development of a country. The Malaysian government encourages and adopts technology development in the financial sector. The development of the Multi-media Super Corridor and adoption of e-government and e-commerce bear testimony to this effort. The government controls and effects appropriate development changes (e.g. Internet banking) in the banking sector through the Bank Negara.

The banking sector in Malaysia definitely needs to keep abreast with the usage of technology development in banking systems, especially the adoption of Internet banking. By explaining usage intention from the user's perspective, the findings of this research might not only help Internet banking authorities to develop better user-accepted Internet banking, but also provide insights into how to present the new information technology (IT) to potential users.

1.6 Organisation of Study

This study comprised of five chapters. Chapter One presented the Introduction which discussed the topics on overview, research problem, research objectives, scope of study, significance of study, and organisation of study. Chapter Two was focused on Literature Review. This chapter included the topics on introduction, definition of concepts, previous studies on the relationship between technology acceptance and Internet banking and summary. Chapter Three was dedicated to Research Framework and Methodology. Topics discussed in this chapter were introduction, theoretical framework, definitions of variables, hypotheses, research design, instruments,

sampling design, data collection method and data analysis.

Chapter Four presented the Research Findings. Various topics were discussed in this chapter, including the introduction, respondents' profile, reliability of measures, means and standard deviations of variables, correlation analysis, and testing of hypotheses.

Finally, the Discussion and Conclusion were shown in Chapter Five. This included topics on introduction, discussion, implications of study, limitations of study, suggestions for future research, and conclusion. The references and appendices were also given at the end of this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In the early 1990s very few people had heard of Internet. At the beginning of the new millennium there were literally millions of Web sites in place (O'Connor & Galvin, 2001:14). The dazzling speed with which the Internet economy had brought significant impact upon public consciousness had left many questions in its wake. The direction was clear in e-commerce. The Internet had become an important part of everyday life for both consumers and business enterprises in developed economies throughout the world. The Internet was an important channel for information and for products that could be digitised. E-commerce was growing rapidly in both businesses to consumers (B2C) and business to business (B2B) markets.

The Internet was truly a global phenomenon, making both time and distance irrelevant to many exchanges. Governments had also embraced the Internet for their own use. Following the adoption of Internet marketing, Internet banking was next in line for use. The traditional establishment of banking services having branches in many places might be reduced in preference for Internet banking. This depended however, on how fast the users' adoption to Internet banking would be. Internet banking, that is conducting banking transactions through the Internet, was expected to grow slowly but surely in today's digital economy.

Several models have been developed to examine and understand the factors affecting the acceptance of computer technology in organisations. The theoretical models used to study user acceptance, adoption, and usage behaviour include the theory of Reasoned Action (TRA) (e.g. Fishbein & Ajzen, 1975; Ajzen &

Fishbein, 1980), Technology Acceptance Model (TAM) (e.g. Davis, 1989; Davis *et al.,* 1989; Moore and Benbasat, 1991; Venkatesh *et al.,* 2000; Ndubisi *et al.*, 2001; Wang *et al.,* 2003), the Theory of Planned Behaviour (TPB) (e.g. Ajzen, 1991, Mathiesen, 1991), the Model of PC Utilisation (Thompson, Higgins & Howell, 1991), the Decomposed Theory of Planned Behaviour (e.g. Taylor & Todd, 1995a; Tan & Teo, 2000), and Innovation Diffusion Theory (e.g. Rogers, 1983; Brancheau & Wetherbe, 1990; Agarwal & Prasad, 1997). Some of these studies were carried out at the individual level (e.g. Agarwal & Prasad, 1998), and some at the organisational level (e.g. Cooper & Zmud, 1990). TAM appeared to be the most widely accepted among information systems researchers. The reason for its popularity was probably because of its parsimony, and the wealth of recent empirical support for it (Agarwal & Prasad, 1999; Adams *et al.,* 1992).

According to TAM, the acceptance behaviour was determined by the intention to use a particular system. This in turn was influenced by the perceived usefulness and perceived ease of use of the system. Studies had been conducted by many information systems researchers. They had examined and replicated the TAM. There was a common agreement among them that the model was valid in predicting individual's acceptance of various corporate IT (Adams *et al,* 1992; Chin and Todd, 1995; Doll *et al.,* 1998; Segars and Grover, 1993). Hence, the model was well suitable for the current study.

However, an alternative research framework to understand the adoption of Internet banking services by customers would be based on the theory of planned behaviour (TPB) (Ajzen, 1985) and the diffusion of innovations theory (Rogers, 1983). Taylor and Todd (1995a) first introduced the decomposed TPB model. Tan and Teo (2000) applied the TPB model in their studies in Singapore since it was found to have better predictive power compared to the technology acceptance model (TAM) and traditional TPB models.

In comparing the TPB model to TAM, Taylor and Todd (1995b:170) indicated that if the sole goal is the prediction of usage, then TAM might be preferable. However, the decomposed TPB provides fuller understanding of usage behaviour and intention and may provide more effective guidance to IT managers and researchers interested in the study of system implementation (Tan & Teo, 2000).

For purpose of understanding the TPB model, the decomposed TPB model uses construct from the innovation literature (e.g. relative advantage, compatibility). I also explores subjective norms (e.g. social influence) and perceived behavioural control more completely by decomposing them into more specific dimensions. It provides a comprehensive way to understand how an individual's attitude, subjective norms and perceived behavioural control can influence his or her intention to use banking services on the internet (Tan & Teo, 2000). Further, the framework postulates that a person's intention to adopt Internet banking is determined by three factors. They are (i) attitude, which describes a person's perception towards Internet banking; (ii) subjective norms, which describe the social influence that may affect a person's intention to use Internet banking; and (iii) perceived behavioural control, which describes the beliefs about having the necessary resources and opportunities to adopt Internet banking.

Examples of recent studies on the adoption of Internet banking were conducted in Singapore by Tan and Teo (2000) and Wang *et al.* (2003) in Taiwan. In Singapore, Tan and Teo (2000) conducted their studies through an online questionnaire survey in the World Wide Web. Their interest was focused on finding the factors influencing the adoption of Internet banking. However, their research framework adapted the decomposed theory of planned behaviour that was first introduced by Taylor and Todd (1995a). The model was based on the theory of planned behaviour (Ajzen, 1985) and the diffusion of innovations theory (Rogers, 1983). Tan and Teo focused their study to identify the attitudinal, social and

perceived behavioural control factors that would influence the adoption of Internet banking. In contrast to Tan and Teo (2000), Wang *et al.* (2003) used the extended technology acceptance model to conduct an empirical study on the determinants of user acceptance of Internet banking. In both studies, the results on the positive relationship between computer self-efficacy and behavioural intention were consistent.

2.2 Definition of Concepts

The significant concepts that needed to be defined in this literature review section included the model itself (TAM) and the factors (perceived risk and trust) which described the thrust of the new mediating variable (perceived credibility) that was added into the model. The other concepts were computer self-efficacy and prior general computing experience as the independent variables; perceived usefulness, perceived ease of use as the other two mediating variables; and behavioural intention as the dependent variable in this study.

2.2.1 Technology Acceptance Model

The Technology Acceptance Model was developed in the mid-1980s under contract with IBM Canada Ltd. where it was used to evaluate the market potential for a variety of then-emerging PC-based applications in the area of multimedia, image processing, and pen-based computing in order to guide investments in new product development (Davis & Venkatesh, 1996). TAM had been widely used to predict user acceptance and use based on perceived usefulness and ease of use (Ndubisi *et al.*, 2001). Davis (1989) and Davis *et al.* (1989) developed the TAM by adapting the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980), to understand the causal chain linking external variables to IT usage intention and actual use in a workplace. Figure 2.1 shows Davis' technology acceptance model.