

A PROPOSED MODEL FOR M-BANKING ADOPTION

Nurudeen Abdulkadir

Master of Science (ICT)

Universiti Utara Malaysia

2010

©All rights reserved.

A PROPOSED MODEL FOR M-BANKING ADOPTION

**A Thesis Submitted to the Faculty of Information Technology in Partial Fulfillment of
the Requirement for the Degree of Master of Science (Information & Communication
Technology) Universiti Utara Malaysia**

By

Nurudeen Abdulkadir

2010

©Nurudeen Abdulkadir, 2010. All Rights Reserved.



**KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
Universiti Utara Malaysia**

**PERAKUAN KERJA KERTAS PROJEK
(Certificate of Project Paper)**

Saya, yang bertandatangan, memperakukan bahawa
(I, the undersigned, certify that)

NURUDEEN ABDULKADIR
(802311)

calon untuk Ijazah
(candidate for the degree of) **MSc. (Information Communication Technology)**

telah mengemukakan kertas projek yang bertajuk
(has presented his/her project paper of the following title)

A PROPOSED MODEL FOR M-BANKING ADOPTION

seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(as it appears on the title page and front cover of project paper)

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan
dan meliputi bidang ilmu dengan memuaskan.
(that the project paper acceptable in form and content, and that a satisfactory
knowledge of the field is covered by the project paper).

Nama Penyelia Utama
(Name of Main Supervisor): **MDM. RAFIDAH ABD RAZAK**

Tandatangan
(Signature) :

Tarikh
(Date) :

20/5/2010

PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for the degree of Master of Science (ICT) from Universiti Utara Malaysia, I agree that the University's library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor or, in his absence, by the Dean of the Graduate School. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Request for permission to copy or make use of materials in this thesis in whole or part should be addressed to:

Dean of Research and Graduate Studies

College of Arts and Science

Universiti Utara Malaysia

06010 UUM Sintok

Kedah, Darul Aman,

Malaysia

ABSTRACT

The evolution of powerful and versatile information systems have altered the way business transactions are made. Millions of dollars are spent by organizations in developing and maintaining these technologies in quest of gaining competitive edge. This cherished goal can only be realized if the target market adopt and use these technologies. Technologies such as Automated Teller Machine (ATM), internet banking, and mobile banking have now become a prerequisite in the banking business. This study extends the applicability of TAM and TPB constructs to investigate the significant factors influencing users' adoption of m-banking services in Universiti Utara Malaysia. The research model was empirically tested through a questionnaire of 125 respondents. Findings showed that perceived usefulness and social influence have significant impact on mobile banking adoption. In contrast with previous studies, perceived ease of use, perceived credibility, image, perceived financial cost, and computer/internet experience were not significant in explaining mobile banking adoption. In summary, perceived usefulness contributed the most in explaining mobile banking adoption. The research findings have both practical and theoretical implications. Practically, the study is hoped to serve as a useful insight for banks and system developers in developing and deploying mobile banking systems that are in consonance with the needs of the target customers. Theoretically, the study extends to the body of literature in mobile banking adoption.

ACKNOWLEDGEMENT

All Praise is due to Allah my Lord, the One and only, whom by His favors all good works come to perfection. Without Thy grace and mercy, this humble effort of mine will not have become a reality. I laud and glorify Thee for all things and in all things, and specifically for giving me the strength, health, and intellectual capability to accomplish this task.

Next, I express my profound gratitude to my beloved parents, Alhaji Abdulkadir Mohammed, Hajiya Aisha Mohammed, and Hajiya Ladi Abu-Bakr; who have been with me since I knew not anything. They have supported me in all aspects of life; financially, morally, and spiritually. They have gone extra miles to make sure I stand on my feet. Without their selfless and unrelenting support, I would have been nothing but a back stage spectator in the theatre of life.

Furthermore, my immense appreciation goes to my able mentor and supervisor, Madam Rafidah Bt Abd Razak for her intellectual prowess, guidance and good counseling. If not for her counseling effort and intellectual inputs, this work will not have been a success. Additionally, I would like to extend my gratitude to Madam Cik Fazilah, my evaluator, for sparing her precious time to correct this work. If not for her, this work would not have been perfected.

I would like to thank my competent lecturers in the faculty for the guidance and direction they gave me which aid me in harmonizing my chain of thoughts.

Also, I would like to express my deepest appreciation to my beloved brothers and sisters for the moral and financial support they gave me during my sojourn in the academic arena. I express my deepest and warm appreciation to my beloved cousin

Hawa'u for being there for me during my pursuit of academic excellence. I would like to acknowledge and give my special thanks to my friends, colleagues and senior colleagues in Universiti Utara Malaysia for their constant support and encouragement, especially, the persons of: Shehu Inuwa Galoji, Ahmad Hamman Jumba, Ahmad Audu Maiyaki, Abdulateef Aliyu, Nura Mukhtar, Hadiza Hassan Yar'adua, Ayaan Dahir Sheik, Mohammed Zaharaddeen, Yahaya Saleh, and Aliyu M. Dogara.

Last but not the least, I wish to thank all those people who through their time and generous support made this research project a dream come true.

Nurudeen Abdulkadir

TABLE OF CONTENTS

	Page
PERMISSION TO USE	i
ABSTRACT	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
CHAPTER ONE: INTRODUCTION	
1.1 Overview	1
1.2 Problem Statement	2
1.3 Research Objective	3
1.4 Scope of the Study	4
1.5 Significance of the Study	4
1.6 Organization of Chapters	5
CHAPTER TWO: LITERATURE REVIEW	
2.1 Introduction	6
2.2 Mobile Banking	6
2.3 Information Technology Adoption	8
2.3.1 Technology Acceptance Model (TAM)	11
2.3.2 Theory of Planned Behavior (TPB)	15
2.3.3 Innovation Diffusion Theory (IDT)	18
2.4 Summary of Chapter	19
CHAPTER THREE: METHODOLOGY	
3.1 Introduction	20
3.2 Research Design	20
3.3 Measurement Development	21

3.4 Research Model and Hypotheses	22
3.4.1 Attitudinal Belief	22
3.4.2 Social Influence	25
3.4.3 Computer/Internet Experience	26
3.5 Population of the Study	26
3.6 Sample Size and Sampling Technique	26
3.7 Data collection Procedure	27
3.8 Data Analysis	27
3.9 Summary of Chapter	28

CHAPTER FOUR: RESEARCH FINDINGS

4.1 Introduction	29
4.2 Demographic Profile of Respondents	29
4.2.1 Age Group	29
4.2.2 Gender	30
4.2.3 Educational Background	30
4.2.4 Occupation	31
4.2.5 Income Level	32
4.3 Cronbach's Alpha Reliability Test	32
4.3.1 Reliability of Attitudinal Belief	33
4.3.2 Reliability of Social Influence	34
4.3.3 Reliability of Computer/Internet Experience	34
4.3.4 Reliability of M-Banking Adoption	35
4.3.5 Summary of Reliability Tests	35
4.4 Correlation Analysis	36
4.5 Multiple Regression Analysis	38
4.6 Summary of Chapter	41

CHAPTER FIVE: DISCUSSION AND CONCLUSION

5.1 Introduction	42
5.2 Recapitulation of Study Findings	42

5.2.1 Research Objective 1	43
5.2.2 Research Objective 2	44
5.2.3 Research Objective 3	44
5.3 Discussion	46
5.4 Contributions of the Research Study	48
5.5 Limitations and Recommendation for Future Research	49
5.6 Conclusion	50

REFERENCES

APPENDICES

Appendix A: Questionnaire

Appendix B: Descriptive Statistics

Appendix C: Cronbach's Alpha Reliability Test

Appendix D: Pearson Correlation

Appendix E: Multiple Regression

LIST OF TABLES

	Page
Table 4.1: Descriptive Statistics of Age Group of Respondent	30
Table 4.2: Descriptive Statistics of Gender of Respondents	31
Table 4.3: Descriptive Statistics of Educational Background of Respondents	31
Table 4.4: Descriptive Statistics of Occupational Background of Respondents	32
Table 4.5: Descriptive Statistics of Income Level of Respondents	33
Table 4.6: Reliability of Attitudinal Belief	34
Table 4.7: Reliability of Social Influence	35
Table 4.8: Reliability of Computer/internet Experience	35
Table 4.9: Reliability of M-banking Adoption	36
Table 4.10: Summary of Reliability Tests	36
Table 4.11: Guideline for Pearson Correlation Strength	37
Table 4.12: Summary of Correlation Analysis	38
Table 4.13: R Square Value (R^2)	40
Table 4.14: ANOVA	40
Table 4.15: Beta Coefficients	41
Table 5.1: Correlation of M-banking Adoption with the Dependent Variables	44
Table 5.2: Summary of Beta Coefficients	45
Table 5.3: Summary of Hypotheses Tested	46

LIST OF FIGURES

	Page
Figure 2.1: Original Technology Acceptance Model (TAM)	12
Figure 2.2: Theory of Planned Behavior	17
Figure 2.3: Decomposed Theory of Planned Behavior	18
Figure 3.1: Research Model	23
Figure 5.1: Proposed Model	46

CHAPTER ONE

INTRODUCTION

1.1 Overview of Study

The rapid advancement in the field of Information Technology (IT), specifically in wireless technology has significantly altered the way and manner financial transactions are conducted. Banks being the central nerve of financial activities have undergone series of transitions and transformations in their life cycle induced majorly by technological break-through. From banking under the mattress to banking: ‘anywhere-anytime’; from fixed, traditional cash-based banking to a mobile, wireless and cashless banking system. The “brick and mortar” system of banking is fast receding. Customers can now perform their banking transactions from the comfort of their beds; pay their bills, transfer funds, check account balance and monitor their finances in a risk free environment. The fear of theft, robbery during the days of hard currency no longer exist now, money now travels in digital space.

The business world today is highly turbulent; waves of change are experienced in high proportion. Consumers of today are highly sophisticated and their need for personalized service is ever increasing by the day. The digital age customers now require banking services to be rendered to them anywhere they are, around the clock.

M-banking (mobile banking) is a technology that has emerged in recent times to augment the shortfalls of e-banking and extend the reach of financial services across all socio-economic groups and geographical boundaries. M-banking is defined as a system used to perform banking (financial) transactions through customers’ handheld

mobile phones (Amin, 2007). M-Banking refers to provision and availment of banking and financial services with the help of mobile telecommunication devices. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customized information (Tiwari & Buse, 2006).

As an emerging technological innovation especially in the developing world, m-banking is yet to gain acceptance on a wide scale and adoption level is marginally insignificant (Amin, 2007; & Luarn & Lin, 2005), hence, the need to understand the factors influencing the adoption of m-banking services.

The present study employs a model based on constructs from Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB) to investigate and validate the dominant factors influencing the adoption of m-banking in Universiti Utara Malaysia (UUM). It is hoped that the findings of the study will add to the body of knowledge in the technology adoption literature, particularly mobile banking. Also, the findings may prove relevant to banking institutions in devising strategies around the model proposed to capture potential customers and also retain old ones.

1.2 Problem Statement

Mobile banking or m-banking as it is popularly known is the recent trend in banking transition and holds a bright future that is promising over and above the one brought by e-banking. E-banking provided personalized, anytime banking services, m-banking on the other hand provides personalized, anytime-anywhere banking services thus making it the future of banking. Nevertheless, with all the laudable benefits of m-banking, it is yet to gain large scale adoption especially in the emerging economies.

In a study by Luarn and Lin (2005), there were 24.5 million mobile subscribers in Taiwan as at 2003 of which m-banking transactions account for less than 1% of this figure. Moreover, as an emerging technology that is still in its formative stage, sufficient literature does not abound in understanding users' adoption of m-banking.

In UUM context, mobile banking services are provided by banks such as CIMB and BIMB but the level of adoption and usage of such services is yet to be ascertained.

Constructs from TAM and TPB have been applied to understand users' adoption/acceptance of m-banking (Luarn & Lin, 2005; Kleijnen et al., 2004; Mathieson, 1991; and Teo & Pok, 2003). Results from this earlier research work show divergence of findings (Amin et al., 2007). Furthermore, though, a huge amount of literature already exists in understanding technology and innovation acceptance in general, research in m-banking adoption is relatively new with its own peculiarities that require further validation of the reliability and applicability of previous research models and findings in other environments and groups.

1.3 Research Objective

Specifically the objective(s) of this study are:

1. To investigate and validate the factors influencing m-banking adoption.
2. To ascertain the dominant factors influencing the adoption of m-banking.
3. To provide a model based on findings from (2) for m-banking adoption.

1.4 Scope of Study

The scope of this study is as follows:

- The study is confined to Universiti Utara Malaysia only.
- The sample size for this study consists of 150 respondents.
- TAM and decomposed version of TPB are the two supporting theories employed in this research study to support the research model.
- Mobile banking technology is the main focus of the study.

1.5 Significance of the Study

The following are the significance to be realized:

1. The study will add to the expanding body of knowledge in the technology/innovation acceptance literature.
2. The study will serve as a useful source of reference and information for academicians and researchers alike investigating in similar area.
3. The study will also contribute and enhance understanding of the factors that significantly affect m-banking adoption.
4. The study will also be of paramount benefit to marketing practitioners and banking institutions in developing marketing strategies that meets consumers' anticipations.

1.6 Organization of Chapters

Chapter One presents an overview of the study, the problem statement, the research objective, research scope and the significance of the study.

Chapter Two covers the literature review. Literatures relating to the research constructs were revisited including the main theories developed in the field. Also a review of the concept of m-banking was conducted.

Chapter Three explains the methodology employed to achieve the research objective. The research design, research model, measurement development, data collection procedure, study sample, and the analysis technique used were elaborated.

Chapter Four presents the data analysis and interpretation of results obtained. Also, hypotheses advanced were tested against the results found.

The final chapter, chapter Five provides a discussion of findings, implications, limitations and direction for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section will explore the previous research works done in the field of IT adoption and usage. It will specifically explore the previous models developed to explain user acceptance and use of technology. Also, literatures on m-banking will be explored to gain an in depth understanding of the concept.

2.2 Mobile Banking

Technological advancements particularly in the area of telecommunications have made it a dream come true for businesses to provide ground-breaking, location-sensitive services on ubiquitous (“anytime, anywhere”) basis to customers on the move (Tiwari et al., 2007). One of such promising service that is steadily gaining momentum in today’s business and financial world is the mobile banking technology (m-banking). Mobile banking or m-banking is an offshoot and an integral part of mobile commerce; it serves as the cornerstone of mobile commerce. Mobile banking entails the provision and availment of banking and financial services via mobile telecommunication devices (Tiwari & Buse, 2006). Recent trends and development showed an increase in the deployment of mobile banking solutions by banks around the world. Banks now employ mobile banking solutions to make extra income, cut costs, and also boost customer satisfaction level. Results from such efforts have often proven positive (Tiwari et al., 2006a). An indication of this success could be inferred from the growing amount of demand for mobile banking services and its usage by customers in some regions of the world (Tiwari et al., 2006b). For example, in South

Korea, the rate of financial transactions done through mobile devices reached 287,000 per day on an average, an increment of 104 percent as compared to the year earlier, according to the Bank of Korea (Korea Times, 2006 in Tiwari et al., 2006b). This increased demand has awoken banks to meet up the challenge by developing and delivering mobile banking solutions suitable and aligned to customers' needs and expectations. As the competition intensifies between banks in providing mobile financial solutions; success will definitely go to those that put into consideration the needs and wants of their target customers when designing the solution. Banks are now considerable designing mobile banking strategies around the expectations of their customers. Customers are becoming ever more sophisticated with the growth of technology and demand products that yield the best value for money spent. Customers now demand for technologies that are user friendly, easy to use, cheap, and which provides the intended service it was designed for effectively. Banks today are faced with technology-savvy customers that are habitually on the move. These customers want banking services to be provided to them while on the move regardless of banking operation hours and geographical proximity (Tiwari et al., 2006b). Also, banks have seen the opportunity in making mobile banking an image enhancing product. The technology savvy customers will be more apt to associate themselves with banks that offer such value added services as against those that do not. In a recent study by Tiwari and Buse (2006), they found out that many bank customers in Germany are willing to switch to other banks if their banks fail to offer mobile services. Additionally, customers have expressed demands for secured mobile banking solutions due to sensitivity of financial transactions (Tiwari et al., 2007).

In general, the advancement in technology have brought about tremendous opportunities as well as increased threats to banking institutions. Mobile banking is an opportunity for banks to increase their market share, reduce cost, boost their revenue and improve their customer services. It is also a threat in that competition is ever mounting to have the largest share of the cake. Success therefore depends on the ability of banks to offer the most effective mobile banking solutions in terms of ubiquity, immediacy, localization, security, and ease of use.

2.3 Information Technology Adoption

The utilization and deployment of IT by organizations to gain competitive edge is ever increasing. The growing number of new IT products flooding the market is overwhelming; each trying to gain wide acceptance from consumers. The acceptance and use of these new technologies by the market is of paramount importance to the success and continuity of organizations. Understanding what drives consumers and end-users to adopt and use a certain technology has become of increasing interest in the IT research field (Taylor & Todd, 1995a; Davis, 1989; Mathieson, 1991; Teo & Pok, 2003; and Al-Somali et al., 2009).

Quite a number of theoretical models have been developed and employed in understanding IT/IS adoption and usage. Among the models developed, three stand out to enjoy the most popularity in the IS/IT field; namely: Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), and Innovation Diffusion Theory (IDT). These models have been employed separately (Davis, 1989; Davis et al., 1989; Venkatesh & Morris, 2000; Wang et al., 2003; Luarn & Lin, 2005; Mattila, 2003; & Al-Somali et al., 2009), compared (Mathieson, 1991; Taylor & Todd, 1995a; Taylor & Todd, 1995b; & Chau & Hu, 2001) and integrated (Wu & Wang, 2005; & Yi et al., 2006) to explain technology adoption and use.

Al-Somali et al. (2009) used an extended TAM to investigate the determinants of adoption of online banking in Saudi Arabia. Findings of the study indicate that internet service quality, awareness of the benefits of online banking, social influence and computer self-efficacy significantly influence the two key beliefs constructs of TAM. Also, trust, resistance to change and level of education were found to affect attitude towards adoption of online banking. Furthermore, Luarn and Lin (2005) tested an extended TAM on 180 users to examine what influences intention to adopt mobile banking. Results showed a strong backing to the extended TAM. Similarly, in another study by Deng et al. (2010), TAM and a trust-based construct was employed to investigate mobile banking adoption in China. Findings showed that TAM is a valid model for predicting consumer intention to adopt mobile banking. Specifically, perceived credibility significantly influenced attitude towards mobile banking. Mattila (2003) used the constructs of IDT in association with risk and external factors such as communication channels to examine mobile banking adoption in Finland. A total number of 1,253 survey responses were collected and tested against the constructs. Findings revealed that perception of relative advantage, compatibility with user's ideals, and perception of complexity highly influence adoption.

Mathieson (1991) compared the predictive power of both TAM and TPB and found that both models predicted behavioural intention considerably well. TAM was found to be more simple and easier to use due to its parsimonious composition. TPB provides more insight into the factors that affect behavioural intention. Taylor and Todd (1995a) extended the works of Mathieson by adding a decomposed version of TPB and tested these models on 786 students. Results of their findings showed that decomposed TPB provides a more explanatory power in understanding behavioural intention than TAM and TPB, though less parsimonious when compared to TAM.

Similarly, Chau and Hu (2001) compared these three models and their findings substantiate the results advanced by Taylor and Todd (1995a).

TAM and TPB have also been integrated both loosely and tightly to study adoption behaviour. Riemenschneider et al. (2003) analyzed a number of models that used TAM and TPB separately and also those that integrated the two either loosely or tightly. Results showed positive improvements in terms of model fit as the two models become more tightly integrated. Wu and Wang (2005) examined the determinants of mobile commerce acceptance using an integrated model based on IDT, TAM, risk and cost. Their findings show the significant influence of all constructs with the exception of ease of use on behavioural intention. In the same light, Yi et al., (2006) tested a new model derived from an integration of key constructs of three theoretical models (TAM, TPB, and IDT) to investigate the acceptance of PDA (Personal Digital Assistant) by health professionals. The resulting model explained 57% of behavioural intention to adopt an information system (IS).

Also, an integration of constructs from Innovation Diffusion Theory and TAM had been used to examine the determinants of technology adoption (Agarwal & Prasad, 1998; Chen et al., 2002; Wu & Wang, 2005; and Karhanna et al., 1999). Karhanna et al., (1999) used IDT and TAM to investigate the pre-adoption and post adoption beliefs and attitudes. Results indicate that potential adopters' behavioural intention is basically determined by normative pressures, while that of users is solely a factor of attitude. Perceptions of usefulness, ease of use, triability, result demonstrability and visibility influence pre-adoption attitude, whereas, only perception of image enhancement and usefulness is significant in influencing post-adopters attitudes towards a given IS. In another study by Chen et al. (2002), a combination of TAM and IDT were used to understand the adoption behaviour and use of virtual stores.

They found that perceptions of compatibility ease of use, and usefulness influence attitude which further determines intention to adopt and use virtual stores.

TAM, have proven to be a valid model in explaining user acceptance of technology. Its predictive power becomes even stronger if additional constructs are included, and also if integrated with other acceptance models like TPB and IDT. TPB provides a general explanation of behavioral intentions. Decomposing the predictive constructs of TPB provides more light in explaining adoption drivers.

An integrated approach that combines the strength of each model had proven to be a more comprehensive model in understanding IS adoption; hence we adopt such approach in this study.

2.3.1 Technology Acceptance Model (TAM)

A significant number of researchers have examined the process and determinants of information technology adoption/usage by end-users (Tan & Teo, 2000; Wang et al., 2003; Luarn & Lin, 2005; Jones & Hubona, 2006; and Al-Somali et al., 2009). Most of these research works were based on the Technology Acceptance Model (TAM) proposed by Davis (1989).

TAM has been widely used and tested across a wide range of information systems to explain adoption of an information system (IS). TAM adapts from the Theory of Reasoned Action developed by Fishbein and Ajzen (1975) which explains individual's behavioural intention and actual behaviour as products of attitude and subjective norm. TAM postulates that behavioural intention to use an information system and its actual usage is determined by individual's attitude towards the system which is further determined by user beliefs (Jones & Hubona, 2006). Furthermore,

the indirect influence of external variables on attitude through user beliefs has been advanced in TAM (Davis, 1989; Jones & Hubona, 2006; and Legris et al., 2003). TAM (figure 2.1) proposes a four-stage procedure in explaining IS adoption and usage thus:

- External variables (system experience) affect beliefs about a given IS;
- Beliefs in turn affect attitude;
- Attitude influences behavioural intention to adopt an IS;
- Intention determines adoption and use of an IS.

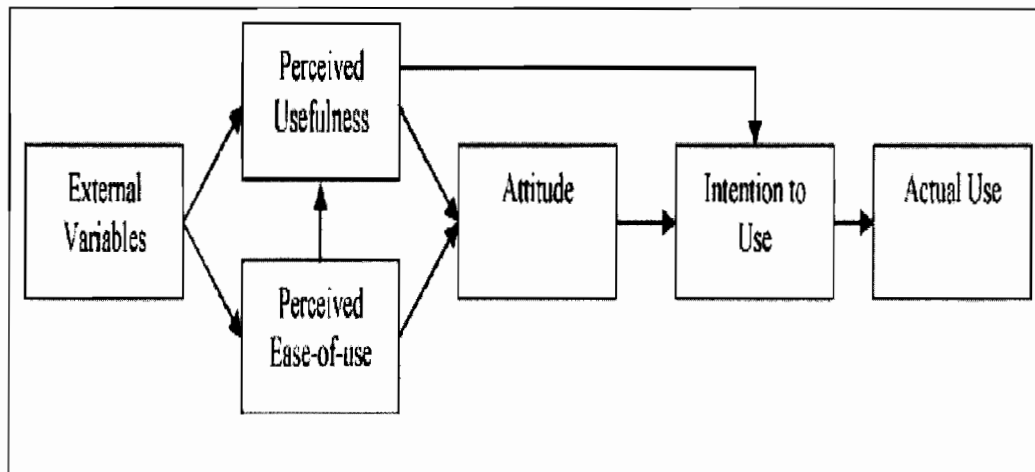


Figure 2.1: Original Technology Acceptance Model (Adopted from Jones & Hubona, 2006)

TAM has been extended by addition of other variables /constructs (Luarn & Lin, 2005; Al-Somali et al., 2009; Venkatesh & Morris, 2000; Lucas & Spittler, 1999; Porter & Donthu, 2006; Vijayasarathy, 2004; and Amin, 2007) and tested over a wide range of information systems (Jones & Hubona, 2006) and has proven to have reliable and valid constructs for predicting about 40% of adoption and use of information systems (Legris et al, 2003).

Perceived usefulness and perceived ease of use are the two key belief constructs of TAM. Perceived usefulness (PU) is the degree to which a person believes that using

an information system would enhance his or her job performance. Perceived ease of use on the other hand, is the degree to which a person believes that using an information system would be free of effort (Davis et al., 1989). Past research works have shown that the two key constructs of TAM have proved to be valid in explaining adoption intention and use of an information system (Wang et al., 2003; & King & He, 2006). Nevertheless, several research works have pointed out the need to include more constructs into the original model, depending on the information system in context and the environment under study to improve its predictive power (Davis et al., 1989; Amin, 2007; Al-Somali et al., 2009; & AlSukkar, 2005).

Thus, in this study other attitudinal belief constructs have been added to the original belief constructs of TAM to enhance the robustness and predictive power of the research model. Perceived credibility, perceived financial cost, and image have been included in the attitudinal belief dimension. The importance of perceived credibility as a significant factor in determining adoption intention of an IS has been noted by past researchers (Wang et al., 2003; Luarn & Lin, 2005, Amin, 2007; & Gefen et al., 2003). The alarming increase in cybercrime rate has made people weary and sensitive about their security and privacy while transacting online. In the context of mobile banking, credibility is deemed to be very significant in determining adoption intention (Luarn & Lin, 2005), and hence included in the research model. Also, financial cost has been shown to have a negative influence on adoption and use of IS (Luarn & Lin, 2005; & Mathieson et al., 2001). Even though the diffusion and penetration rate of mobile devices has reached almost all the nooks and crannies of the world; people, especially in the developing world are still financially sensitive, and will definitely be influenced by the financial cost consideration of an IS. Therefore, this construct is added to the research model because of its relevance to the mobile banking context

and the environment under study. Furthermore, perception of image enhancement has been found to be positively related to adoption and use of an IS (Teo & Pok, 2003). Even with the high level of penetration, mobile phones are still associated with a particular social image. Mobile phone producers have different variants of mobile phones targeted at different market segments in the society. Mobile banking can only be realized with a WAP-enabled mobile phone which is associated with a certain social image. Thus, mobile banking users are perceived to be IT-fashionable and IT savvy. Thus, this construct is included in the belief dimension due to its applicability to the mobile banking context.

i. External Variables and TAM

The importance of external variables in determining IT adoption and use has been noted in earlier studies (Jones & Hubona, 2006; Dishaw & Strong, 1999; Legris et al., 2003; Igarria et al., 1997; and Compeau et al., 1999). These studies have shown that external variables (user training, prior experience e.t.c) have direct and indirect influence on adoption and use. Indirect influence of external variables through PEOU and PU on IS adoption and usage have been found (Legris et al., 2003; Igarria et al., 1997; and Dishaw & Strong, 1999). Also, the direct influence of external variable on adoption and use of IT was highlighted in past research works (Compeau et al., 1999; and Jones & Hubona, 2006). Jones & Hubona (2006) confirmed that external variables such as user experience directly influence the adoption and use of a given IS. Hence, in this study, computer/internet experience was added to the research model to confirm and validate prior findings. In the context of mobile banking, it is assumed that people that are computer and internet literate will be more positively inclined to use mobile banking as against those that are not.

2.3.2 Theory of Planned Behaviour (TPB)

Another renowned theory that has been widely applied to study IS acceptance and use is TPB. This theory has its root in social psychology. TPB was postulated by Ajzen (1985) as an extension of Theory of Reasoned Action (TRA). The theory argues that actual behaviour is determined by behavioural intention which in turn is influenced by individual's attitude, subjective norm and perceived behavioural control (Ajzen, 1991; in Teo & Pok, 2003). TPB was developed to augment the limitations of TRA in predicting and understanding behaviour under incomplete volitional control.

TPB, unlike TAM is not specific to IS field and therefore a more general theory of explaining behaviour. In addition to attitudinal beliefs, TPB adds two more important constructs in explaining behaviour; subjective norm (normative beliefs) and perceived behavioural control (control beliefs). Subjective norm refers to the influence of others (reference group) in determining individual's adoption and use of technology. Subjective norm which is analogous with social influence has been found to be a significant factor in influencing the adoption and use of IS (Venkatesh & Morris, 2000; Teo & Pok, 2003; Taylor & Todd, 1995a; and Al-Somali et al., 2009). Man being a social being is positively or negatively influenced towards a particular thing by those that are important to him (significant others). In the mobile banking context, social influence can play a significant role in deterring or facilitating the adoption and use of m-banking services. Hence, this construct is included in the research model to test its applicability and validity. Perceived behavioural control refers to an individual's belief about the availability of factors that may ease or hinder the performance of a given behaviour (Ajzen, 1985). Thus, one may be hindered from adopting and using an IS if he believes that he does not have the required skills (internal factor), or he does not have the financial resource (external factor) to do so.

The significance of perceived behavioural control in determining IT adoption and use have been acknowledged in earlier studies (Moore & Benbasat, 1993; & Mathieson, 1991). In this study, perceived financial cost (PFC) has been included in the research model due to its applicability to the context of m-banking. Financial matters can be a facilitating or impeding factor in the adoption and use of IT.

Like TAM, TPB's monolithic constructs have been decomposed into specific belief constructs and used to predict adoption intention and usage of information Technology (Taylor & Todd, 1995a; Teo & Pok, 2003).

Earlier studies have shown that TAM is a more suitable model in terms of parsimony and predictive power than TPB (Davis et al, 1989; Mathieson, 1991). In a study by Taylor and Todd (1995b), decomposed TPB was found to be relatively better than TAM in understanding adoption intention and use of IT. On the other hand, the original TPB constructs suffered from operationalization problems due to their one dimensional nature, thus reducing the explanatory and predictive power of the model (Bagozzi, 1984).

TPB provides a broad picture and general understanding of adoption intention and usage of IT and therefore more suitable to theoreticians. Decomposed TPB and TAM on the other hand, are more specific and focused in explaining adoption intention and usage of IT and therefore more suitable for applied researchers and practitioners (Taylor & Todd, 1995b). Since this study is specifically concerned with the practical implications and applicability of research findings, constructs from both TAM and decomposed TPB will be used as the basis for the research model. Below (Figure 2.2) are the TPB model and the decomposed version of the model (Figure 2.3).

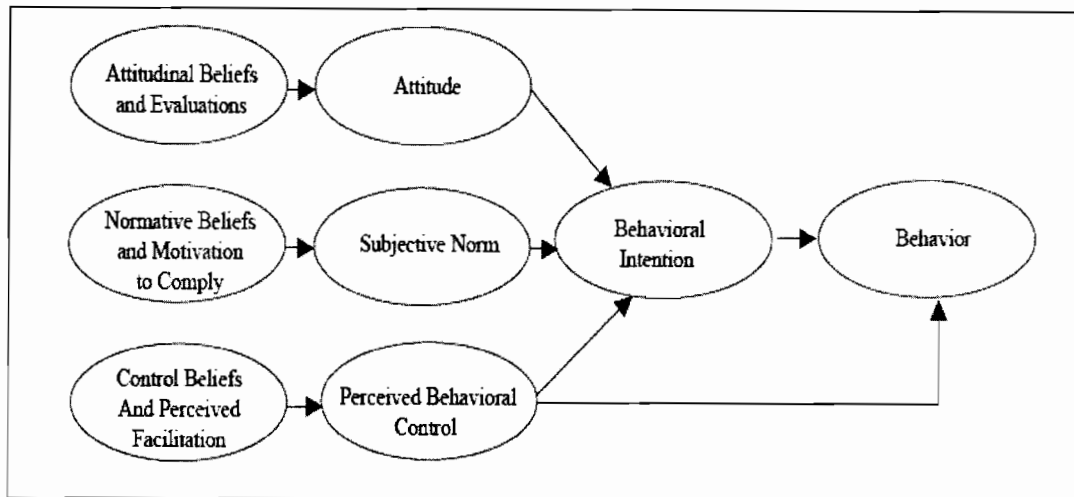


Figure 2.2: Theory of Planned Behavior (Adopted from Teo & Pok, 2003)

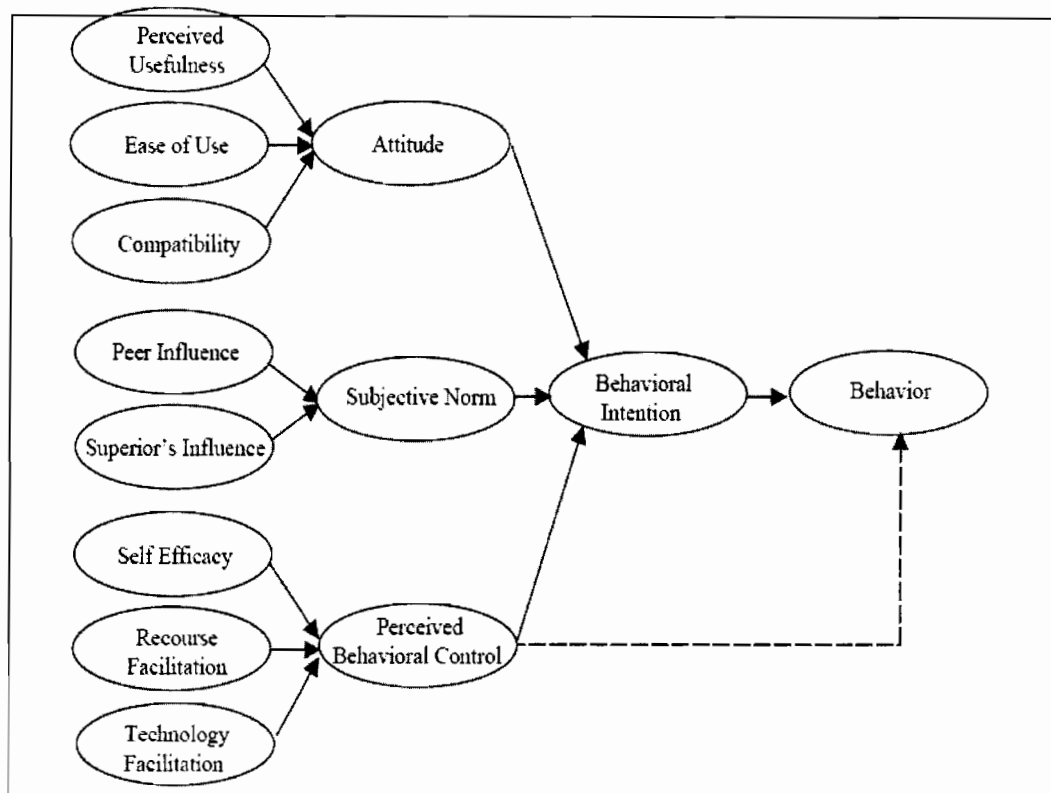


Figure 2.3: Decomposed Theory of Planned Behavior (Adopted from Teo & Pok, 2003)

2.3.3 Innovation Diffusion Theory (IDT)

A number of research works have confirmed that it is the perceived features of an Information System (IS) rather than personal characteristics that are the chief determinants of adoption intention (Black et al., 2001; & Mattila, 2003). In the quest to explain consumers' adoption of technology, and where focus is on the consumer

perspective, the Innovation Diffusion Theory of Rogers (1983) has been in the forefront of theories used (Howcroft et al., 2002; Black et al. 2001). Innovation Diffusion Theory (IDT) postulates that system's characteristics are the key factors that influence the level of diffusion of an innovation. Rogers pointed out five key system attributes that affect the diffusion rate of an innovation. These five characteristics are: Relative advantage, compatibility, complexity, observability, and triability. Relative advantage refers to the degree to which an innovation is perceived to be better than its predecessor (Rogers, 1995). Relative advantage is akin to Davis's perceived usefulness in TAM. Another construct of interest that is analogous to TAM's construct of "perceived ease of use" is complexity which refers to the degree to which an innovation is perceived to be difficult to use (Rogers, 1995).

A number of researchers have utilized Rogers's theory to study users' adoption of innovation (Moore & Benbasat, 1991; Tan & Teo, 2000; Howcroft et al., 2002; & Mattila, 2003) and it has proven to be a good predictor of innovation adoption (Mattila, 2003). Mattila used the constructs from Roger's model to study factors influencing adoption of mobile banking. Results of the study showed that the most significant factors influencing adoption are relative advantage derived, compatibility with existing values of adopters, and the perceived complexity of innovation.

2.4 Summary of Chapter

Mobile banking has evolved as the new trend in banking transition. It avails customers the opportunity to conduct financial transactions 'anywhere-anytime'. As an emerging technology, mobile banking adoption and use is gradually rising and more banks are now providing this value added service to their customers. As the competition level deepens between banks; success goes to those whose services are

accepted by the market. Hence the need to know what motivates customers to use mobile banking.

Quite a great deal of researchers have investigated the determinants of IS/IT acceptance using established models and theories. Among these researchers, some have extended these theories, some have integrated it, and some have compared these theories to study what drives consumers to adopt a certain IS. TAM is the most widely used model in the field of IS/IT adoption and have been tested on a broad range of Information Systems with a high a rate of success in its predictive power.

The present study uses an integrated approach to examine the factors influencing mobile banking adoption.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Methodology provides a framework and a guideline for a researcher on how to accomplish his task. It is at the centre of any research endeavour. It specifically answers the question 'how' (Punch, 2006). Thus, methodology outlines and stipulates how the research objective will be realized.

In this section, the research design, the research model, hypotheses, the population of the study, the sample size and sampling technique, method of data collection and analysis will be elaborated.

3.2 Research Design

The purpose of research design is to make sure that facts obtained allow one to answer the initial question posed as clearly as possible. This study employs a cross-sectional survey design; that is data was collected at one point in time. The survey research design is a suitable means for assessing opinions, social facts, beliefs, attitudes and trends (Kerlinger, 1973). Also, survey design is a good way of measuring relationship between variables (Punch, 2003). Since this study is concerned with how variables are associated, the quantitative survey design is used.

The unit of analysis in this study is the *individual*. That is each individual response is considered as an independent data source. Surveys having the individual as the unit of analysis are the most generally used (Punch, 2003). Furthermore, the data collection

procedure is based on the self-administered questionnaire. This type of data collection method is generally the most commonly used in quantitative survey study (Punch, 2003).

3.3 Measurement Development

The measurement items of the survey variables were adapted from previous validated measures of past research studies (Luarn & Lin, 2005; Wang et al., 2003; Moore & Benbasat, 1991; Taylor & Todd, 1995a, Teo & Pok, 2003; and Al-Somali et al., 2009) and modified to suite the research context. Overall, the questionnaire instrument used in this study consists of 35 items, excluding the demographic items which comprises of 5 items. Attitudinal belief which is a multidimensional construct was measured with 23 items. Specifically, perceived usefulness (PU) was measured with 6 items, 5 items to measure perceived ease of use (PEOU), 4 items to measure perceived credibility (PC), 5 items to measure image, and 3 items to measure perceived financial cost (PFC). Social influence was measured by 6 items, and the last construct, computer and internet experience was measured by 3 items. A five-point likert scale ranging from (1) “strongly disagree” to (5) “strongly agree” were employed to measure responses, except for items measuring computer and internet experience, which has the range of (1) “none” to (5) “expert”. The interval scale was used in this study because it is more suitable for measuring the magnitude of preference among individuals (Sekaran, 2003). Furthermore, a pilot test was conducted on a selected sample of 30 students to verify the reliability of the measurements, and the questionnaire was modified based on the pilot test result. The modified version of the questionnaire used in this study is attached in Appendix A.

3.4. Research Model and Hypotheses

The research model for this study was adapted from previous research works, specifically the Technology Acceptance model (TAM) and the Theory of Planned behaviour (TPB) are the underpinning theories of this research work. Below is the proposed research model for the study.

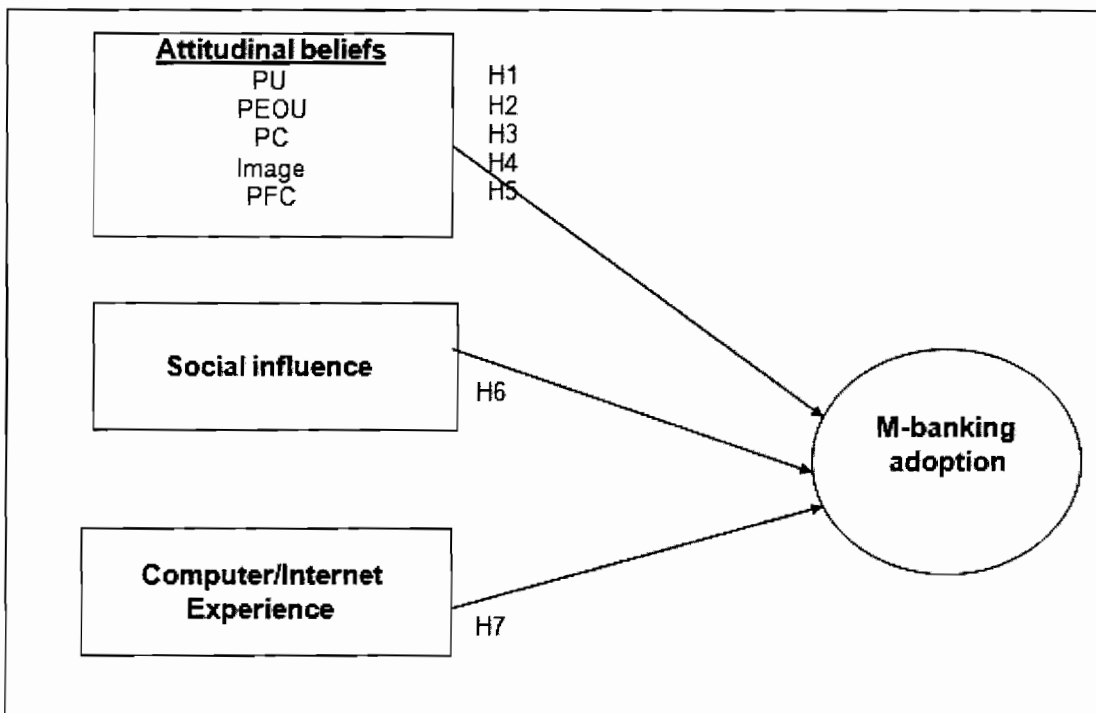


Figure 3.1: Research Model

3.4.1 Attitudinal Beliefs

Attitudinal belief refers to an individual's belief that a given technology possesses a particular quality or that performing a certain behaviour results to a specific outcome (Taylor & Todd, 1995a). Attitudinal belief is multi-dimensional and consists of numerous belief dimensions. In this study, the attitudinal belief is decomposed into five specific belief constructs, namely; perceived usefulness (PU), perceived ease of use (PEOU), perceived credibility (PC), image, and perceived financial cost (PFC).

i. Perceived Usefulness

Perceived usefulness (PU) refers to the degree to which an individual believes that use of technology will enhance his performance (Davis, 1989). Previous research findings have shown the significance of PU towards the adoption and usage of an information system (Davis et al., 1989; Taylor & Todd, 1995; Luarn & Lin, 2005, and Wang et al., 2003). This construct was adapted from the original TAM developed by Davis (1989). The more people perceive m-banking as useful, the more likelihood of them adopting it. Thus, the following hypothesis is tested:

H1. Perceived usefulness positively affects m-banking adoption.

ii. Perceived Ease of Use

Perceived ease of use (PEOU) refers to the degree to which one believes that using an information system is free from effort (Davis, 1989). Earlier research works have found that PEOU has significant influence on adoption and use of technology (Wang et al., 2003; Davis et al., 1989; Luarn & Lin, 2005; and Al-Somali et al., 2009). Luarn and Lin (2005) found that PEOU was significant in determining intention to adopt m-banking. In the same vein, this construct will be validated further in this study. Individuals will adopt and use m-banking services if they perceive it as easy to learn and use. Hence, the following hypothesis is proposed:

H2. Perceived ease of use positively affects m-banking adoption.

iii. Perceived Credibility

Wang et al. (2003) defined perceived credibility as the degree to which a person believes that use of an information system is free from security and privacy breach. Perceived credibility consist of two elements (Wang et al., 2003)-security and privacy. Security entails the protection of an information system from unauthorized

access. Privacy entails the protection of user personal information from unsanctioned intrusion while using internet banking (Wang et al., 2003). The findings of Wang et al. (2003) show the importance of PC towards the acceptance of internet banking. Considering the similarities between internet banking and m-banking, this construct was added to the research model. The perceived belief of m-banking being secured and confidential affects the level of adoption and usage. Therefore, the following hypothesis is tested:

H3. Perceived credibility positively affects m-banking adoption.

iv. **Perceived Image**

Perceived image refers to the extent to which the use of technology is believed to promote one's status in the social ladder (Moore & Benbasat, 1991). A study by Teo and Pok (2003) found a strong relationship between image and the adoption of WAP-enabled mobile phones. Consequently, the more one believes that using m-banking will enhance his social status, the more the probability of him adopting and using it. To verify this, the following hypothesis is proposed:

H4. Perceived image positively affects m-banking adoption.

v. **Perceived Financial Cost**

Perceived financial cost (PFC) refers to the degree which an individual believes that use of m-banking services is costly (Luarn & Lin, 2005). Mathieson et al. (2001) pointed out the significance of economic motivations and outcomes in influencing information system acceptance (IS). In the context of m-banking, Luarn & Lin (2005) found out that PFC plays a vital role in m-banking adoption and subsequent usage. Arguably, consumers will readily adopt m-banking if the perceived financial cost is

acceptable to them and will not adopt it if the perceived financial cost is high. To confirm this, the following hypothesis is proposed:

H5. Perceived financial cost negatively affects m-banking adoption.

3.4.2 Social Influence

Social influence can be defined as the extent of influence of reference groups (significant others) towards the adoption and use of technology (Teo & Pok, 2003). Al-Somali et al. (2009) confirmed the importance of social influence in determining the acceptance and usage of online banking in Saudi Arabia. Individuals may adopt and use a technology just to be in conformity with their reference groups rather than their own beliefs (Davis et al., 1989). Social influence is equivalent to subjective norm and entails other people's opinion, superior influence, and peer influence (Taylor & Todd, 1995a). Hence, in the context of m-banking, social influence can play a significant role in promoting or deterring adoption and usage of m-banking. To validate this, the following hypothesis is proposed:

H6. Social influence positively affects m-banking adoption.

3.4.3 Computer/Internet Experience

The direct impact of external variables on behavioural intention to adopt an information system has been confirmed in earlier studies (Jones & Hubona, 2006; and Compeau et al., 1999). Jones & Hubona (2006) found out that system experience has a significant and direct effect on intention to adopt and use an information system. Computer/internet experience refers to the level of expertise and frequency of usage of an information system by an individual. Thus, people that are experienced and skilled in the use of computer and internet will be more inclined to use m-banking

than those that have no prior skill or experience. To verify this claim, the following hypothesis is tested:

H7. Computer/internet experience positively affects m-banking adoption.

3.5 Population of the Study

Sekaran (2000) defined population as the entire group of people, events or things of interest that the researcher wishes to investigate. The population for this survey study are the residents of UUM comprising of staff and students. The staff constitute of academic and non-academic staff, while the students comprise of postgraduate and undergraduate students.

3.6 Sample Size and Sampling Technique

A sample is a subgroup of the target population studied for the purpose of generalizing about the target population (Creswell, 2008). To fully represent the different stratum of the population and to enable generalization, Area sampling will be used to select the sample. Area sampling does not rely on a population frame and is a good choice when the population is large (Sekaran, 2000). The population will be broadly divided into 3 distinct geographical locations constituting of the three main colleges in UUM; namely College of Arts and Science (CAS), College of Business (COB), and College of Law and International Studies (COLGIS).

150 participants drawn from the 3 divisions of the population was the sample size. This choice was based on the rule of thumb proposed by Roscoe (1975; in Punch 2003).

3.7 Data Collection Procedure

A survey questionnaire was used as the instrument for data collection. This choice is based on several factors such as cost considerations, nature of population, level of privacy and anonymity, and the response rate required. A total of 150 questionnaires were distributed and 130 responses were collected, of which 5 were found invalid due to incomplete data. Overall, 125 usable responses were analyzed, yielding a response rate of 83.3% (125/150). The questionnaires were delivered directly to participants and data was collected over a period of two weeks.

3.8 Data Analysis

The data of the study was analysed by means of both descriptive and inferential statistics. The data to be collected are quantitative in nature. The analysis of quantitative data entails a process of summarizing and 'distilling' data to arrive at a substantive conclusion about the way variables are related to each other (Punch, 2003).

The analysis was done in three successive stages as proposed by Punch (2003). First, the data was cleaned, codified and summarized for simplicity. Second, a descriptive analysis of the demographic features of respondents was done. Third, reliability test using cronbach alpha was done to ascertain the reliability of measurements used. And fourth, correlation and multiple linear regression were employed to analyse the relationship between independent variable (s) and the dependent variable. The analysis was done with SPSS software package version 12 for windows.

3.9 Summary of Chapter

This study employs a cross-sectional survey to investigate what influences adoption of m-banking. A questionnaire instrument adapted from previous studies was used as the means of data collection. A total number of 150 questionnaires were distributed out of which 125 were valid for analysis. The data collected was analyzed using SPSS version 12 for windows.

Also, the research model and the accompanying hypotheses to be tested were presented in this chapter.

CHAPTER FOUR

RESEARCH FINDINGS

4.1 Introduction

In this section, the research findings are presented. First, the demographic profile of respondents is given. Second, reliability test of measurements scale is depicted. Third, the result of multiple regression analysis used to test the hypotheses advanced is presented.

4.2 Demographic Profile of Respondents

The descriptive analysis of the respondents' demographic characteristics is presented. The demographic profile covered includes the age, gender, educational background, occupation, and income level of respondents.

4.2.1 Age Group

Table 4.1: Descriptive Statistics for Age Group of Respondents

Age Group	Frequency	Percent
16-29	72	57.6%
30-39	28	22.4%
40-49	21	16.8%
50 above	4	3.2%
Total	125	100%

From table 4.1 above, the total number of respondents sums up to 125. 72 respondents fall between the age group of 16-29 (57.6%), 28 respondents were in the category of 30-39 (22.4%), 21 were in the age category of 40-49 (16.8%), and only 4 (3.2%) respondents fall in the category of 50 and above. More than half of the respondents were in the age group of 16-29. This high percentage of respondents in this age group

is due to the fact that the majority of the population are students who are mostly youths.

4.2.2 Gender

Table 4.2: Descriptive Statistics of the Gender of the Respondents

Gender	Frequency	Percent
Male	69	55.2%
Female	56	44.8%
Total	125	100.0%

Table 4.2 shows the gender distribution of the respondents. 69 (55.2%) respondents were males, the remaining 56 (44.8%) were females. The variation in the respondents' gender distribution is not much as seen in the table (1) above. Overall, the male respondents' were more than the females.

4.2.3 Educational Background

Table 4.3: Descriptive Statistics of the Educational Background of the Respondents

Educational Background	Frequency	Percent
Degree	62	49.6%
M.sc	33	26.4%
PhD	16	12.8%
Diploma	4	3.2%
Secondary Cert.	8	6.4%
Others	2	1.6%
Total	125	100%

Table 4.3 shows the educational profile of respondents. 62 (49.6%) were in their degree level, 33 (26.4%) were pursuing their Masters degree, 16 had PhD (12.8%), only four (3.2%) had diploma certificate, 8 (6.4%) had finished secondary school, and

2 (1.6%) had other certificates. In general, the educational level of the respondents was high.

4.2.4 Occupation

Table 4.4: Descriptive Statistics of the Occupational Background of Respondents

Occupation	Frequency	percent
Student	84	67.2%
Academic	32	25.6%
Admin	9	7.2%
Total	125	100.0%

Table 4.4 shows the occupational background of the respondents. Students have the highest frequency of 84 out of 125 making up 67.2% of the total respondents. Next, is the academic staff with a frequency rate of 32 (25.6%), followed by the administrative staff with the frequency of 9 (7.2%). It is not surprising that the number of students and academic staff far outnumber that of administrative staff due to the type of environment (i.e. university) under study.

4.2.5 Income Level

Table 4.5: Descriptive Statistics of the Income Level of Respondents

Monthly Income/Allowance	Frequency	Percent
<1000RM	61	48.8%
1,001-2,000RM	23	18.4%
2,001-3,000RM	15	12.0%
3,001-4,000RM	9	7.2%
5,000RM and above	17	13.6%
Total	125	100.0%

Table 4.5 depicts the monthly income/allowance of the respondents. Almost half of the respondents have a monthly income of less than 1,000RM per month (48.8%). 23 (18.4%) of the respondents have a monthly income of 1,001-2,000RM, 15 (12.0%) have a monthly income between the range of 2,001-3,000RM, only 9 (7.2%) have income level ranging between 3,001-4,000RM, 17 (13.6%) have income of RM5, 000 and above. Overall, the income level is low with half of the respondents living on a monthly income/allowance of <RM, 1000. This is because the bulk of the respondents are students who are mostly supported by their parents or sponsors.

4.3 Cronbach Alpha Reliability Test

To ascertain the reliability of the measurement scales and to check the degree to which the items that make up the scale “hang together”, Cronbach alpha coefficient was calculated. Cronbach alpha checks the internal consistency reliability of scales. It checks whether the items that make up the scale actually measure the same underlying construct (Pallant, 2001). For a scale to be reliable its Cronbach alpha value should be

above .7 (Pallant, 2001; and George and Mallery, 2003). The following rules of thumb were advanced by George and Mallery (2003) on Cronbach alpha value thus:

“> .9 – Excellent, > .8 – Good, > .7 – Acceptable, > .6 – Questionable, > .5 – Poor, and
< .5 –Unacceptable”

The guideline above indicates that the higher the Cronbach’s alpha value is, the more reliable are the items measuring a given construct. Cronbach’s alpha closer to 1.00 is preferred. A Cronbach’s alpha value of 0.90 and above is regarded as the most reliable of scales, while a scale that has a Cronbach’s alpha value that is below 0.50 is regarded as unreliable and cannot be used to measure a given construct.

4.3.1 Reliability of Attitudinal Belief

To verify the reliability of the scales summed up to measure attitudinal belief, Cronbach alpha value was calculated. Attitudinal belief is a multidimensional construct of which a total of 23 items were added to measure it. The alpha value computed was 0.883, indicating the internal consistency reliability of the items measuring the underlying construct. Table 4.6 depicts the Cronbach alpha of attitudinal belief.

Table 4.6: Reliability of Attitudinal Belief

Cronbach’s Alpha	N of Items
.883	23

4.3.2 Reliability of Social influence

To examine the reliability of the scales summed up to measure social influence, Cronbach alpha value was computed. 6 items were summed to measure social influence. The alpha value for the six items was 0.836, indicating the internal consistency reliability of the items measuring the underlying construct. Table 4.7 shows the Cronbach alpha social influence

Table 4.7: Reliability of Social Influence

Cronbach's Alpha	N of Items
.836	6

4.3.3 Reliability of Computer/Internet Experience

To evaluate the reliability of the scales added to measure computer/internet experience, Cronbach's alpha value was computed. 2 items were summed to measure computer/internet experience. The alpha value for the 2 items was 0.867, also indicating the internal consistency reliability of the items measuring the underlying construct. Table 4.8 shows the Cronbach's alpha of computer/internet experience

Table 4.8: Reliability of Computer/Internet Experience

Cronbach's Alpha	N of Items
.867	2

4.3.4 Reliability of M-Banking Adoption

To evaluate the internal consistency reliability of the 3 items measuring the dependent variable (m-banking adoption), Cronbach's alpha value was calculated which yielded a value of 0.922, exceeding the required value of 0.70 (Pallant, 2001). Table 4.9 below shows the reliability of m-banking adoption.

Table 4.9: Reliability of M-banking Adoption

Cronbach's Alpha	N of Items
.922	3

4.3.5 Summary of Reliability Tests

To further assess the reliability of the items measuring each specific dimension of attitudinal belief which consist of five constructs; Cronbach's Alpha value was calculated for each. Below (Table 4.10) is the summary of reliability test for all constructs measured.

Table 4.10: Summary of Reliability Tests

Variable	Cronbach's Alpha
Attitudinal Belief	.883
Social Influence	.836
Computer/internet Experience	.867
M-Banking Adoption	.922
Perceived Usefulness	.917
Perceived Ease of Use	.802
Perceived Credibility	.835
Image	.893
Perceived Financial Cost	.703

In summary, the Cronbach's alpha value for all variables ranged from 0.703 to 0.922, satisfying and even surpassing the recommended value of 0.70 (Pallant, 2001; & George & Mallery, 2003). Thus, the measurement items for the constructs in this study are deemed reliable and therefore accepted as true measures of the variables they represent.

4.4 Correlation Analysis

To explore the strength and direction of linear relationship between the variables of interest, Pearson product-moment correlation is used. Pearson correlation coefficient is most suitable when the variables are continuous (Sekaran, 2000). Pearson correlation coefficients (r) can range from -1 to +1, indicating a negative or positive relationship between variables. A positive correlation indicates that as one variable increases so does the other, while a negative correlation indicates that when one variable increases, the other decreases. A correlation of 0 indicates that there is no relationship between the variables. Here, we are interested in the strength and direction of relationship between the independent variables (predictive variables) and the dependent variable (m-banking adoption). The correlation coefficient (r) of attitudinal belief (a multidimensional construct) and m-banking adoption will be calculated as a whole as well as distinctly (i.e. the correlation coefficient of each underlying dimension will be calculated). A high correlation (whether negative or positive) points to a strong relationship between the variables, while a low correlation coefficient (r) indicates a weak relationship. Cohen (1988) provides a classification of the strength of relationship based on the size of the value of Pearson Correlation coefficient (r) thus:

Table 4.11 Guideline for Pearson correlation strength

r = .10 to .29 or r = -.10 to -.29	Small
r = .30 to .49 or r = -.30 to -.49	Medium
r = .50 to 1.0 or r = -.50 to -1.0	Large

Below (Table 4.12) is the summary of correlation analysis:

Table 4.12: Summary of Correlation Analysis

Pearson Correlation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	DV(9)
Attitudinal Belief (1)	1	.519**	-.092	.787**	.739**	.838**	.782**	-.341**	.642**
Social Influence (2)	.519**	1	-.225*	.219*	.147	.526**	.573**	-.418**	.503**
Computer/Internet Experience (3)	-.092	-.225*	1	.059	.026	-.117	-.156	.257**	.000
Perceived Usefulness (4)	.787**	.219*	.059	1	.587**	.538**	.397**	-.044	.546**
Perceived Ease Of Use (5)	.739**	.147	.026	.587**	1	.543**	.396**	-.080	.403**
Perceived Credibility (6)	.838**	.526**	-.117	.538**	.543**	1	.660**	-.227*	.499**
Perceived Image (7)	.782**	.573**	-.156	.397**	.396**	.660**	1	-.273**	.476**
Perceived Financial Cost (8)	-.341**	-.418**	.257**	-.044	-.080	-.227*	-.273**	1	-.240**
M-Banking Adoption (9)	.642**	.503**	.000	.546**	.403**	.499**	.476**	-.240**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4.12 above shows the summary of correlations among the variables of interest. The shaded cells indicate the correlation of each independent variable with the dependent variable (m-banking adoption). Using the guideline given by Cohen (1988), three of the independent variables (attitudinal belief, perceived usefulness, and social influence) are highly and positively correlated with the dependent variable ($r = .642$, $r = .546$, $r = .503$ respectively where $p < .005$). This means that attitudinal belief factors, social influence and perception of usefulness positively influence the

adoption of m-banking. The next three independent variables (perceived credibility, perceived image, and perceived ease of use) are moderately and positively correlated with the dependent variable ($r = .499$, $r = .403$, $r = .476$ respectively where $p < .005$). In essence these three factors have a moderate positive impact on adoption of m-banking.

Perceived financial cost is faintly and negatively correlated with the dependent variable ($r = -.240$ where $p < .007$). This means that perception of financial cost has a minimal negative impact on the adoption of m-banking. The last factor that was found to have a 0 correlation with the dependent variable is computer/internet experience ($r = .000$). This indicates that level of experience and frequency of use of computer/internet does not have any effect on adoption intention.

4.5 Multiple Regression Analysis

To test the hypotheses advanced, multiple regression analysis was used. Multiple regression analysis is an advanced extension of correlation, where one variable (the criterion variable) can be predicted based on a number of variables (predictor variables). Multiple regression analysis aids in testing models/theories. It gives us information about the model as a whole and the relative significance (contribution) of each factor that form the model. It is a most suitable statistics when you have a set of continuous independent variables (two or more) and one dependent variable (Pallant, 2001). Two key statistical analysis are important here; the squared multiple correlation coefficient (R^2), and the standardized coefficient weight (beta weight). The R^2 shows how much of variance in the dependent variable (in our case m-banking adoption) is explained by the model (predictor variables). The beta value on the other hand, tells us the significance of each independent variable (in the model) in

predicting the dependent variable (m-banking adoption). Both the R^2 and beta value range between 0 and 1.0, the more closely the value is to 1.0 the better. To test the model, the multidimensional construct (attitudinal belief) will be decomposed to the specific constructs that combine to produce it. Below (Table 4.13, 4.14, & 4.15) is the summary of multiple regression analysis conducted.

Table 4.13: R Square Value (R^2)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688(a)	.474	.442	1.73535

Dependent Variable: M-banking Adoption

Table 4.13 above (model summary) shows the value of R Square and the Adjusted R Square value. The R^2 value tells us the amount of variance in the dependent variable (m-banking adoption) accounted by the model. A high variance indicates a high level of success of the model. Sometimes, the R square value have a propensity to somewhat overrate the success of the model when applied to the real world scenario. The Adjusted R Square value provides a more correct estimate measure of the success of the model. In our own case, the R Square value is .474 and the Adjusted R Square is .442. This implies that the model accounts for 47.4% (expressed as percentage) of the variance in m-banking adoption. To better depict a true estimate the Adjusted R Square indicates that the model explains 44.2% of the variance in the dependent variable. This is a very good model when compared to findings reported in past journal articles (Chau and Hu, 2001; & Mathieson, Peacock, & Chin, 2001).

Table 4.14: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	317.068	7	45.295	15.041	.000(a)
	Residual	352.340	117	3.011		
	Total	669.408	124			

Dependent Variable: M-banking Adoption

The next table (Table 4.14) shows the ANOVA which evaluates the statistical significance of the model. The result shows that the research model is significant (Sig. = .000, meaning that $p < .005$).

Table 4.15: Beta Coefficient

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.437	1.902		-.230	.819
	Usefulness	.205	.049	.373	4.222	.000
	Perceived ease of use	.068	.070	.087	.974	.332
	Perceived credibility	.005	.078	.007	.067	.947
	Perceived image	.051	.058	.086	.884	.378
	Social influence1	.186	.049	.345	3.762	.000
	Total computer/internet	.161	.134	.085	1.203	.231
	total financial cost	-.093	.102	-.069	-.920	.360

Dependent Variable: M-banking Adoption

The last table (Table 4.15) presents the Standardized Beta Coefficient. This value tells us the unique contribution of each independent variable to the model when other predictor variables are controlled for. A large value implies that the underlying variable made a significant contribution to the model. Looking at the Standardized Beta column, we can see that only two variables; perceived usefulness

(Beta= .373) and social influence (Beta= .345) made significant contribution to the model. Overall, perceived usefulness made the largest contribution in explaining the dependent variable. The t and Sig (p) values indicate the statistical significance of each independent variable in predicting the dependent variable. A large absolute t value and a small p value ($p < .05$) points out that a predictor variable is significant in predicting the dependent variable. From the result of the analysis (Table 4.15) only perceived usefulness ($t = 4.222$ and $p = .000$) and social influence ($t = 3.762$ and $p = .000$) are significant factors in predicting m-banking adoption.

From the results obtained in the multiple regression analysis, only perceived usefulness and social influence are significant and they explain 44.2% of the variance in the dependent variable (m-banking adoption). Thus, hypotheses H1 and H6 are accepted. On the other hand, hypotheses H2, H3, H4, H5, and H7 were not supported and thus rejected in this study. Perceived ease of use, perceived credibility, perceived image, perceived financial cost, and computer and internet experience were found to be insignificant in explaining the variation in the dependent variable. Computer/internet experience was found to have a 0 correlation with the dependent variable ($r = .000$ where $p = .998$).

4.6 Summary of Chapter

Data collected was analyzed and interpreted in a series of stages. First, the demographic profile of respondents was summarised and analyzed. Second, the reliability of the items used in measuring the constructs was validated using Cronbach's alpha. Third, the correlation of the dependent variables and the dependent variable was ascertained through Pearson product moment correlation method. And lastly, standard multiple regression analysis was used to establish the statistical

significance of the model and the predictive power of each independent variable in explaining the dependent variable (m-banking adoption).

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter will elaborate on the research findings, its implication to theory and practice, limitations encountered and recommendations for future research. Also, a revisit of the research objectives will be made to see whether these objectives have been realized. Furthermore, the study findings will be compared with past works done in the field of IS adoption.

5.2 Recapitulation of Study Findings

The steady rise in the use of mobile devices mainly mobile handheld phones has made financial institutions (majorly banks) foresee the opportunities therein; of extending banking services to the unbanked and also increase their worldwide coverage, presence, and market share. The recent trend in banking is the personalization of services and availing customers the opportunity to conduct financial transactions anywhere they are, 24 hours a day. As the number of banking and financial institutions that provide mobile banking services increases, it becomes vital for them to know what drives customers to adopt and use these services. Additionally, the

success or failure of these services is based on their acceptance and use by the market.

The present study utilized constructs from TAM and decomposed TPB to investigate and validate the significant factors influencing the adoption of mobile banking services in the context of Universiti Utara Malaysia. Findings showed that only the perception of usefulness (PU) and social influence (i.e. normative pressure) were significant in influencing the adoption of mobile banking services. The three research objectives advanced will be answered thus:

5.2.1 Research Objective 1

The first research objective seeks to investigate and validate the factors influencing m-banking adoption. To answer this objective the correlation table will be used.

Table 4.16: Correlation of M-banking Adoption with the Independent Variables

	M-banking Adoption (DV)	Attitudinal Belief (IV)	PU (IV)	PEOU (IV)	PC (IV)	Image (IV)	PFC (IV)	Computer/Internet Exp (IV)	Social Influence (IV)
M-banking Adoption (DV)	1	.642**	.546**	.403**	.499**	.476**	-.240**	.000	.503**
Sig. (2-tailed)		.000	.000	.000	.000	.000	.007	.998	.000
N	125	125	125	125	125	125	125	125	125

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

From the table above (Table 4.16), all the independent variables with the exception of computer/internet experience correlate with the dependent variable. Attitudinal belief had the highest correlation (.642), followed by perceived usefulness (.546) and social influence (.503). Perceived ease of use, perceived credibility, and image had a moderate influence on m-banking adoption. Perceived financial cost had a negative

but low correlation with m-banking adoption. Overall, all the independent factors tested except one (i.e. computer/internet experience) influence m-banking adoption.

5.2.2 Research Objective 2

The second objective is to determine which of the factors significantly influence the dependent variable (m-banking adoption). To answer this objective the multiple regression analysis will be utilized. Specifically, the Beta coefficient table (Table 4.15) will be used.

Table 4.17: Summary of Beta Coefficients

Model	Beta	t	Sig.
Perceived usefulness	.373	4.222	.000
Perceived ease of use	.087	.974	.332
Perceived credibility	.007	.067	.947
Perceived image	.086	.884	.378
Perceived financial cost	-.069	-.920	.360
Social influence	.345	3.762	.000
Computer/internet exp.	.085	1.203	.231

a Dependent Variable: M-banking Adoption

Table 4.17 shows the contribution and statistical significance of each independent variable to the model. From the Beta column, two variables have the largest influence on the dependent variable (PU = .373 &, social influence = .345 respectively). Similarly, the t and Sig (p) values indicate that only two variables have statistical significance (i.e. PU & social influence) where p = .000. In essence, only two factors were found to have dominant influence on m-banking adoption.

5.2.3 Research Objective 3

In the same light, the third objective of this study is to develop a model based on findings. The findings showed only two factors to be significant and hence the final model excludes all those factors that are insignificant. The proposed model for this research is presented thus:

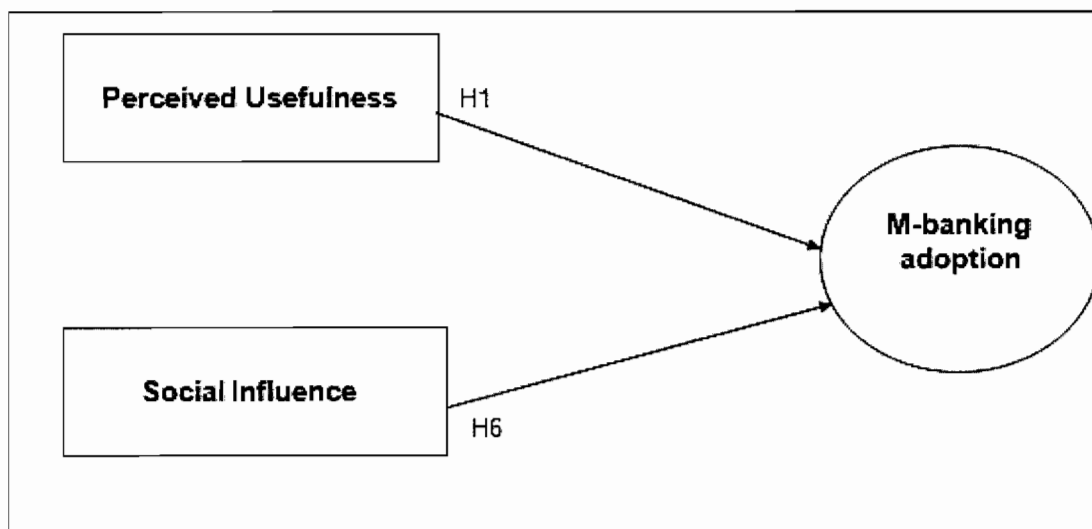


Figure 5.1: Proposed Model

Figure 5.1 is the final model of the research which was based on results obtained. The accepted hypotheses (i.e. H1 & H6) were included in the final model. Hypotheses H2, H3, H4, H5, and H7 did not satisfy the statistical requirement and thus rejected. Below (Table 4.18) is the summary of the hypotheses tested.

Table 4.18: Summary of Hypotheses Tested

Hypotheses	Statuses
H1. Perceived usefulness positively affects m-banking adoption	Accepted
H2. Perceived ease of use positively affects m-banking adoption	Rejected
H3. Perceived credibility positively affects m-banking adoption	Rejected
H4. Perceived image positively affects m-banking adoption	Rejected
H5. Perceived financial cost negatively affects m-banking adoption	Rejected
H6. Social influence positively affects m-banking adoption	Accepted
H7. Computer/internet exp. Positively affects m-banking adoption	Rejected

5.3 Discussion

The findings obtained from this study are quite interesting and intriguing; attitudinal belief factors and social influence were found to impact on m-banking adoption. These findings corroborate with the results of Teo and Pok (2003). All constructs have a correlation with m-banking adoption except computer/internet experience construct. Also, contrary to the popular findings in the field of IS adoption, the study findings indicate that only two factors significantly influence m-banking adoption. One of this factors is an attitudinal factor (perceived usefulness), and the other a normative factor (social influence).

Perceived usefulness has received tremendous support from past research works (Davis, 1989; Davis et al., 1989; Subramanian, 1994; Keil et al., 1995; & Hu et al., 1999) as a dominant factor in explaining adoption of an IS. Thus, if mobile banking is perceived to be useful, the tendency to adopt it will be greater than if it is perceived

otherwise. By and large, perceived usefulness had the most significant effect on adoption intention.

With regards to social influence (a normative factor), prior researches have confirmed its significance in explaining IS adoption (Taylor & Todd, 1995; Teo & Pok, 2003; Al-Somali et al., 2009; & Kleijnen et al., 2004). Social influence plays a significant role in influencing adoption of an IS particularly at the early periods where one does not have full information about the technology. Specifically, potential adopters have to rely on their reference group (significant others) to form an opinion about a given IS. Normally, potential adopters rely on those they trust and look up to (i.e. parents, mentors, friends and colleagues) for advice before taking any concrete step to adopt a new technology. Thus, m-banking adoption is significantly influenced by the social group opinion about it.

The remaining attitudinal belief factors (i.e. PEOU, PFC, PC, and perceived image) were not supported in the findings of this study. Perceived ease of use was found to be insignificant in influencing mobile banking adoption. This result is in contrast with previous findings (Luarn & Lin, 2005; Davis et al., 1989; Wang et al., 2003, Shih, 2004; Venkatesh & Morris, 2000; Igbaria et al., 1997; Chau, 1996; & Al-Somali et al., 2009). A possible reason for this outcome could be attributed to the composition of the population of study, comprising majorly of the young and adventurous who were born in the information age who do not see anything new when it comes to using a technology. Most youngsters nowadays are IT savvy and are not deterred by the complexity of a new technology.

Also, perceived credibility (i.e. the security and privacy concerns) was found to be an insignificant factor in determining mobile banking adoption. This is inconsistent with

the findings of Wang et al. (2003), and Luarn and Lin (2005). A probable explanation could be ascribed to the culture of the people, where security and privacy issues do not matter most as compared to western cultures. In the same vein, perceived financial cost did not have any significant influence in influencing the adoption of mobile banking services. This result is in contrast with that of Luarn and Lin (2005). That is to say that people are not concerned much about the financial implication of using mobile banking services but rather, they are more concerned with the benefits it renders. As long as it provides value, the financial aspect is secondary.

Furthermore, perceived image proved to have no significance in influencing mobile banking adoption. This is contrary to what Teo and Pok (2003), and Tornatzky and Klein (1982) found. A possible reason could also be attributed to the culture and lifestyle of the people (Asians) which is simple, modest and restrained compared to western culture that is flashy, ostentatious and flamboyant.

The third construct, computer/internet experience was found to be totally uncorrelated ($r = .000$) with the dependent variable (m-banking adoption). The result of multiple regression analysis showed that computer/internet experience does not influence m-banking adoption. This finding is not consistent with that of Jones and Hubona (2006), and Compeau et al. (1999). That is to say that being computer/internet literate and experienced does not contribute or influence one in adopting mobile banking services.

The final model consists of only the dominant factors and discards the weak factors.

5.4 Contributions of the Research Study

The findings have both theoretical and practical significance. In the practical aspect, the research findings of this study will provide banking institutions and mobile banking practitioners useful information in formulating strategies that can enhance the adoption of mobile banking services. For instance, banks can promote and market mobile banking services by emphasising on its usefulness to the target market. Massive advertisements can be made by banks promoting mobile banking and showing therein the benefits that lies in it. Additionally, since social influence have been found to be a driving force in influencing adoption; banks can use celebrities, leaders, and people that are respected and revered in the society to correct any misconception about mobile banking services. Ensuring that people's opinion is positive about mobile banking services will contribute a lot in influencing adoption.

Theoretically, the study findings contributes to the body of literature in the field of IS adoption. Specifically, it contributes to the understanding of mobile banking adoption. Furthermore, the study has shown that applying TAM and TPB does not necessarily gain support in every circumstance; environmental and cultural factors can also play a significant role in influencing adoption.

5.5 Limitations and Recommendation for Future Research

As it is with all research works, this study is not without some shortcomings. First, this study employs a cross-sectional method; that is data was measured at a single point in time. Nevertheless, opinions, attitudes and perceptions can change overtime as experience increases. This may have a significant implication for researchers and practitioners that want to measure and predict the m-banking adoption over a given period of time. Other, studies could employ a longitudinal approach to study mobile banking adoption. Second, the findings of this study and its associated implications

were gotten from one study that is confined to a single technology and a particular environment. To further generalize the study findings, more research is required to test it on other technologies and environments. Third, more constructs are needed to be integrated to TAM and TPB to improve the predictive power of the models. Environmental factors and cultural factors can be integrated to further enhance understanding of adoption intention.

5.6 Conclusion

The intent of this study was to investigate and validate the factors that motivate the adoption of mobile banking services in UUM. By drawing upon the strength of established theories in the IS/IT acceptance literature, the study extends the applicability of TAM and TPB constructs in examining the adoption of a relatively new technology (mobile banking) in a new environment. The results obtained have shown that TAM constructs (specifically perceived usefulness) and TPB constructs (specifically social influence) are valid and applicable in other contexts. Understanding what influences users (customers) to accept mobile banking can be beneficial to banks, system developers, and marketing practitioners in developing and marketing m-banking services that will be acceptable by the target market.

REFERENCES

- Ajzen, I. (1985). From intentions to actions: a theory of planned behavior. In Kuhl, J. & Beckmann, J. (Eds), *Action control: from cognition to Behavior* (pp. 11-39). New York: Springer-Verlag.
- Al-Somali, S.A., Gholami, R., and Clegg, B. (2009). An investigation into the acceptance of online banking in Saudi Arabia. *Technovation*, 29(2), 130-141.
- Amin, H. (2007). Is the technology acceptance model valid for BIMB mobile banking? *International Journal of e- Business Management*, 1(1), 37-49.
- Amin, H., Baba, R., and Muhammad, M. Z. (2007). An analysis of mobile banking acceptance by Malaysian customers. *Sunway Academic Journal* 4. Retrieved 3rd December, 2009 from http://www.sunway.edu.my/others/vol4/mobile_banking.pdf
- Bagozzi, R.P. (1984). Expectancy value attitude models: An analysis of critical measurement issues. *International Journal of Research in Marketing*, 1, 295-310.
- Chau, P. Y. K., and Hu, P. J.-H. (2001), Information technology acceptance by individual professionals: A model comparison approach. *Decision Sciences*, 32(4), 699–719.
- Cohen, J. W. (1988), *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Compeau, D.R., Higgins, C.A., and Huff, S. (1999). Social cognitive theory and individual reactions to computing technology: A longitudinal study. *MIS Quarterly*. 23(2), 145-158.
- Creswell, J.W. (2008). *Educational Research: planning, conducting and evaluating quantitative and qualitative research* (3rd ed.). US: Pearson Education International.
- Davis, F.D. (1989), Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 318-339.

- Davis, F.D., Bagozzi, R.P., and Warshaw, P.R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35 (8), 982- 1003.
- Deng, Z., Lu, Y., and Chen, Z. (2010). Exploring Chinese user adoption of mobile banking. *International Journal of Information Technology and Management*, 9(3), 289-301.
- Fishbein, M., and Ajzen, I. (1975). *Belief, Attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- George, D., and Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference. 11.0 update* (4th ed.). Boston: Allyn & Bacon.
- Hair, J.F. Jr, Anderson, R.E., Tatham, R.L., and Black, W.C. (1998). *Multivariate data analysis*. 5th ed. New Jersey: Prentice Hall Inc.
- Hu, P.J., Chau, P.Y.K., Sheng, O.R.L., and Tam, K.Y. (1999). Examining technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems*, 16(2), 91-112.
- Igbaria, M., Zinatelli, N., Cragg, P., and Cavaye, A. (1997). Personal computing acceptance factors in small firms: A structural equation model. *MIS Quarterly*, 279-302.
- Jones, A.B., and Hubona, G.S. (2006). The mediation of external variables in the technology acceptance model. *Information & Management*, 43(6), 706-717.
- Kerlinger, F.N. (1973). *Foundation of behavioural research*. (2nd edition). New York: Holt, Rinehart & Winston.
- Keil, M., Beranek, P.M., and Konsynski, B.R. (1995). Usefulness and ease of use: Field study evidence regarding task considerations. *Decision Support Systems*, 13, 75-91.
- Kleijnen, M., Wetzel, M., and de Ruyter, K. (2004). Consumer acceptance of wireless finance. *Journal of Financial Services Marketing*, 8(3), 206-217.

- Legris, P., Ingham, J., and Colletette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & Management*, 40(3), 191-204.
- Luarn, P., and Lin, H.-H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, 21(6), 873-891.
- Mathieson, K. (1991). Predicting user intentions: comparing technology acceptance model with the theory of planned behavior. *Information Systems Research*, 2(3), 173-191.
- Mathieson, K., Peacock, E., and Chin, W. W. (2001), Extending the technology acceptance model: The influence of perceived user resources. *DATA BASE for Advances in Information Systems*, 32(3), 86-112.
- Mattila, M. (2003). Factors affecting the adoption of mobile banking services. *Journal of Internet Banking and Commerce*. Retrieved 3rd December, 2009 from <http://www.arraydev.com/commerce/jibc/0306-04.htm>
- Moore, G.C., and Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192-222.
- Pallant, J. (2001). *SPSS survival manual: A step by step guide to data analysis using SPSS for Windows (version 10 and 11)*. USA, Philadelphia: Open University Press.
- Porter, C.E., and Donthu, N. (2006). 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), 999-1007.
- Punch, K.F. (2003). *Survey Research: The basics*. London: SAGE Publications Ltd.
- Punch, K.F. (2006). *Developing effective research proposals, (2nd ed.)*. London: SAGE Publications Ltd.

- Riemenschneider, C.K., Harrison, D.A., and Mykytyn, P.P. (2003). Understanding it adoption decisions in small business: integrating current theories. *Information and Management*, 40(4), 269-285.
- Rogers, E.M. (1995). *Diffusion of innovations (4th ed.)*. New York: Free Press.
- Sekaran, U. (2000). *Research methods for business: A skill-building approach (3rd ed.)*. US: John Wiley & Sons, Inc.
- Shih, H.-P. (2004). Extended technology acceptance model of internet utilization behavior. *Information & Management*, 41(6), 719-729.
- Subramanian, G.H. (1994). A replication of perceived usefulness and perceived ease of use measurement. *Decision Sciences*, 25(5/6), 863-874.
- Tan, M., and Teo, T.S.H. (2000). Factors influencing the adoption of internet banking. *Journal of the Associations for Information Systems*, 1(5), 1-44.
- Taylor, S., and Todd, P.A. (1995a). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144-176.
- Taylor, S., and Todd, P.A. (1995b). Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption intentions. *International Journal of Research in Marketing*, 12(2), 137-155.
- Teo, T.S.H., and Pok, S.H. (2003). Adoption of WAP-enabled mobile phones among internet users. *The International Journal of Management Science*, 31(6), 483-498.
- Tiwari, R. and Buse, S. (2006). *The Mobile Banking Prospects: A Strategic Analysis of Mobile Commerce Opportunities in the Banking Sector*. Hamburg University Press, Hamburg.
- Tiwari, R., Buse, S., and Herstatt, C. (2006a). *Mobile banking as business strategy: Impact of mobile technologies on customer behaviour and its implication for banks*. Working Paper No. 37. Retrieved 3rd March, 2010 from:
http://www.tuharburg.de/tim/downloads/arbeitspapiere/Working_Paper_37.pdf
 f,

- Tiwari, R., Buse, S., and Herstatt, C. (2006b). Customer on the Move: Strategic Implications of Mobile Banking for Banks and Financial Enterprises, in *CEC/EEE 2006, Proceedings of The 8th IEEE International Conference on E-Commerce Technology and The 3rd IEEE International Conference on Enterprise Computing, E-Commerce, and E-Services*, 522-529, San Francisco.
- Tiwari, R., Buse, S., and Herstatt, C. (2007). Mobile services in banking sector: The role of innovative business solutions in generating competitive advantage, in: *Proceedings of the International Research Conference on Quality, Innovation and Knowledge Management*. New Delhi, 886-894.
- Tornatzky, L.G., and Klein, K.J. (1982). Innovation characteristics and innovation adoption implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, 29(1).
- Vijayarathy, L.R. (2004). Predicting consumer intentions to use on-line shopping: the case for an augmented technology acceptance model. *Information & Management*, 41(6), 747-762.
- Venkatesh, V., and Morris, M.G. (2000). 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), 115-139.
- Wang, Y.-S., Wang, Y.-M., Lin, H.-H., and Tang, T.-I. (2003). Determinants of user acceptance of internet banking: An empirical study. *International Journal of Service Industry Management*, 14(5), 501-519.

APPENDICES

APPENDIX A: Questionnaire



Dear Respondent,

RE: M.Sc. Research Project

With reference to the above captioned, you have been selected as a respondent in this research study.

I am a Master's student in the Faculty of Information Technology, Universiti Utara Malaysia conducting a research study in partial fulfillment of the requirements for the degree of Master of Science (ICT). The purpose of this research is to determine the major factors influencing the **adoption of m-banking**.

I would appreciate much if you could spare some time and thought to complete this survey questionnaire. Your full co-operation is a pre-requisite to the success of this research endeavor.

This questionnaire comprises of three sections (**A, B & C**). Please indicate your choice by ticking (✓) or putting an (**X**) mark in the box provided.

All information obtained will be treated as private and confidential.

Please do not hesitate to contact me if you have any enquiries with regards to the questionnaire. Thank you for your willingness to participate in this survey.

Thank you.

Nurudeen Abdulkadir

802311

M.Sc. (ICT)

Mobile: 0175538380/0134277781

Email: nurgido@yahoo.com

APPENDIX A: Questionnaire

M-BANKING ADOPTION: A SURVEY

Instructions:

- Please indicate your choice by putting an mark within the box.
- Indicate your response on all items.

Section A: Participant Profile

1. Age group

- 16 – 29 years
- 30 – 39 years
- 40 – 49 years
- 50 years and above

2. Gender

- Male
- Female

3. Highest educational background

- First degree
- Masters degree
- PhD or equivalent
- Diploma
- Secondary school Certificate
- Others-please specify-----

4. Occupation

- Student
- Academic staff
- Administrative staff
- Others-please specify-----

5. Monthly income/allowance

- Less than Rm 1,000
- Between Rm 1,001 to Rm 2,000
- Between Rm 2,001 to Rm 3,000
- Between Rm 3,001 to Rm 4,000
- Rm 5,000 and above

Section B: Computer and Internet Experience

6. How will you rate your level of computer/internet experience?

- None Beginner Intermediate Advanced Expert
-

7. How frequently do you use computer?

- Almost never Monthly Weekly Several times a week Daily
-

M- Banking Adoption Survey

8. How frequently do you use the Internet?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Almost never | Monthly | Weekly | Several times a week | Daily |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Section C:

Please indicate your degree of agreement/disagreement with the following statements.

9. I find mobile banking to be a better way of banking:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
10. I believe that mobile banking will be of benefit to me:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
11. I believe that mobile banking will help me better manage my banking transactions:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
12. I believe that use of mobile banking would help improve my performance in conducting banking transactions:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
13. I believe that use of mobile banking would make it easier for me to conduct banking transactions:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
14. I would find mobile banking useful for conducting banking transactions:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
15. I believe that learning to use mobile banking would be easy for me
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
16. I believe that it would be easy for me to become skillful at using mobile banking:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
17. I believe mobile banking will be very convenient to use:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
18. I believe learning to use mobile banking requires little effort:
- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
19. I believe that conducting banking transactions through mobile banking is not difficult:

M- Banking Adoption Survey

Strongly Disagree Disagree Neutral Agree Strongly Agree

20. I believe mobile banking is a reliable and credible means of conducting banking transactions:

Strongly Disagree Disagree Neutral Agree Strongly Agree

21. I trust mobile banking in conducting my banking transactions:

Strongly Disagree Disagree Neutral Agree Strongly Agree

22. I believe that use of mobile banking would not reveal my personal information:

Strongly Disagree Disagree Neutral Agree Strongly Agree

23. I believe that mobile banking is free from security threats:

Strongly Disagree Disagree Neutral Agree Strongly Agree

24. Use of mobile banking will improve my image status among my peers

Strongly Disagree Disagree Neutral Agree Strongly Agree

25. People who use mobile banking are IT fashion conscious:

Strongly Disagree Disagree Neutral Agree Strongly Agree

26. I believe that use of mobile banking would help improve my prestige:

Strongly Disagree Disagree Neutral Agree Strongly Agree

27. I believe that use of mobile banking would help improve my IT savvy image:

Strongly Disagree Disagree Neutral Agree Strongly Agree

28. I believe that use of mobile banking would help me appear technology fashion conscious:

Strongly Disagree Disagree Neutral Agree Strongly Agree

29. I will adopt mobile banking to conduct banking transactions only if the cost charge is cheap:

Strongly Disagree Disagree Neutral Agree Strongly Agree

30. I believe that it would cost me a lot to use mobile banking:

M- Banking Adoption Survey

- | | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 31. I believe that there would be financial barriers (e.g. expensive line rent) to my using mobile banking: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. My friends would expect me to use mobile banking: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. My colleagues will expect me to use mobile banking: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 34. I will use mobile banking if it is acceptable by my family members: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 35. I will use mobile banking if my parents require me to do so: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. I will adopt mobile banking if the general opinion about it is positive: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. My family members would expect me to use mobile banking: | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

M- Banking Adoption Survey

38. If I am given the opportunity to use mobile banking, then I would adopt it for my banking transactions:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. I will adopt mobile banking as soon as I have the opportunity to do so:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

40. I would adopt mobile banking in the future for my banking transactions if I have the opportunity:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

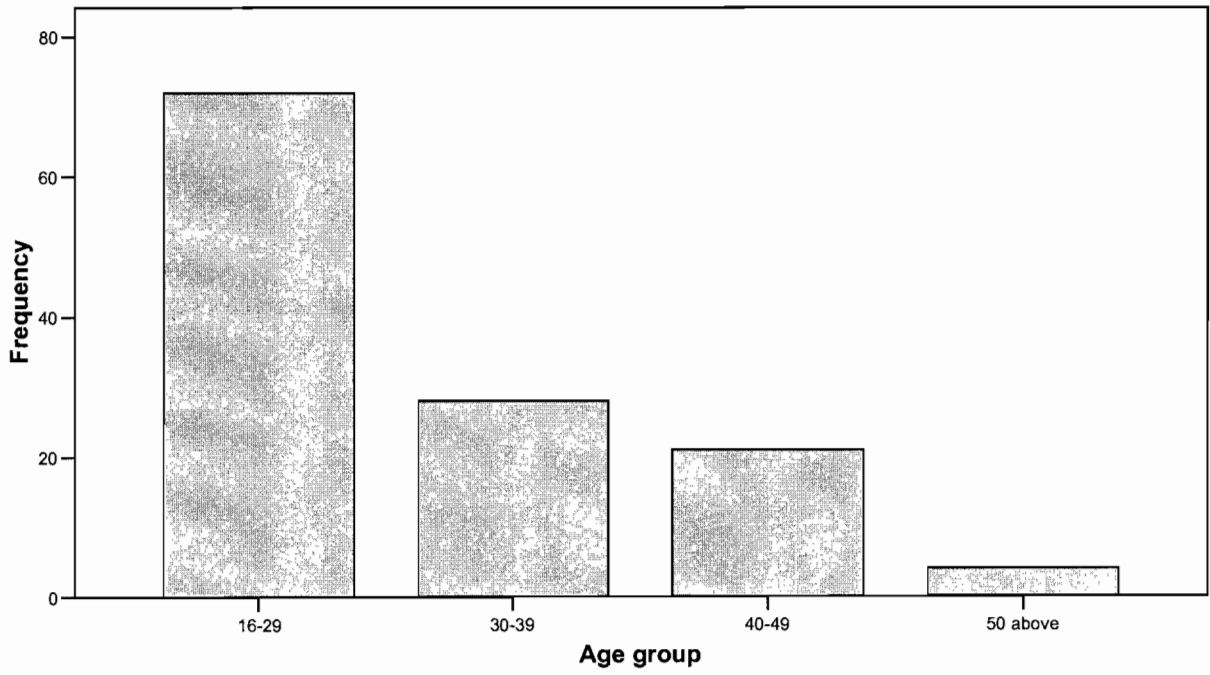
Thank you so much for your participation!

APPENDIX B: Descriptive Statistics

Age group		
N	Valid	125
	Missing	0
Mean		1.66
Median		1.00
Mode		1
Std. Deviation		.872
Skewness		1.031
Std. Error of Skewness		.217
Kurtosis		-.097
Std. Error of Kurtosis		.430
Minimum		1
Maximum		4

Age group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-29	72	57.6	57.6	57.6
	30-39	28	22.4	22.4	80.0
	40-49	21	16.8	16.8	96.8
	50 above	4	3.2	3.2	100.0
	Total	125	100.0	100.0	

Age group

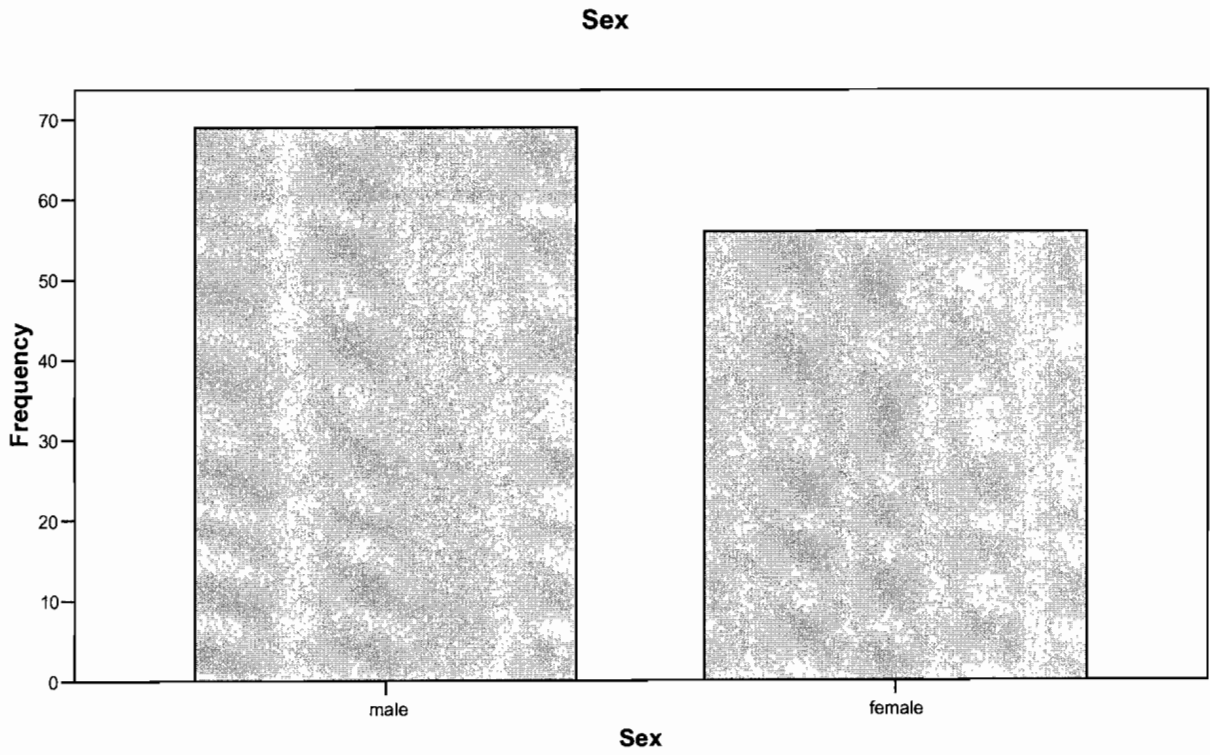


Sex

N	Valid	125
	Missing	0
Mean		1.45
Median		1.00
Mode		1
Std. Deviation		.499
Skewness		.212
Std. Error of Skewness		.217
Kurtosis		-1.987
Std. Error of Kurtosis		.430
Minimum		1
Maximum		2

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	69	55.2	55.2	55.2
	female	56	44.8	44.8	100.0
Total		125	100.0	100.0	



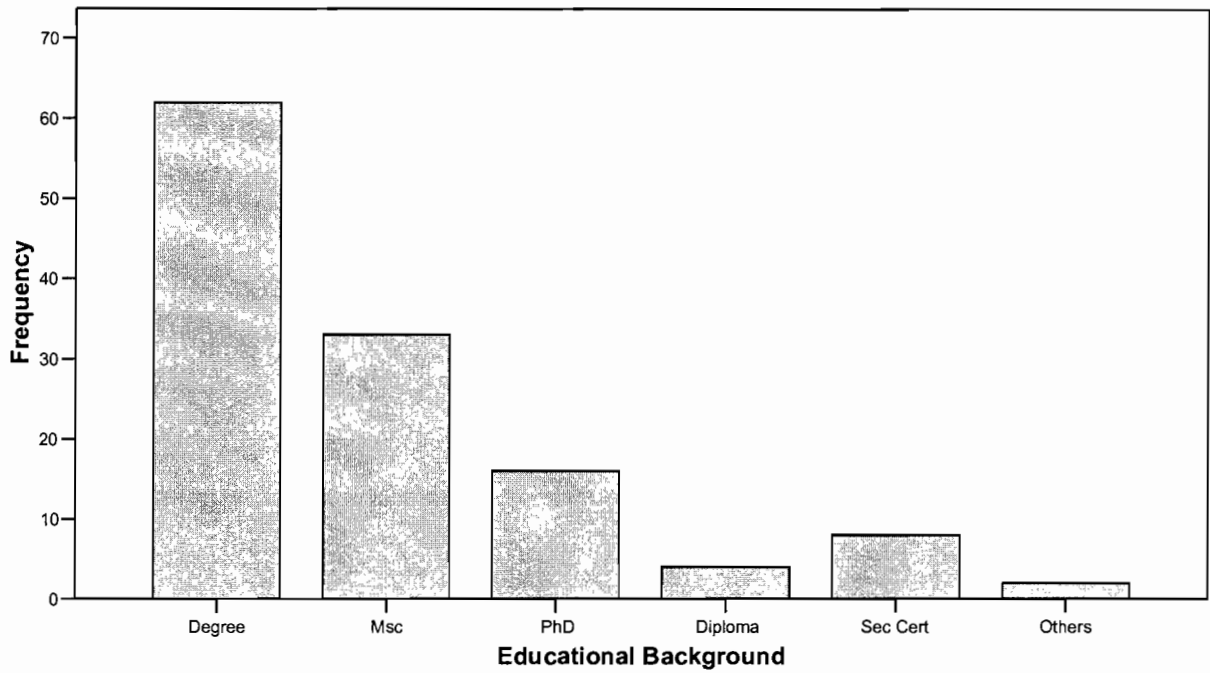
Educational Background		
N	Valid	125
	Missing	0

Mean	1.95
Median	2.00
Mode	1
Std. Deviation	1.263
Skewness	1.459
Std. Error of Skewness	.217
Kurtosis	1.481
Std. Error of Kurtosis	.430
Minimum	1
Maximum	6

Educational Background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Degree	62	49.6	49.6	49.6
	Msc	33	26.4	26.4	76.0
	PhD	16	12.8	12.8	88.8
	Diploma	4	3.2	3.2	92.0
	Sec Cert	8	6.4	6.4	98.4
	Others	2	1.6	1.6	100.0
	Total	125	100.0	100.0	

Educational Background

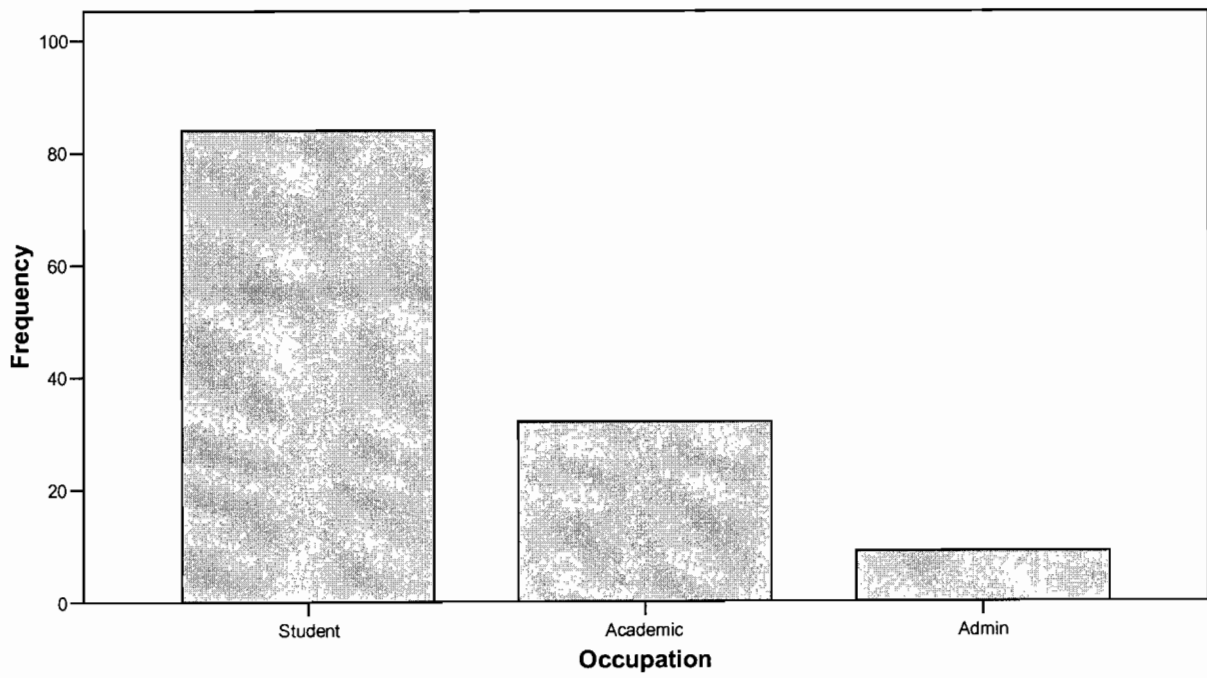


Occupation		
N	Valid	125
	Missing	0
Mean		1.40
Median		1.00
Mode		1
Std. Deviation		.622
Skewness		1.307
Std. Error of Skewness		.217
Kurtosis		.614
Std. Error of Kurtosis		.430
Minimum		1
Maximum		3

Occupation				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Student	84	67.2	67.2	67.2
	Academic	32	25.6	25.6	92.8
	Admin	9	7.2	7.2	100.0
	Total	125	100.0	100.0	

Occupation



Monthly Income/Allowance

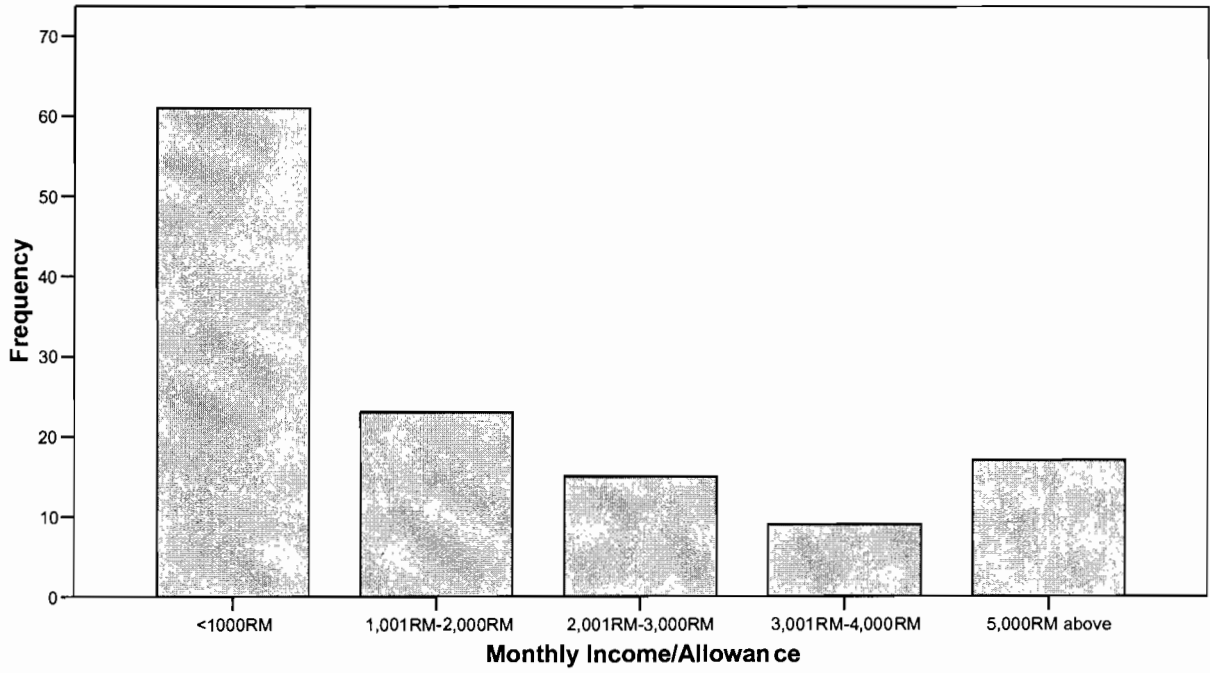
N	Valid	125
	Missing	0
Mean		2.18
Median		2.00

Mode	1
Std. Deviation	1.450
Skewness	.914
Std. Error of Skewness	.217
Kurtosis	-.598
Std. Error of Kurtosis	.430
Minimum	1
Maximum	5

Monthly Income/Allowance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1000RM	61	48.8	48.8	48.8
	1,001RM- 2,000RM	23	18.4	18.4	67.2
	2,001RM- 3,000RM	15	12.0	12.0	79.2
	3,001RM- 4,000RM	9	7.2	7.2	86.4
	5,000RM above	17	13.6	13.6	100.0
	Total	125	100.0	100.0	

Monthly Income/Allowance



APPENDIX C: Cronbach's Alpha Reliability Tests

Computer/Internet Experience

Cronbach's Alpha	N of Items
.867	2

Perceived Usefulness

Cronbach's Alpha	N of Items
.917	6

Perceived Ease of Use

Cronbach's Alpha	N of Items
.802	5

Perceived Credibility

Cronbach's Alpha	N of Items
.835	4

Image

Cronbach's Alpha	N of Items
.893	5

Perceived Financial Cost

Cronbach's Alpha	N of Items
.703	2

Social Influence

Cronbach's Alpha	N of Items
.836	6

Attitudinal Belief

Cronbach's Alpha	N of Items
.883	23

M-Banking Adoption

Cronbach's Alpha	N of Items
.922	3

total financial cost	Pearson Correlation	-.240(**)	-.044	-.080	-.227(*)	-.273(**)	-.418(**)	-.341(**)	.257(**)	1
Sig. (2-tailed)	.007	.627	.373	.011	.002	.000	.000	.000	.004	.
N	125	125	125	125	125	125	125	125	125	125

* Correlation is significant at the 0.05 level (2-tailed).

APPENDIX E: Multiple Regression

Model Summary (b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688(a)	.474	.442	1.73535

a Predictors: (Constant), total financial cost, Pusefulnes, Total computer/internet, Social influence1, P ease, Pimage, Pcredibility

b Dependent Variable: M-banking Adoption

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	317.068	7	45.295	15.041	.000(a)
	Residual	352.340	117	3.011		
	Total	669.408	124			

a Predictors: (Constant), total financial cost, Pusefulnes, Total computer/internet, Social influence1, P ease, Pimage, Pcredibility

b Dependent Variable: M-banking Adoption

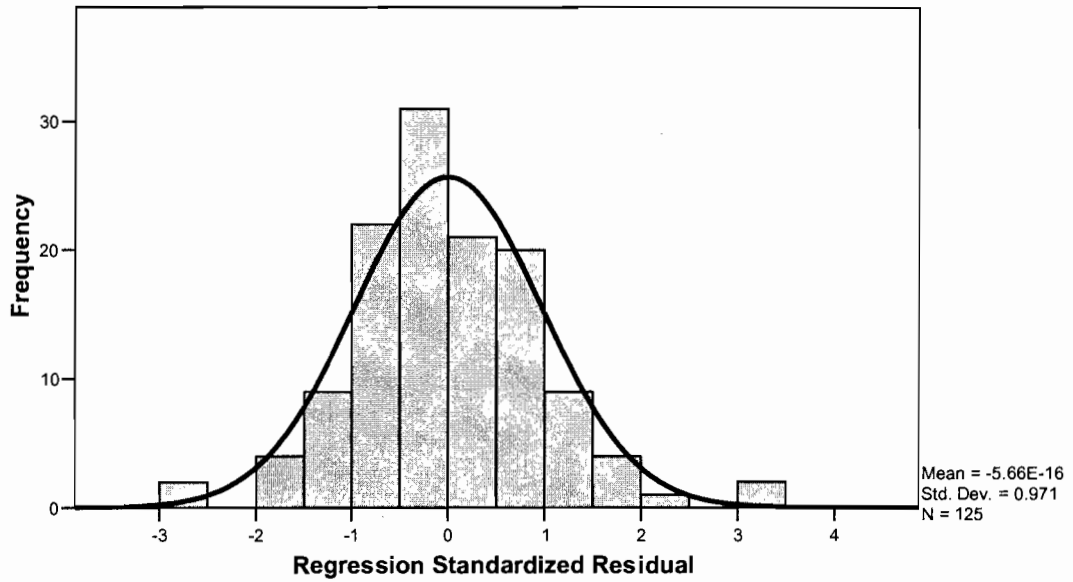
Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	-.437	1.902			-.230	.819
	Pusefulnes	.205	.049	.373		4.222	.000
	P ease	.068	.070	.087		.974	.332
	Pcredibility	.005	.078	.007		.067	.947
	Pimage	.051	.058	.086		.884	.378
	Social influence1	.186	.049	.345		3.762	.000
	Total computer/internet	.161	.134	.085		1.203	.231
	total financial cost	-.093	.102	-.069		-.920	.360

a Dependent Variable: M-banking Adoption

Histogram

Dependent Variable: M-banking Adoption



Normal P-P Plot of Regression Standardized Residual

Dependent Variable: M-banking Adoption

