



**UNIVERSITY OF NAIROBI**  
**SCHOOL OF COMPUTING AND INFORMATICS**

**APPLICATION OF TECHNOLOGY ACCEPTANCE MODEL IN  
MOBILE BANKING ADOPTION IN KENYA**

**BY**

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Submitted in partial fulfillment of the requirements of the Master of Science in Information Systems

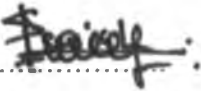
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## DECLARATION

This research project describes the work undertaken as part of a programme of study at the University of Nairobi, School of Computing and Informatics. The research is my original work and has not been submitted for the award of a degree in any other university.

Sign .....  .....

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This research project has been undertaken by the student under my supervision and the submission is hereby made to the University of Nairobi School of Computing and Informatics with my approval as the students supervisor.

Sign.....  .....

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## ABSTRACT

Mobile Banking is an application of mobile computing which provides customers with the support needed to access their bank accounts and bank anywhere, anytime using a mobile handheld device such as a mobile phone. Mobile Banking removes space and time limitations from banking activities such as checking account balances, or transferring money from one account to another. Research and studies has found that Mobile Banking applications have become popular in many countries and regions across the globe; however they are still not widely used.

This study identifies and investigates the factors which influence the adoption of Mobile Banking, and specifically focuses on the evaluation of M-Kesho Mobile Banking application in the context of Kenya. The research model includes the basic concepts of the Technology Acceptance Model. Survey was conducted to gather data which was coded in SPSS 16. Confirmatory Factor Analysis was used to analyse data and Structural Equation Modeling using Analysis of Moment Structures 16 software was used to validate the research model.

Result show that Perceived Ease of Use, Perceived Uselutness, Perceived Normative Pressure, Perceived Financial Cost and Perceived Credibility significantly influences customers attitude which influences adoption of Mobile Banking. The results of the data analysis contributes to the body of knowledge by demonstrating factors such as Perceived Financial Cost, Perceived Normative Pressure influencing attitude towards Mobile Banking which in turn affect adoption of Mobile Banking. Although the study has its limitations, the implications of the results allow providing practical recommendations to the banking industry, and directions for further work.

**Keywords:** Mobile Banking, Technology Acceptance Model, Adoption.

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God bless you all and School of Computing and Informatics.

## **DEDICATION**

To my wife,  
Rose

And  
My Parents

I truly cherish you all.

God bless you.

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## LIST OF ABBREVIATIONS

|       |   |
|-------|---|
| ATA   | Attitude Toward Adoption                  |
| AMOS  | Analysis of Moment Structures             |
| BI    | Behavior Intention                        |
| CFA   | Confirmatory Factor Analysis              |
| GFI   | Good of Fit Index                         |
| IDT   | Innovation Diffusion Theory               |
| IVR   | Interactive Voice Response                |
| RMSEA | Root Mean – Square Error of Approximation |
| SMS   | Short Message Service                     |
| PC    | Perceived Credibility                     |
| PFC   | Perceived Financial Cost                  |
| PEoU  | Perceived Ease of Use                     |
| PNP   | Perceived Normative Pressure              |
| PSE   | Perceived Self Efficacy                   |
| PU    | Perceived Usefulness                      |
| TAM   | Technology Acceptance Model               |
| TLI   | Tucker – Lewis Index                      |
| TPB   | Theory of Planned Behavior                |
| TRA   | Theory of Reasoned Action                 |
| TTM   | Task Technology Fit Model                 |
| WAP   | Wireless Application Protocol             |

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background

Today's major technologies enable people to collect, send and receive information in minutes wherever they are, at homes or behind offices. Because of the needs of mobility, the use of wireless device to conduct Mobile Commerce or Mobile Business has emerged as a new communication networks and become one of the major topic of research in the last few years. Mobile phones create a new meaning for business such as Mobile Banking, wireless electronic payment, micro payments, wireless wallets, bill payment, mobile shopping and advertising. Prensky (2004) estimated more than 1.5 billion mobile phones are used across the world and this is more than three times the number of personal computers used, these sophisticated phones have the processing power of a mid-1990s personal computers.

According to Keen and Mackintosh (2001) technological features play an important role in the adoption of mobile value added services. In service use, mobile phones are no longer used as they have typically been used before. Talking and text messaging (SMS) will remain, but extensive service use is expected to grow. These facts, in addition to the more personality of mobile phones over personal computers internet and the range of computer-like functionality offered by top-of-the-range devices are leading some observers to speculate that many people in the near future will start to see the mobile phone as an alternative to personal computers.

Mobile Banking is an innovation which has been perpetuated by the wide spread of this mobile communication technology. Mobile Banking (M-Banking) is defined as the financial services delivered via mobile networks and performed on a mobile phone (Bangens, 2008). These services may or may not be defined as banking services by the regulator depending on the legislation of a country as well as on the kind services being offered. Research has shown that Mobile communications has a potential of leapfrogging traditional infrastructure; M - Banking has great potential for extending the provision of financial services to unbanked people through a technology that is both familiar and widespread. It is a better digital alternative to other traditional bank channels such as ATMs, internet banking and physical

branches; it removes space and time limitations from banking activities such as checking account balances, or transferring money from one account to another.

In Kenya Mobile Banking services or operations such as: account transfers, balance inquiries, bill payments, and stop-payment requests, and some even offer online loan and credit card applications; are still in their immaturity, leaving a great deal of room for development. There is a need, therefore, to understand users' acceptance of Mobile Banking and to identify the factors affecting their intentions to use Mobile Banking. This information can assist developers in the building of Mobile Banking systems that consumers want to use, or help them to discover why potential users avoid using the existing system.

Recent literature has shown different methods applied in the study of Mobile Banking technology. Most studies have applied a wide variety of methods and frameworks, some of these models are; the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), Task Technology Fit Model (TTM), Innovation Diffusion Theory (IDT), and Technology Acceptance Model (TAM). In this study, we will investigate the adoption of Mobile Banking in Kenya as a new technology by using a well-known model of information technology-adoption and use; the technology acceptance model (TAM).

### **1.2 Problem Definition**

Mobile phones with Mobile Commerce technology are becoming more readily available in Kenya, similarly many financial institutions and mobile phone service providers have been teaming up to provide banking services to customers via the mobile phone. However, the number of people who choose to adopt or use such technologies is still relatively low. Therefore there is need to assess the acceptance of such technologies and establish factors that hinder or promote their acceptance.

User acceptance of information technology is defined as the act of receiving information technology use willingly (Saga, 1994). Mobile Banking technology in Kenya has not been readily embraced by many users despite the mobile phone having penetrated to all corners of

the country as opposed to other technologies such as the internet which has been readily embraced by many people but not penetrated to most rural places in Kenya.

Mobile Banking combines information technology and financial applications together and enables users to obtain special services without having to visit the traditional bank for personal transactions. Since Mobile Banking was introduced in Kenya, it has provided a convenient way of doing banking transaction, however, limited research has been done to find out the adoption, impact and usage of the technology. The use of Mobile Banking technology requires basic knowledge to operate. As a result, majority of Kenyans should embrace its use, both the banked and the unbanked can use the services provided by Mobile Banking. Mobile phones can enable various transactions such as paying bills, sending money to friends and relatives and easily managing accounts at a person's convenience.

The slow adoption of Mobile Banking has attracted studies concerning consumers' intentions to use the M-banking services which have been conducted on the basis of Davis's Technology Acceptance Model. The Technology Acceptance Model (TAM) tries to explain the adoption process and underlying influencing factors in technology acceptance. The model has been used widely in IS research (Adams et al., 1992), however the model has a number of limitations in studying mobile based services (Nysveen et al., 2005), one of the limitations of TAM is it was designed to be used in an organizational context rather than in everyday life context this makes it not favorable to study mobile based technology. It is also limited in explaining various forms of technology which is a common characteristic in the innovation in mobile telephony. Therefore to study mobile based services, TAM should be extended.

This study will address this issue, it will investigate the factors that enhance the acceptance of Mobile Banking in Kenya using an adapted Technology Acceptance Model. The study will adapt TAM and extend it in studying Mobile Banking in Kenya.

### **1.3 Research Objectives**

The primary objective of this study is to extend the Technology Acceptance Model and develop a framework for assessing Mobile Banking adoption in Kenya,

The secondary objectives of the study are;

- i. To assess the level of Mobile Banking adoption success in Kenya.
- ii. To find out factors affecting the adoption of Mobile Banking in Kenya.

#### **1.4 Research Questions**

The study will be based on the following two questions;

1. What are the factors that influence the use of Mobile Banking in Kenya?
2. Which is the most appropriate framework that can be used to evaluate Mobile Banking adoption in Kenya?

#### **1.5 Project Justification**

Technology has not only changed lives in Kenya but it has completely redefined the country's business and the social set-up (Kabukuru, 2010). Although Kenyans didn't invent the phone and had nothing to do with mobile phone either, they are taking an unprecedented lead in how to successfully use some of the mobile based financial services.

M-PESA is a Kenyan mobile payment success story that has completely changed the regional business terrain. It has empowered the local people, from the capital city Nairobi to the rural outposts, by giving them what had been impossible owing to a banking regime with strict regulatory frameworks. With the changing shape in mobile communication and prevalence of mobile phones in Kenya, Banks have come up with innovative platforms that can provide financial transactions to their customers over the mobile phone. This has expounded the research in Mobile Banking although more effort has been directed on innovation leading to a slow adoption of the technology. Therefore, there is need to expound research on user acceptance in order to increase adoption of this ever changing technology.

The study aims to obtain insights into the factors that influence the adoption of Mobile Banking services among users in Kenya. The results of this study will extend current knowledge on technology acceptance in Mobile Banking services. Further, the study will provide deeper insights into what is needed in order for users to accept this emerging technology and thus, allow for improvement in mobile service provider's strategies to attract users of Mobile Banking services. Also, with accelerated business competition and the

popularity of internet and mobile device use, there is an urgent need to understand the factors that would entice users to use Mobile Banking. Comprehending the essentials of what determines user's Mobile Banking acceptance can provide great management insight into developing effective strategies that will allow enterprises to remain competitive and hold their market. Therefore the finding of this study will provide a good basis for industry developing a service evaluation framework to determine the adoption potential of new mobile services. The modified TAM model used in this study provides a framework for services that are adopted for functional reasons and services that are directed specifically at innovative user attitudes.

### **1.6 Organization of the Report**

The study begins with an introduction of the research area and background of the study. The remainder of this report is organized as follows. This study is divided into six parts:

Chapter 2 contains a literature review on previous Mobile Banking studies and information systems acceptance. It presents a preview of Mobile Banking technologies, factors which impact adoption of Mobile Banking in Kenya and theories on technology acceptance used in previous studies. The literature review works as a basis for the research and development of the model and construction of the hypothesis

Chapter 3 presents a description of the proposed research model and hypotheses. It explains the variables in the model and their sources.

Chapter 4 presents the research design, research setting and sample used in the research. The chapter also explains the data analysis of the data gathered in relation to its reliability and validity.

Chapter 5 presents the results of the hypotheses testing and validated research model. In this chapter data is analyzed using Structural Equation Modeling in AMOS 16.



Chapter 6 presents a summary of the study findings and discusses the theoretical and practical implications of the study. Limitations of the study are acknowledged and a number of suggestions for future research are proposed.

References and appendixes are included at the end of the report.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter presents the literature review. The purpose of this chapter is to review relevant literature related to adoption behavior research. This chapter is divided into two sections, section one provides a review of Mobile Banking in Kenya and section two provides a review on theories related to adoption and prior research and their implication to this study

#### **2.2 Basic of Mobile Banking Technologies**

There are four fundamental approaches to Mobile Banking (Harris, 2010); interactive voice response, SMS Banking, WAP Technology based Mobile Banking and Stand alone Mobile Banking application. The first two rely on technologies that are standard features on almost all cell phones. The next section provides an overview of these technologies.

##### **1. Interactive Voice Response (IVR)**

Interactive Voice Response (IVR) is a telephony technology that allows users to interact with a database through phone keypad or voice commands. IVR automated systems save businesses money and employee resources, while making routine services and inquiries available to the public 24 hours a day. If you've ever called your mobile phone subscriber help desk and you have been meandered through a maze of prompts -- "For English, press 1; for account information, press 2" -- then you're familiar with interactive voice response. In Mobile Banking, it works like this:

1. Banks advertise a set of numbers to their customers.
2. Customers dial an IVR number on their mobile phones.
3. They are greeted by a stored electronic message followed by a menu of options.
4. Customers select an option by pressing the corresponding number on their keypads.
5. A text-to-speech program reads out the desired information.

IVR is the least sophisticated and the least "mobile" of all the solutions. In fact, it doesn't require a mobile phone at all. It also only allows for inquiry-based transactions, so customers can't use it for more advanced services.

## **2. Short Message Service (SMS)**

SMS banking uses text messaging. SMS works in either a push mode or a pull mode. In pull mode, the bank sends a one-way text message to alert a mobile subscriber of a certain account situation or to promote a new bank service. In push mode, the mobile subscriber sends a text message with a predefined request code to specific number. The bank then responds with a reply SMS containing the specific information.

SMS banking has several advantages:

- It works on virtually every cell phone, regardless of manufacturer, model or carrier.
- It's a familiar technology. Text messages are entirely used by all mobile phone owners.
- Sending text messages is relatively cost-effective.
- It accommodates two-way communication, allowing messages to be initiated by banks or by customers.

The disadvantages of SMS are related to the inherent limitations of text messaging. For example, messages can only be 160 characters in length. Plus, there are no guarantees that a message will actually be delivered to its recipient. But most troubling for banks is the inability of SMS to deliver a custom interface.

## **3. Wireless Application Protocol (WAP)**

Wireless Application Protocol (WAP) is the technology architecture that makes accessing Internet pages possible from a mobile phone. Because it includes the concepts of browsers, servers, URLs and gateways, WAP provides a user experience that echoes Internet banking conducted on a home computer. This is an attractive feature to many banks, who also appreciate the fact that customers don't have to download any proprietary software to enjoy robust access to a full line of services and transactions.

WAP banking does have its disadvantages:

- The browsers that run on mobile phones must work on a very small screen. As a result, banks must create "mobile-friendly" sites that work more efficiently in cramped quarters. Even with such accommodations, the number of clicks required to complete a task can be prohibitive.

- WAP banking requires a smart phone or a PDA, but such devices represent less than 10 percent of the phones in use. Even if a customer has a WAP-enabled phone, he or she can elect not to sign up for the more costly data plans required for Internet access.
- Mobile phones lack the level of anti-virus and personal firewall protection now considered standard on PCs.
- Two-way communication isn't possible. Customers can initiate a dialog, but banks can't.

#### **4. Standalone Mobile Application**

It provides a downloadable client that mobile subscribers can use to access bank services.

These mobile applications offer a reliable channel and enable users to conduct even complex transactions. They also allow banks to customize the interface and brand it accordingly.

Although this solution likely represents the future of Mobile Banking, there are some issues.

First, users are forced to download, install and learn a proprietary application. Not only that, the application must be customized to each mobile phone on which it will reside, greatly increasing development costs. And just like the mobile browsers used in WAP banking, these standalone applications are vulnerable to attacks, have limited availability and can only accommodate customer-initiated communication.

As a financial institution prepares for the Mobile Banking revolution, it must weigh the advantages and disadvantages of these various solutions to decide which one best meets the needs of its customers and its own technology infrastructure. We will investigate the adoption of an SMS Mobile Banking application of a one leading Bank in Kenya.

##### **2.2.1 M- Kesho**

M-Kesho was launched on 18<sup>th</sup> May 2010 by Equity Bank and Safaricom Mobile phone service provide to facilitate customers to transfer money to and from their Equity bank account via the mobile phone line while still enjoying other benefits that comes with the bank accounts(Mtaa, 2010). It is geared towards reaching the unbanked population by enabling them to easily open bank accounts, save money into the bank account and enjoy the benefits of having the value added services of both M-PESA and an EQUITY Bank account.

M-Kesho is an SMS Banking application technology discussed in the previous section above.

Kenya's lack of telecommunications infrastructure allowed it to jump straight to mobile-phone technology in the past decade (Onyiego, 2010). Millions of Kenyans, many of them living in poor or rural communities, now own cell phones and have benefited from access to mobile technology. Now they could have access to long-awaited financial services. The launch of M-Kesho came just weeks after Nobel Laureate and microcredit pioneer Muhammad Yunus called for the international community to provide financial services to the poor at the 14th annual Africa Middle East Microcredit Summit in Nairobi (Onyiego, 2010).

M-Kesho users do not need to go to the bank to check their account balances. They can comfortably do it on phone; customers can transfer money from M-Kesho account to M-PESA account and from their M-PESA account to the M-Kesho account. The system allows customer to check their last five transactions on their linked account. Other products that come with M-Kesho Account include; customers are able to get pre-qualified Personal Accident insurance cover, access short-term loan facilities ranging from 100/=, and earn interest on your mobile account from as little as 1/=.

Customers are able to request for Insurance Policies and get covered without having to walk into Insurance Company or see an Insurance agent. The customer will be covered by the terms and conditions of operating the account once they request for the policy. The premiums payment will be tiered so as not to lock out those who truly need them. The application is built with the ability to score a customer's credit rating using 6 months history of his M-PESA-centric balances. The customer will request for the facility through his phone and the bank will respond with the fate of the application with either loading the money into his M-Kesho Account or otherwise. Asking for short-term credit while down at the village, cannot be made easier. There is no application form to fill, no cost of travelling and no waiting next in line to apply with the officer. The partners intend to carry out media promotions on these services to educate customers on how to register for the M-PESA Equity Bank Account. Both Equity Bank and Safaricom would continue to enter into strategic partnerships of the type launched today to deepen their product offering and stretch their reach.

M-Kesho makes use of the existing M-PESA agent infrastructure. The inter-linking of the M-PESA system, Kenya's first mobile money transfer service with conventional banking infrastructure like Equity's presents a ground-breaking innovation that is a fitting platform for the development of new services in line with M-PESA's positioning.

### **2.2.2 Mobile Banking in Kenya**

Mobile Banking (M-banking) includes m-payments but involves access by mobile device to the broader range of banking services, such as account-based savings or transactions products offered by banks. It involves the use of a mobile phone or another mobile device to undertake financial transactions linked to a client's account. Mobile Banking is one of the newest approaches to the provision of financial services through ICT made possible by the widespread adoption of mobile phones. The roll out of mobile telephony has been rapid; it has extended access well beyond already connected customers in developing countries and in some cases forming the only means of communication in developing countries. With banks bundling transactional services within their Mobile Banking platform and additional momentum from electronic bill presentment over the internet (Juniper Research, 2009), mobile phone transactional banking usage will quickly increase. By the end of 2011 we are forecasting that in excess of 150 million subscribers worldwide will have used a transactional service which represents growth of more than three times since 2008.

The first Mobile Banking service in Kenya (M-PESA), developed by Vodafone was rolled in March 2007. The initial concept of M-PESA was to create a service which allowed microfinance borrowers to conveniently receive and repay loans using the network of Safaricom airtime resellers. Later M-PESA was re-focused and launched with a different value proposition; sending remittance home across the country and making payments. The re-launch was necessitated after customers adapted the service for a variety of alternative uses. There have been many advances to the M-PESA in the recent past.

M-PESA is a branchless banking service meaning that it is designed to enable users to complete basic banking transactions without the need to visit a bank hall. The continuing

success of M-PESA in Kenya has been due to the creation of a highly popular, affordable payment service with only limited involvement of a bank.

There have been drastic changes in the banking Industry history since then. Banks have come up with initiatives to take advantage of the wide spread of Mobile Telephony and advances in Telecommunications. Mobile Banking has become a key advertisement feature used by Banks to attract customers.

### **2.2.3. Consideration Factors for Adoption of Mobile Banking in Kenya**

The concept of provision of financial services over the Mobile Phone has been there for a decade. Mobile Network operators since the year 2000 began exploring the concept of Mobile payments with little success. However, recent advances in handset functionality, chip and mobile network technologies, and upgrades to point-of-sale infrastructure have dramatically improved the environment for mobile money solutions, bringing together different industry groups, such as banks and operators. This advancement has greatly contributed to the growth of mobile telephony Mobile Banking being one of the innovations. Major factors which have shaped the adoption of Mobile Banking in Kenya include Market segments, infrastructure and regulation. In tune with this understanding the various characteristics defining the Kenyan Mobile Banking environment can be analyzed as follows:

#### **a. Market Segments**

Porteous (2006) asserts that Mobile Banking has the potential to be transformational owing to various facts. First, it uses existing mobile communications infrastructure which already reaches unbanked persons. Secondly it may be driven by new players, such as mobile phone industry operators, with different target markets from traditional banks who are able to harness the power of new distribution networks for cash transactions. These include airtime merchants, who extend the reach beyond the conventional tellers or ATM networks of banks. In addition it may be cheaper than conventional banking, if the offering is competitive enough.

## **b. Competition**

The Kenyan case offers sufficient evidence to the claim that competition triggers creativity and innovation. To survive in a competitive market firms must maintain new products. The sustained presence of mobile products being floated to customers on a consistent basis depicts high standards of innovativeness. Continuous innovation not only yields new products but rather promotes efficiently in performance of activities. As a result the price for new services introduced to the market declines consistently.

Currently, the Mobile Banking market is held by majorly by Safaricom, Airtel and Orange with the latter dominating due to the benefits of early entry.

## **c. User Capacity Building and Empowerment**

Though not seriously impaired, the capacity of a wider population of Kenyan users is fairly curtailed by not being fully conversant with all that they can accomplish through the mobile. Deliberate interventions must be undertaken to successfully ensure that the targeted persons particularly the rural residents and females are empowered not only with technology but with skills and finance as well.

To prevent these communities from lagging behind they must be familiarized with the benefits and opportunities of Mobile Banking. Calculated strategies to overcome hindrances require exploration so that these groupings can be converted into meaningful participants who will utilize this technology for economic take off.

## **d. Literacy Levels**

Research has shown negative correlation between the levels of usage and the education background and scope. Observably population categories with lower levels of education happen to be the larger users of mobile based technologies. There has been that academic exposure matters little when it comes to the use of technology based products. This study took the view that the capacity for unschooled and semi illiterate persons to quickly capture the skills of manipulating the considerably sophisticated mobile phone menu items is of a derived nature. It emanates from the motivation the facility provides in terms of real time monetary worth. And since the mobile phone is perceived to hold cash, users, their literacy



level notwithstanding inevitably acquaint themselves with the monetary oriented menus, just like they would acquaint themselves with new currency. This has contributed greatly to the advancement of mobile based services.

#### **e. Mobile Phone Penetration**

The number of enlisted mobile phone service users imposes a ceiling on the possible user of M-banking Auxiliary services availability in the form and time vendors are also a factor of concern, this is so because Mobile Banking services largely ride on the back of other services of mobile operators. Most agents happen to be air time distributors or retail outlets for handsets. Where network coverage is inexistent or poorly established it then follows that Mobile Banking implementation is low in form.

CCK puts the current mobile phone penetration at 51% of the populace. Sharp concentrations of those with access are within urban areas (75%). This reveals a spectacular Mobile Banking divide highly skewed against the rural population.

#### **f. Income Levels and Mobile Banking Use**

A clear majority of regular M-banking users are low and average income earners. These categories also happen to hold the higher percentage of people without possession of traditional bank accounts. On this account users perceive the M-banking service as a complete substitute to bank accounts as previously held. This negates the argument of mobile service providers, who in an effort to circumvent certain regulatory requirements front these facilities as "Money transfer services" rather than "Mobile Banking services."

Though the average mobile phone balances may be seen as low, the fact that there are balances is sufficient to prove the case that there's storage. This can be perceived as acceptance of deposits, a domain of legally established banks. Overall there's a significant indication of the high value placed on the convenience associated with the use of mobile money services.

### **g. Urban Rural Access**

Concentration of M-banking is evidently heavier in urban settings. Universal access in rural areas is faced with numerous challenges including how to manage the float (Cash) in light of prospected demand. Access becomes a serious issue of concern in some other underdeveloped regions where network signals are extremely sparse. Operators have tended to focus mainly on the densely populated economic zones. With the latest government move to encourage operators to develop services in the rural areas, with promises to support these efforts it is reasonable to expect a better environment for mobile activities.

Mobile money applications offer a channel to expand traditional services and extend access to multiple market segments including underserved or un-served groups. In Kenya, the large rural populations provide a perfect base to tap the unbanked group with no bank account but a mobile phone. The younger generations commonly referred to as the Y- generation are also a high potential segment, given their willingness to adopt new technologies. Lower income workers are also likely to take up mobile money services, as they are not well served by the large banks.

#### **2.2.4 Infrastructure**

The transformational Mobile Banking is made available by mobile phone service providers as part of their value added services. It is embedded among other services within the service providers menu. The perceived difference between mobile service providers mainly lies on the pricing strategy, quality and scope of services as well as the pricing strategy.

While the fees charged for transactions are largely below those levied by traditional banks for similar services, low incomes amongst the vast proportions of the population tends to reduce the levels of affordability. But prices are expected to decline over time as competition intensifies. The collective access points of Mobile Banking are numerous and widespread. The service vests a heavy reliance on airtime distributors who double as agents. It is these agents who decide on the most strategic points to locate their service outlets. This highly differs from the conventional banking systems whereby banks will only be located in major urban centers. Infrastructure is a key in adoption of any technology. This wide spread of

telephony communication network in Kenya has played a major part in the spread of Mobile Banking technology.

### **2.2.5 Regulation**

Regulation is a key factor to enhance delivery of quality services, in Kenya, laws governing mobile money transactions have yet been realized. The success of M-PESA for example has raised concern by Banking Institutions demanding audit and regulation set up to control Mobile money based transactions. Lack of regulatory policies may have been a contributory factor to the faster adoption of services like M-PESA and ZAP while a slow in adoption of the Bank based Mobile Banking services.

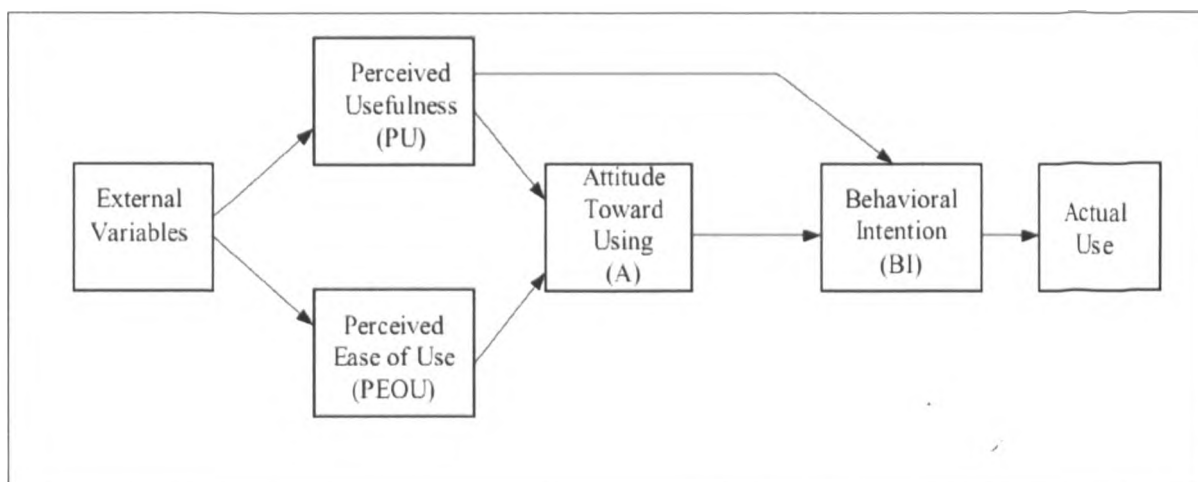
### **2.3 Adoption**

Adoption is the acceptance and continued use of a product, service or idea. According to Rogers and Shoemaker (1971), consumers go through “a process of knowledge, persuasion, decision and confirmation” before they are ready to adopt a product or service. In order to understand the process behind the factors consumer’s intention to use and adopt mobile services, it is necessary to provide thorough understanding of the theoretical foundation behind adoption behavior of information systems research. Several models that have been developed and built up on each another will be reviewed in this research. This section discusses the models and shows how they are used in adoption of mobile services research. Three models of IS adoption behavior have been widely applied when explaining ICT – adoption, i.e, the Technology Acceptance Model (Davis, 1989), the Theory of Reasoned Action Fishbein & Ajzen, 1975) and the extension of Theory of Reasoned Action into a Theory of Planned Behaviour (Ajzen, 1985).

#### **2.3.1. Technology Acceptance Model**

Several studies focusing on adoption of mobile services have their roots in Technology Acceptance Model. The model is originally designed to predict user’s acceptance of information technology and usage on the job. TAM focuses on the attitude explanations of intention to use a specific technology or service; it has become the most widely applied model for user acceptance and usage. TAM has become well established as a robust, powerful model for predicting user acceptance.

The original Technology Acceptance Model was developed based on the Theory of Reasoned Action (TRA) (Fishbein and Ajzein's, 1975). According to TRA, determinants of behavioral intention are attitude towards the behavior and subjective norm associated with the behavior. Attitude refers to personal beliefs about the positive or negative value associated with a health behavior and its outcomes. Subjective norm refers to a person's positive or negative value associated with a behavior. It depends on whether or not the behavior is accepted by important referent individuals and their motivation to comply with those referents. Interventions can be designed to change behavioral intention by affecting attitude and subjective norm to promote specific health behaviors. Fishbein and Ajzen suggested that a person's actual behavior could be determined by considering his or her prior intention along with the beliefs that the person would have for the given behavior.



**Figure 2.1 Technology Acceptance Model (Davis, 1989)**

Davis extended the Theory of Reasoned Action to formulate the Technology Acceptance Model. TAM model suggests that when users are presented with a new technology, two important factors influence their decision about how and when they will use it (Davis, 1989) these key factors are;

- Perceived usefulness (PU) - This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance".
- Perceived ease-of-use (PEoU) - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort"

TAM deals with perceptions and it is not based on observing real usage but users reporting their conceptions. The instruments used in connection with TAM are surveys, where the questions are constructed in such a way that they reflect the different aspects of TAM (Straub et al., 1995). As Davis (1989) noted, future technology acceptance research must address how other variables affect usefulness, ease of use and user acceptance. Therefore, perceived ease of use and perceived usefulness may not fully explain behavioral intention towards the use of mobile services. Another key limitation of TAM is that while it provides a valuable insight into user's acceptance and use of technology, it focuses only on the determinants of intention and does not tell us how such perceptions are formed or how they can be manipulated to foster user's acceptance and increased usage.

The basic connection between TRA and TAM is Behavioral Intention (BI). They both postulate that user behavior in information systems is determined by behavioral intent (Knight, 2004). However they differ in that where TRA states a user's behavioural intention is determined by their Attitude (A) and Subjective Norms (SN) ie: what they perceive is the behaviour expected of them by those around them, TAM states a user's behavioural intention is determined by their attitude and Perceived Usefulness of the chosen behavior.

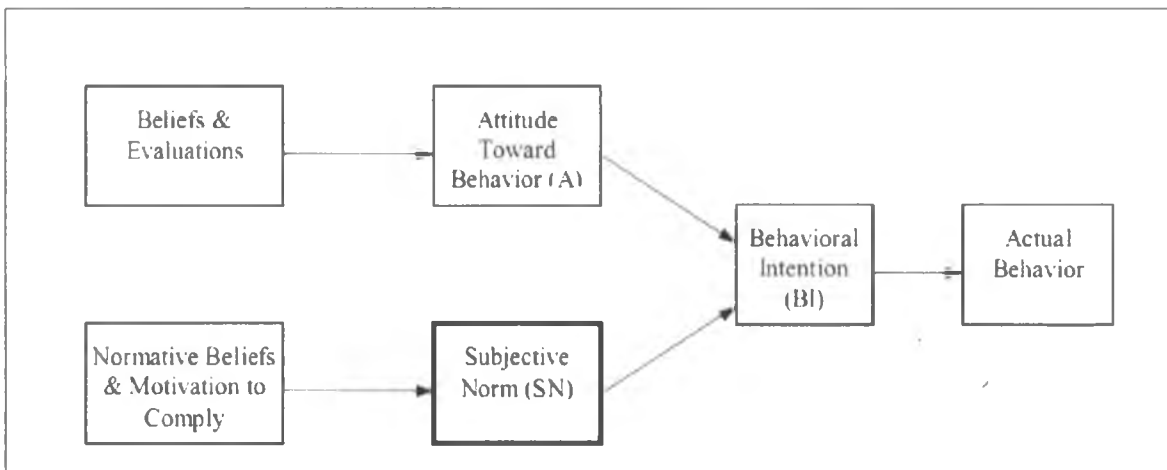
Although TAM was generally accepted by researchers as a sound method for understanding and predicting user behavior towards IS, subsequent investigations and writings identified a number of weaknesses in the TAM model (Knight, 2004). The first weakness identified is it lacked the constructs for the vast variety individual differences in users of information systems (Taylor et al., 1995). It also made an assumption that Behavioural Intention was voluntary (Dishaw et al., 1999). However the major advantage of TAM is its extendibility. Some researchers have removed parts of the mode, others added constructs or while others combined TAM with known constructs from other behavioural models:

TAM has been used in many studies, for example, it was employed to study user acceptance of microcomputers (Igbaria et al., 1989), the World Wide Web (Lederer et al., 2000), software and decision support systems (Morris & Dillon, 1997), and many other studies.

### 2.3.2 Theory of Reason Action

The theory of reasoned action (TRA), proposed by Fishbein & Ajzen (1975), is a well – established model that has been used broadly to predict and explain human behavior in various domains. TRA is a more general theory than TAM, and has been applied to explain behavior beyond the adoption of technology. However, when applied to adoption behavior, the model includes four general concepts which are behavioral attitudes, subjective norms and important addition when compared to TAM.

According to the TRA, the most important determinant of a person is behavioral intention (BI). Behavioral intention is defined as the strength of one’s intention to perform a specific behavior. A person’s intention to perform a behavior is a combination of the attitude towards performing the behavior and his/her subjective norm.



**Figure 2.2 Theory of Reasoned Action (Fishbein, and Ajzen 1975)**

TRA is one of the most influential theories of wide range of human behavior (Venkatesh et al., 2003). It suggests that attitude towards behavior and subjective norms will determine intention to perform behavior. TRA has been applied in its original form to explain the adoption of ICT – applications but typically TRA is used as a basis for modifying the TAM model with subjective norm (Venkatesh, et al., 2000). TRA has been successfully applied to predict behavior and intention in a variety of subjective areas. At the same time, a number of studies have been carried out to understand its limitations, test hypotheses, analyze extensions and refinements.

TRA is a general theory; it does not specify the beliefs that are operative for particular behavior (Davie et al., 1989). Thus, Ajzen & Fishbein (1980) suggested that researchers using TRA must first identify the beliefs that are salient for subjects regarding the behavior under investigation. Furthermore TRA deals with the prediction rather than outcome of behaviors. Despite the strong predictability of TRA across studies, it becomes problematic as researchers reported mixed results on the effects of subjective norms on behavioral intention. In TRA, the ability of attitude and subjective norms to predict behavior intention will differ within the domain of study. Attitude will be a dominant predictor of behavior intention over subjective norms when personal based influence is stronger in behavior domain. On the other hand, subjective norms are a dominant predictor of behavior intention for behavior in which normative implications are strong. For example, attitude is a dominant predictor of behavioral intention when purchasing something for personal use while subjective norms would be a dominant predictor when purchasing something for others. Furthermore, subjective norms can be more important in the early stages of innovation implementation when users have limited knowledge or experience that forms the attitude.

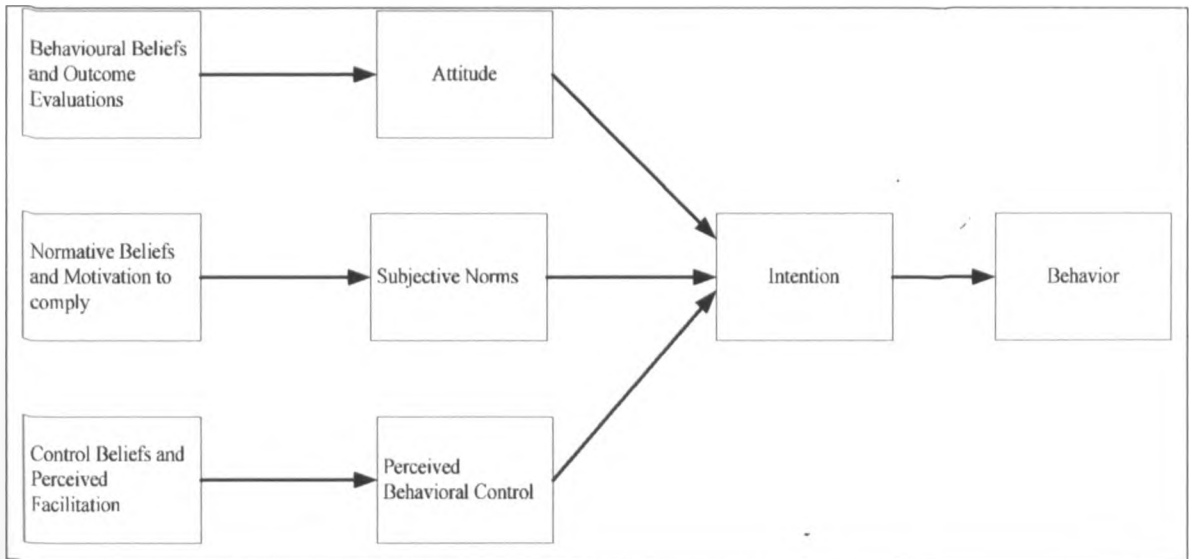
Actual behavior is determined by behavioral intentions, thus limiting the predictability of the model to situations where intention and behavior are highly correlated. When intention and behavior is measured at the same time then it is not an accurate test of the model's power to predict future, but rather a test of the model's power to predict current behavior. To overcome the lack of variable in TRA that captures s situation specific information, Ajzen(1991) developed the Theory of planned Behavior (TPB) by including an additional construct namely perceived behavioral control

### **2.3.3 Theory of Planned Behavior**

Theory of planned behavior (TPB) was proposed as an extension of TRA to account for conditions where individuals do not have complete control over their behavior (Ajzen, 1991). The development of TPB is originally based on the theory of reasoned action (TRA) designed to explain almost any human behavior across various application contexts. The TPB suggests that in addition to determinants of behavioral attitude and subjective norm, a third

element, perceived behavioral control (PBC), also influences behavioral intentions and actual behavior

Models based upon TPB have been applied to the explanation of different types of behavior, but when applied to the adoption of ICT systems or services, the model contains five concepts which are behavioral attitudes, subjective norm, behavioral control, intention to use and actual use. According to the theory, both attitude toward behavior and subjective norms are immediate determinants of intention to perform behavior. Attitude refers to the degree of a person's favorable or unfavorable evaluation or appraisal of the behavior in question. Subjective norms refer to the perceived social pressure to perform or not to perform the behavior (Ajzen, 1991). TPB further proposes that intention to perform behavior is the proximal cause of such behavior. Intentions represent motivational components of behavior, that is, the degree of conscious effort that people will exert in ease or difficulty in performing the behavioral of interest. It is associated with the beliefs about the presence of control factors that may facilitate or hinder the performance of the behavior (Ajzen, 2002).



**Figure 2.3 Theory of planned Behavior (TPB) (Mathieson, 1991)**

The dominant predictors of behavioral intention and actual behavior might vary with the behavior domain study. TPB has several challenges and limitations. Firstly, like TRA, TPB assumes proximity between intention and behavior, thus, the precise situational correspondence is still vital for accurate prediction, secondly the operation of the theory is



troubled by the problem of measuring perceived behavioral control directly as opposed to recording control beliefs (Manstead et al., 1995). Thirdly the theory introduces only one new variable when there is continuing evidence that other factors add predictive power over and above the measures formally incorporated in the TPB.

## CHAPTER THREE

### RESEARCH MODEL

#### 3.1 Research Model Adoption

This research adopts the Technology Acceptance Model (TAM). TAM is chosen as the appropriate model because of its flexibility, it has been widely used in other researches to predict user acceptance and use of technology. Previous research has suggested that trust-related constructs and resource related constructs should be the critical antecedents of the behavioural intention to use information systems. Based on the information systems acceptance literature, especially the extended TAM by Luarn & Lin (2004), this research adopts the research model, as indicated in Figure 3.1. The construct perceived subjective norms absent in the Luarn & Lin's (2004) model is proposed. This construct has been proposed as a determinant of Mobile Banking adoption as noted in the following research; Fishbein, and Ajzen (1975) in the theory of Reasoned Action, Mathieson, (1991) in the Theory of planned Behavior (TPB). Julio et al., (2010), in the study Mobile Banking, proposition of an integrated adoption intention framework among other studies. The proposed constructs and hypotheses are all supported by prior studies in the information system literature.

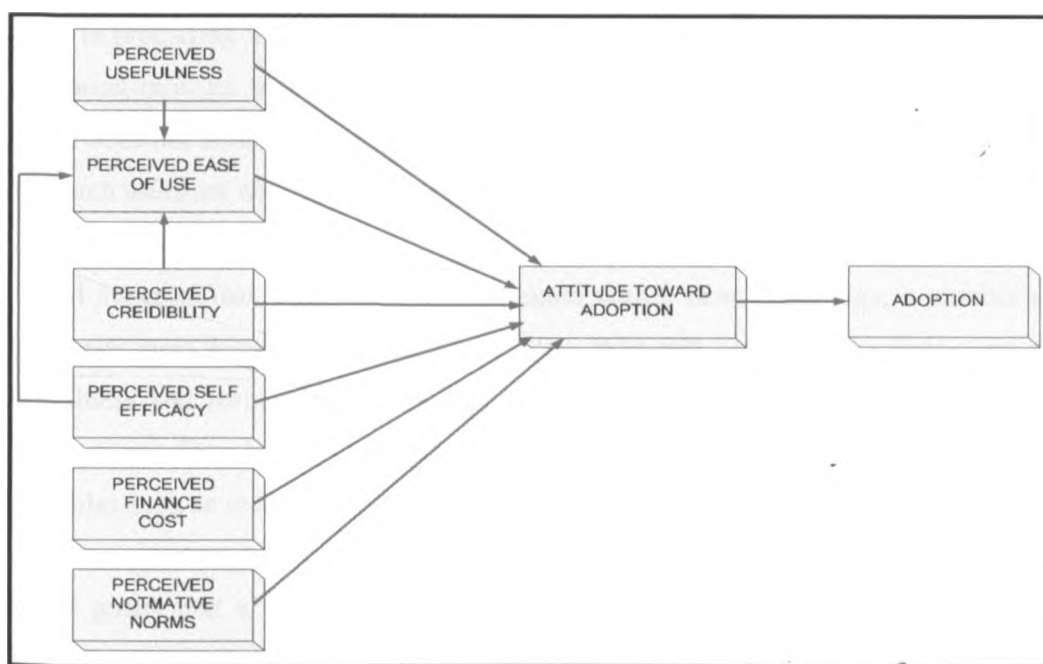


Figure 3.1 Proposed research model

As noted by Davis (1989), future research of Information System and Information Technology usage has to address the other variables which affect usefulness, ease of use and user acceptance. Consequently these two determinants may not fully explain the factors which predict the acceptance of a technology application such as Mobile Banking. Prior studies have extended the original TAM with added constructs. Such as perceived playfulness (Moon & Kim, 2001), perceived enjoyment (Koufaris, 2002) and perceived credibility (Wang et al., 2003). The next section provides a definition of the constructs adopted in this research.

### **3.1.1 Perceived Usefulness, Perceived Ease of Use, and Attitude**

The construct Perceived Usefulness, Perceived Ease of Use and Attitude to use Mobile Banking have been adapted from the Davis Technology Acceptance Model. The adoption of technological products and services is often explained by the TAM (Davis, 1989). TAM is at present the widely used theory of technology acceptance in information systems research. This model has also been applied for understanding the adoption of mobile services. In studies on the adoption of mobile services, result fairly well comply with central factors in the TAM: perceived ease of use and perceived usefulness. TAM is generally found to be valid in predicting user acceptance of the various systems. However in mobile services non-utilitarian motives such expressiveness and enjoyment are often reported in studies which TAM does not address. The acceptance of Mobile Banking services varies with the context in which users are able to use the technology.

TAM suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. These factors are perceived usefulness and perceived ease of use; the two factors are considered to be the primary determinants for adopting and using a new technology and are influenced by other external variables such as security concerns, cost, convenience, satisfaction etc.

TAM posits that a user's acceptance of information system is determined by that user's intention to use the systems, while perceived usefulness and ease of use can predict the usage intention, and perceived ease of use is hypothesized as a predictor of perceived usefulness.

According to TRA, users' beliefs influence their attitude, which in turn influence behavioral intention. Both perceived usefulness and perceived ease of use are beliefs. Thus, they will affect user's attitude. In addition, TAM states that perceived ease of use will have a direct effect on perceived usefulness.

Therefore, we gave hypotheses as follows.

H1: User's attitude to use Mobile Banking has a significant effect on behavioral intention to use.

H2: Perceived usefulness has a significant effect on attitude to use Mobile Banking.

H3a: Perceived usefulness has a significant effect on perceived ease of use of Mobile Banking.

H3b: Perceived ease of use has a significant effect on attitude to use Mobile Banking.

### **3.1.2 Perceived Credibility**

Perceived credibility consists of two important elements namely privacy and security. Further, security refers to the protection of information or systems from unsanctioned intrusions or outflows. Fear of the lack of security is one of the factors that have been identified in most studies as affecting the growth and development of technology including Mobile Banking adoption.

Accordingly, perceived usefulness and ease of use may not fully explain behavior attitude of Mobile Banking, and there are other factors that can be better predict user's acceptance. Wang examined the impact of perceived credibility on usage intention, and they found that perceived credibility had a significant effect on intention (Wang et al., 2003). Considering the context of Mobile Banking services, this study extends TAM by adding perceived credibility to the model to explain user acceptance of Mobile Banking.

We propose the following hypothesis in order to further observe the relationship between perceived credibility and behavioral intention but, from the Kenyans' point of view:

H3c: Perceived credibility has a significant effect on the perceived ease of use of Mobile Banking

H4: Perceived credibility will have a positive effect on behavioral intention to use Mobile Banking.

### **3.1.3 Normative Pressure (Subjective Norms)**

This construct was promoted by Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975). By definition, subjective norm can be defined as a person's perception that most people who are important to her or him should or should not perform the behavior in question (Fishbein and Ajzen, 1975). Previous studies have explored the importance of such construct in social science studies including in banking studies (Nysveen et al., 2005). Nysveen et al. (2005) examined mobile chatting usage in Norway, and found that subjective norm or subjective norm was found to be an important driver for mobile chatting usage among Norwegian.

In view of these studies, it is important to examine whether this construct is able to provide a clear direction as a key predictor for Mobile Banking use. Using the findings of the above mentioned studies, we proposed the following hypothesis:

H5: Subjective norm will positively influence intention to use Mobile Banking.

### **3.1.4 Perceived Financial Cost**

Another important factor for users considering whether to use Mobile Banking is service cost. According to behavioral decision theory, the cost-benefit pattern is significant to both perceived usefulness and ease of use. If consumers perceive the cost of Mobile Banking service is acceptable, they will adopt it easier, and then use it. According to Mathieson et al. (2001), economic motivations and outcomes are most often the focus of IS acceptance studies

This variable was used in prior research on Mobile Banking adoption (extended TAM, Luarn & Lin, 2004). The cost consideration may prevent many people from choosing this Mobile Banking service (Luarn & Lin, 2004). Moreover, hardware/software and financial resources are important for users of an information system (Mathieson et al., 2001). Based on the

literature perceived cost was likely to directly influence the user's intention to use Mobile Banking. The following hypothesis was formulated:

H6: Perceived cost will have a negative effect on behavioral intention to use Mobile Banking.

### 3.1.5 Self Efficacy

Findings from previous studies (Wang et al., 2003; Luarn and Lin, 2005; McFarland and Hamilton, 2006) have confirmed the importance of appropriate levels of perceived self-efficacy in technology adoption decisions. Correspondingly, our research assumes that users with higher levels of perceived self-efficacy are more likely to adopt Mobile Banking than those who perceive themselves to be lacking in such skills. Hence, the hypothesis is

H7a: Self-efficacy has a positive influence on the behavioural intentions to adopt Mobile Banking.

H7b: Self efficacy positively influences the perceived ease of use of Mobile Banking in Kenya.

The figure below shows the research model with the hypotheses to be validated.

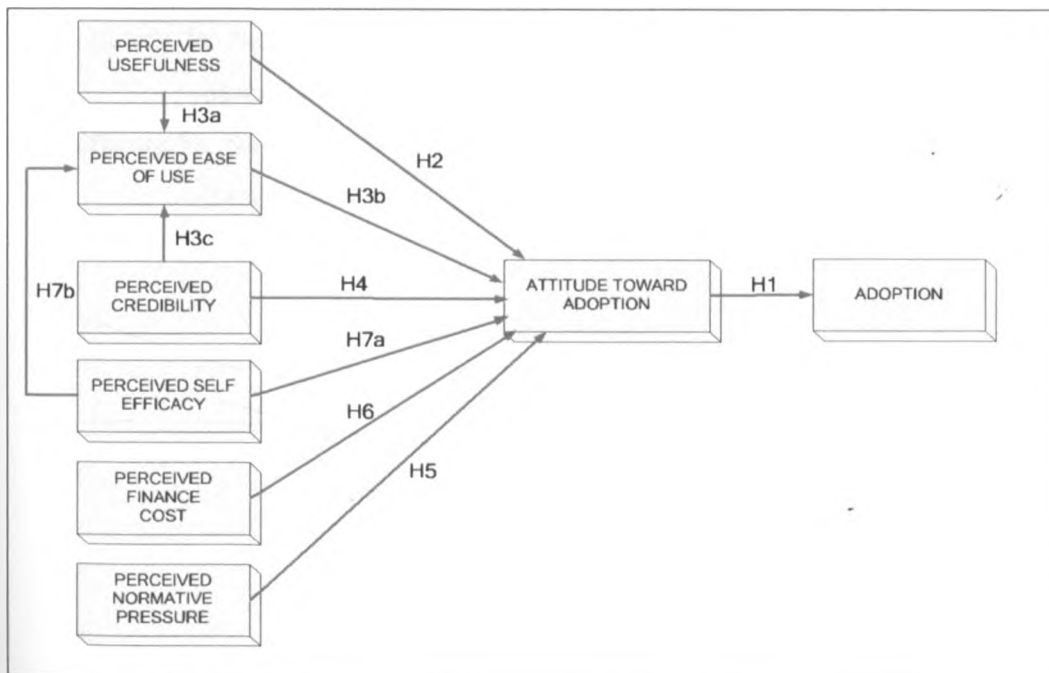


Fig 3.2 Research Hypotheses

- Hypotheses 1:** User's attitude to use Mobile Banking has a significant effect on behavioral intention to Mobile Banking adoption.
- Hypotheses 2:** Perceived usefulness has a significant effect on attitude to use Mobile Banking.
- Hypotheses 3a:** Perceived usefulness has a significant effect on perceived ease of use of Mobile Banking.
- Hypotheses 3b:** Perceived ease of use has a significant effect on attitude to use Mobile Banking
- Hypotheses 3c:** Perceived credibility has a significant effect on the perceived ease of use of Mobile Banking
- Hypotheses 4:** Perceived credibility will have a positive effect on behavioral intention to use Mobile Banking
- Hypotheses 5:** Perceived Normative Pressure will positively influence attitude to use Mobile Banking.
- Hypotheses 6:** Perceived cost will have a negative effect on attitude to use Mobile Banking.
- Hypotheses 7a:** Self-efficacy has a positive influence on the behavioural attitude to adopt Mobile Banking.
- Hypotheses 7b:** Self efficacy positively influences the perceived ease of use of Mobile Banking in Kenya.

## CHAPTER FOUR

### RESEARCH METHODOLOGY

#### 4.1 Research Design

This study conducts a survey to collect data and to test the research framework. Survey has been used in previous studies. The aim of the survey is to generate sufficient data to piece together a picture of user's perception to the Mobile Banking. In relation to the aims and objectives of the study, questionnaires can be useful in discovering both facts and opinions such as attitudes, credibility, and ease of use among others. Furthermore, a self-administered questionnaire is a cost effective method of questioning a large number of people, being relatively easy to administer. They are flexible in that they can be used to collect a wide variety of data in a variety of different circumstances. They are also relatively cheap (Moore, 2001). The survey method was also selected due to the high participation rate in prior surveys for other studies (Mathieson, 1991; Taylor & Todd, 1995) are examples of studies where this method has been used.

#### 4.2 Selecting the Sampling Method

Selection of the sampling method to use in a study depends on a number of related theoretical and practical issues. These include considering the nature of the study, the objectives of the study and the time and budget available. Traditional sampling method can be divided into two categories, probability and non- probability sampling.

Probability sampling is most commonly associated with survey-based research where researcher needs to make inferences from the sample about a population to answer the research questions or to meet research objectives (Saunders et. al., 2003). In probability sampling, sampling elements are selected randomly and the probability of being selected is determined ahead of time by the researcher. If done properly, probability sampling ensures that the sample is representative.

Non-probability sampling provides a range of alternative techniques based on researcher subjective judgment (Saunders et. al., 2003). In non-probability sampling the selection of elements for the sample is not necessarily made with the aim of being statistically representative of the population. Rather the researcher uses the subjective methods such as



personal experience, convenience, expert judgment and so on to select the elements in the sample. As a result the probability of any element of the population being chosen is not known.

This study used the probability sampling; the research was conducted on M-Kesho Equity Bank Mobile Banking facility within Nairobi. The research was conducted on M-Kesho because of the following reasons:

1. M-Kesho is an SMS Mobile Banking facility which bridges the gap between the banked and the unbanked. One does not need to have a bank account with the Equity Bank to be registered with this facility. Thus opening up does for the unbanked who could like to enjoy banking services with a financial institution.

2. This study is a survey, a sample on financial institutions as at end of November 2010 indicated that Equity Bank has approximately 5.7 Million account holders representing about 60% of all accounts in Kenya. Mobile Banking products by the bank include M-Kesho, Orange Money, Yu Cash and Eazy 24/7. M-Kesho has the leading number of registered users amounting to approximately 744,000.

Other Banks sampled include Kenya Commercial Bank with 1,140,560 account holders, 205,435 KCB Connect registered (Mobile Banking) of which only 40,682 are active representing 19.8% Mobile Banking users. The Co-operative Bank of Kenya with an approximate of 140,000 accounts holders of which about 22,000 use Mobile Banking.

#### **4.3 Sample Size**

A complex process is normally involved in determining the sample size for a survey. If a sample size is small, the results may not properly represent the entire population. If the sample size is large, the survey may not be able to be carried out due to cost and time restraints. Kothari (2004), suggested that the sample size should be determined by a researcher keeping in view the following points

- ❖ Nature of the universe. The universe may either be homogenous or heterogeneous in nature. A homogeneous universe, a small sample size can save the purpose.

- ❖ Number of classes proposed. If many class-groups are to be formed, a large sample would be required.
- ❖ Nature of study. If the items are to be intensively and continuously studied, the sample should be small.
- ❖ Type of sampling. Sampling technique plays an important role in determining the size of the sample.
- ❖ Standard of accuracy and acceptable confidence level. If the standard of accuracy or the level of precision is to be kept high, we shall require relatively larger samples.
- ❖ Availability of finance. In practice, the size of the sample depends upon the amount of money available for the study purposes.

Based on these factors, Kothari suggests two alternative approaches for determining the size of a sample.

1. The first approach is to specify the precision of estimation desired and then to determine the sample size necessary to insure it.
2. The second approach uses Bayesian statistics to weigh the cost of additional information against the expected value of the additional information.

The first approach is capable of giving a mathematical solution as such a frequently used technique. This study uses the second approach to estimate the sample size.

The formula for estimating the sample size for an infinite population where we are to estimate the proportion in the universe is

$$n = \frac{z^2 \cdot p \cdot q}{e^2}$$

But in the case of finite population, the above stated formula will be changed as under

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2 \cdot (N - 1) + z^2 \cdot p \cdot q}$$

Where N= size of the population

n= size of sample

e= acceptable error (the precision)

z= standard variant at a given confidence level

p= the proportion in the target population estimated to have characteristics being measured

q=1-p

The variables in the formula were calculated as follows; The estimated registered account holders in Equity Bank as at 31<sup>st</sup> November 2010 are 5,700,000 which represents 57% of account holders in Kenya. From this total population registered M-KESHO users approximated to 744,000 of which an approximated of 25% of the accounts are active and 65% dormant.

Based on this information we were able to determine the following values in the formula.

$$\begin{aligned} N &= 744,000 \\ P &= 0.25 \\ q &= 1 - 0.25 \\ &= 0.65 \end{aligned}$$

For determination of standard variant, Precision refers usually to a 95% confidence interval for the true value of the effect. Using tables of normal probabilities the z score for 95% confidence level is 1.96. The precision for the research is estimated at plus or minus 4%.

Using the above value the estimated sample size is;

$$\begin{aligned} n &= \frac{1.96^2 \times 0.25 \times 0.65 \times 744,000}{0.04^2(744,000 - 1) + 1.96^2 \times 0.25 \times 0.65} \\ &= 389.95 \\ &\approx 390 \end{aligned}$$

#### 4.4 Survey Instrument

Reviewing prior studies on Mobile Banking, e-commerce and information systems, it was found that many studies used questionnaires to collect data for analysis and research objective investigation. In this study a survey with questionnaires will be implemented to explore user behaviour and intention to use Mobile Banking.

##### 4.4.1 Instrument Development

Regarding instrument construction, the items used to operationalize the constructs of each investigated variable are mostly adopted from relevant previous studies and modified for adaptation to the Mobile Banking context with necessary validation and wording changes being made (Nysveen et al., 2005; Wang et al., 2003; Davis, 1989;).

Items measuring perceived ease of use, perceived usefulness, and attitude toward use were measured using items developed from adapting the original items of Davis (1989) in the theory of technology acceptance model. One of the advantages in using the TAM was that it had a well validated measurement inventory (Ndubisi, 2006; Wang et al., 2003). The measure of items measuring subjective norms was adapted from various studies related to the original scale developed by Fishbein & Ajzen (1975), perceived financial cost, perceived credibility and self efficacy was adapted from study conducted by Luarn & Lin (2004). These constructs are shown in the Table 4.1 below while the developed questionnaire in appendix A.

| Variable                    | Definition  | Source                             |
|-----------------------------|---|------------------------------------|
| Perceived Ease of Use (PEU) | The degree to which a person believes that using a particular system will be free of effort   | Davis (1989)                       |
| Perceived Usefulness (PU)   | The degree to which a person believes that using a particular system will be of value to him or her.  | Davis (1989); Nysveen et al (2005) |
| Self Efficacy (SE)          | The degree to which a person's confidence in her/his ability to use banking.  | Bandura (1982)                     |
| Perceived Credibility (PC)  | Perceived credibility is a determinant of behavioral intention to use an information system. Perceived credibility consists of two important elements: privacy and security | Luarn & Lin (2004)                 |
| Subjective Norms            | Represent the degree to which a person perceives that important others believe he or she should use banking   | Taylor and Todd (1995)             |
| Usage Intention             | A person readiness to adopt a system/technology (in this study Mobile Banking )   | Davis et al., (1989)               |
| Perceived Financial Cost    | The perceived Mobile Banking service cost.  | Luarn & Lin (2004)                 |

**Table 4.1 Construct Sources**

Likert scales (1-7), with anchors ranging from “strongly disagree” to “strongly agree” was used for all questions. To ensure validity and reliability of the research instruments a pre-test

of these measures was conducted through selected 25 users of M-Kesho Mobile Banking to validate the instrument.

In order to facilitate participants' understanding of this research, a brief introduction of the research purpose and a definition of Mobile Banking were provided at the beginning of the questionnaire. Furthermore, confidentiality and anonymity were afterwards. The demographic questions for this research were placed at the end of the questionnaire. This was better to keep participants' minds on the purpose of the survey at the beginning.

| VARIABLE               |       | ITEM  |
|------------------------|-------|---|
| Perceived Ease of Use  | PEoU1 | Learning to use Mobile Banking services is easy to me   |
|                        | PEoU2 | It is easy to access the Mobile Banking application on my phone and make a transaction.   |
|                        | PEoU3 | Using Mobile Banking takes too much time.   |
|                        | PEoU4 | Using Mobile Banking is often frustrating because I need to remember the access code to do further banking transaction each time. |
| Perceived Usefulness   | PU1   | Using Mobile Banking make me a modern customer  |
|                        | PU2   | Using Mobile Banking make my transaction easier   |
|                        | PU3   | I will use Mobile Banking if there no other banking options.  |
| Self Efficacy          | SE1   | When I hear about new mobile technology I look for possibilities to experiment it.  |
|                        | SE2   | I use Mobile Banking because someone has shown me how to do it.   |
|                        | SE3   | I usually the fast to try new information technology on mobile services   |
|                        | SE4   | I use Mobile Banking because I have seen someone else using it.   |
| Perceived Credibility  | PC1   | Mobile Banking is a secure way of transacting   |
|                        | PC2   | I am afraid that my personal or transaction details would be leaked while transacting   |
|                        | PC3   | It is very easy for my money to be stolen if using Mobile Banking   |
|                        | PC4   | Mobile Banking is a faster way of bank transacting  |
|                        | PC5   | Mobile Banking is more accessible than visiting a bank  |
|                        | PC6   | I have a positive perception about using Mobile Banking services  |
| Perceived Finance Cost | PFC1  | There are financial barriers (e.g communication time) to my using Mobile Banking  |
|                        | PFC2  | Using Mobile Banking increases my banking costs.  |
|                        | PFC3  | Using Mobile Banking fits well with the way I like to control and manage my banking transactions.                                 |

|                              |      |  |
|------------------------------|------|--|
| Perceived Normative Pressure | PNF1 | Most people who are important to me think I should use Mobile Banking. |
|                              | PNF2 | People important to me think that I should use Mobile Banking          |
|                              | PNF3 | My peers think I should use Mobile Banking.                            |
|                              | PNF4 | It is expected people like me use Mobile Banking services              |
|                              | PNF5 | People I look up expect me to use Mobile Banking                       |
| Attitude Toward Adoption     | AT1  | Using Mobile Banking services is a good idea                           |
|                              | AT2  | My attitude towards Mobile Banking services is favorable               |
|                              | AT3  | I think that using Mobile Banking services is beneficial to me         |
|                              | AT4  | I like the idea of using Mobile Banking services                       |
|                              | AT6  | Using the Mobile Banking services would be pleasant                    |
| Adoption                     | A1   | I plan to use Mobile Banking services                                  |
|                              | A2   | I will frequently use Mobile Banking services in the future            |
|                              | A3   | I will strongly recommend others to use Mobile Banking services        |

**Table 4.2 Questionnaire items**

#### 4.4.2 Questionnaire Reliability

Reliability refers to the consistency and stability in the results of a test or scale. A test is said to be reliable if it yields similar results in repeated administrations when the attribute being measured is believed not to have changed in the interval between measurements, even though the test may be administered by different people and alternative forms of the test are used. A reliable instrument or test must meet two conditions: it must have a small random error; and it must measure a single dimension.

A pre-test was conducted to validate the instrument. Feedback about the layout of the questionnaire and question ambiguity was obtained, furthermore, measures of internal consistency to test the reliability of the questionnaire items in SPSS was conducted. The method of internal consistency for estimating reliability is mainly focused on how consistently the examinees/subjects performed or scored across items or subsets of items on this single test/scale form. The reliability estimates generated by this method is usually called coefficient of internal consistency. The individual scales will be examined for internal consistency by subjecting them to Cronbach's alpha test. Variables can be used for analyses

within acceptable reliability scores if the alpha is greater than 0.70. Table 4.3 shows the result of the alpha scores obtained when the items were subjected to Cronbach alpha test.

| Construct                    | Item  | Factor Loading | Composite Reliability |
|------------------------------|-------|----------------|-----------------------|
| Perceived Ease of Use        | PEoU1 | 0.800          | -0.1368               |
|                              | PeoU2 | 0.773          |                       |
|                              | PeoU3 | 0.851          |                       |
|                              | PeoU4 | 0.776          |                       |
| Perceived Usefulness         | PU1   | 0.866          | -0.2811               |
|                              | PU2   | 0.807          |                       |
|                              | PU3   | 0.786          |                       |
|                              | PU4   | 0.853          |                       |
| Self Efficacy                | SE1   | 0.877          | -0.0157               |
|                              | SE2   | 0.851          |                       |
|                              | SE3   | 0.898          |                       |
|                              | SE4   | 0.900          |                       |
| Perceived Credibility        | PC1   | 0.914          | 0.0968                |
|                              | PC2   | 0.897          |                       |
|                              | PC3   | 0.846          |                       |
|                              | PC4   | 0.893          |                       |
|                              | PC5   | 0.926          |                       |
| Perceived Finance Cost       | PFC1  | 0.835          | -0.61690              |
|                              | PFC2  | 0.898          |                       |
|                              | PFC3  | 0.802          |                       |
| Perceived Normative Pressure | PNF1  | 0.964          | 0.9049                |
|                              | PNF2  | 0.962          |                       |
|                              | PNF3  | 0.888          |                       |
|                              | PNF4  | 0.910          |                       |
|                              | PSE5  | 0.938          |                       |
| Attitude towards Adoption    | AT1   | 0.978          | 0.8783                |
|                              | AT2   | 0.947          |                       |
|                              | AT3   | 0.894          |                       |
|                              | AT4   | 0.852          |                       |
|                              | AT5   | 0.906          |                       |
| Adoption                     | A1    | 0.932          | 0.9220                |
|                              | A2    | 0.934          |                       |

**Table 4.3 Pre-tested Initial Questionnaire**

The variables Perceived ease of use, Perceived usefulness, perceived self efficacy, perceived credibility and perceived financial cost had their alpha scores less than 0.7. The questionnaire items in this variables are to be rephrased and using alpha if item is deleted value determine which questionnaire items are to be eliminated. This was carried out as follows;

- ❖ Item 3 and 4 on the variable perceived ease of use were rephrased to ensure consistent of this variable.

- ❖ The variable perceived usefulness, item 3 correlated poorly with the other two items and could raise the alpha value by a big margin (0.5920) if the item was deleted. To ensure internal consistency the variable was rephrased.
- ❖ The questionnaire items in this variable poorly correlated. The items were rearranged.
- ❖ The questionnaire items in this variable were rephrased and rearranged to ensure internal consistency.
- ❖ The variable perceived financial cost, the item 3 correlated poorly with the other variable. This item was rephrased to ensure internal consistency of this variable.

The questionnaire items after restructuring are shown in table 4.4 below. The questionnaire was re – tested and the table 4.5 below shows the alpha scores obtained. The questionnaire items attained the recommended alpha score of 0.7 and above as recommended.



| VARIABLE                     |       | ITEM  |
|------------------------------|-------|---|
| Perceived Ease of Use        | PeoU1 | Learning to use M- Banking services is easy to me   |
|                              | PeoU2 | It is easy to access the M- Banking application on my phone and make a transaction.                                       |
|                              | PeoU3 | Using M- Banking takes less time.   |
|                              | PeoU4 | Using M- Banking is less frustrating. It is easy to remember the access code to do further banking transaction each time. |
| Perceived Usefulness         | PU1   | Using M- Banking make me a modern customer  |
|                              | PU2   | Using M- Banking make my transaction easier   |
|                              | PU3   | M- Banking does not substitute other banking options.   |
| Self Efficacy                | SE1   | When I hear about new mobile technology I look for possibilities to experiment it.  |
|                              | SE2   | I am usually fast to try new information technology on Mobile services  |
|                              | SE3   | I use M- Banking because I have seen someone else using it.   |
|                              | SE4   | I use M- Banking because someone has shown me how to do it.   |
| Perceived Credibility        | PC1   | M- Banking is a secure way of transacting   |
|                              | PC2   | M- Banking is a faster way of bank transacting  |
|                              | PC3   | M- Banking is more accessible than visiting a bank  |
|                              | PC4   | It is not easy for my money to be stolen when using M- Banking.   |
|                              | PC5   | I have a positive perception about using Mobile Banking services  |
| Perceived Finance Cost       | PFC1  | There are financial barriers to my using Mobile Banking   |
|                              | PFC2  | Using M- Banking reduces my banking costs.  |
|                              | PFC3  | Using M-Banking fits well with the way I like to control and manage my banking transactions.                              |
| Perceived Normative Pressure | PNF1  | Most people who are important to me think I should use M-Banking.   |
|                              | PNF2  | People important to me think that I should use M-Banking  |
|                              | PNF3  | My peers think I should use M- Banking.   |
|                              | PNF4  | It is expected people like me use M- Banking services   |
|                              | PNF5  | People I look up expect me to use M-Banking   |
| Attitude Towards             | AT1   | Using M-Banking services is a good idea   |
|                              | AT2   | My attitude towards M-Banking services is favorable   |
|                              | AT3   | I think that using M-Banking services is beneficial to me   |
|                              | AT4   | I like the idea of using M-Banking services -   |
|                              | AT5   | Using the M-Banking services would be pleasant  |
| Intention to Adopt           | A1    | I will frequently use M-Banking services in the future  |
|                              | A2    | I will strongly recommend others to use M-Banking services  |

**Table 4.4 Rephrased/Reworded Questionnaire Item**

| Construct                    | Item  | Factor Loading | Composite Reliability |
|------------------------------|-------|----------------|-----------------------|
| Perceived Ease of Use        | PeoU1 | 0.869          | 0.8116                |
|                              | PeoU2 | 0.776          |                       |
|                              | PeoU3 | 0.804          |                       |
|                              | PeoU4 | 0.791          |                       |
| Perceived Usefulness         | PU1   | 0.921          | 0.9006                |
|                              | PU2   | 0.925          |                       |
|                              | PU3   | 0.763          |                       |
| Self Efficacy                | SE1   | 0.717          | 0.8973                |
|                              | SE2   | 0.928          |                       |
|                              | SE3   | 0.841          |                       |
|                              | SE4   | 0.830          |                       |
| Perceived Credibility        | PC1   | 0.804          | 0.8172                |
|                              | PC2   | 0.889          |                       |
|                              | PC3   | 0.883          |                       |
|                              | PC4   | 0.672          |                       |
|                              | PC5   | 0.841          |                       |
| Perceived Finance Cost       | PFC1  | 0.890          | 0.9676                |
|                              | PFC2  | 0.850          |                       |
|                              | PFC3  | 0.864          |                       |
| Perceived Normative Pressure | PNP1  | 0.883          | 0.9123                |
|                              | PNP2  | 0.894          |                       |
|                              | PNP3  | 0.912          |                       |
|                              | PNP4  | 0.894          |                       |
|                              | PNP5  | 0.836          |                       |
| Attitude Toward              | AT1   | 0.843          | 0.8647                |
|                              | AT2   | 0.877          |                       |
|                              | AT3   | 0.905          |                       |
|                              | AT4   | 0.903          |                       |
|                              | AT5   | 0.912          |                       |
| Adoption                     | A1    | 0.877          | 0.9048                |
|                              | A2    | 0.887          |                       |

**Table 4.5 Alpha Value Re – tested Questionnaire items**

#### 4.6 Data Collection

In this study survey is used as a data collection method. As we mentioned before the main goal of this study is to found factors influencing the adoption of Mobile Banking from customer point of view. Sample was taken randomly from Equity Bank customers using M-Kesho Mobile Banking services within Nairobi. Data collection was conducted in Nairobi in the month of December 2010. Total number of distributed questionnaire was equal to 450,

from which 410 were collected back. 15 of the collected questionnaire were incomplete so the collected questionnaires were 395 which met the target sample size of 390 of this study.

#### **4.7 Quality Standard: Validity and Reliability**

In order to reduce the possibility to getting wrong answer, attention need to be paid to: Reliability and validity (Saunders and Thornhill, 2003) of the collected data.

##### **4.7.1 Reliability**

Reliability can be defined as the degree to which measurements are free from error and, therefore, yield consistent results. Operationally, reliability is defined as the internal consistency of a scale, which assesses the degree to which the items are homogeneous.

Reliability can be assessed by the following questions (Easteby-Smith et al., 1991)

1. Will the measures yield the same results on other occasions?
2. Will similar observation be reached by other observers?
3. Is there transparency in how sense was made from row data?

For reflective measures, all items are viewed as parallel measures capturing the same construct of interests. Thus, the standard approach for evaluation, where all path loadings from construct to measures are expected to be strong (i.e., 0.70 or higher), is used. In the case of formative measures, all item measures can be independent of one another since they are viewed as items that create the “emergent factor.” Thus, high loadings are not necessarily true and reliability assessments such as Cronbach's alpha are not applicable. Under this situation, Chin (1998) suggests that the weights of each item be used to assess how much it contributes to the overall factor. For the reflective measures, rather than using Cronbach's alpha, which represents a lower bound estimate of internal consistency due to its assumption of equal weightings of items, a better estimate can be gained using the composite reliability formula (Chin, 1998).

So Measure reliability was assessed using internal consistency scores, calculated by the composite reliability scores (Werts et al., 1974).

Internal consistencies of all variables are considered acceptable since they exceed .70; figure 4.1 shows the reliability coefficients of the questionnaire items while Table 4.6 the composite reliability.

| RELIABILITY ANALYSIS - SCALE (ALPHA) |                                  |                                      |  |                                    |                             |
|--------------------------------------|----------------------------------|--------------------------------------|--|------------------------------------|-----------------------------|
| Item-total Statistics                |                                  |                                      |  |                                    |                             |
|                                      | Scale Mean<br>if Item<br>Deleted | Scale Variance<br>if Item<br>Deleted | Corrected<br>Item-<br>Total<br>Correlation | Squared<br>Multiple<br>Correlation | Alpha<br>if Item<br>Deleted |
| PEOU1                                | 165.3544                         | 662.0162                             | .3958                                      | .5803                              | .8593                       |
| PEOU2                                | 165.4835                         | 664.0829                             | .3960                                      | .6042                              | .8594                       |
| PEOU3                                | 165.4329                         | 666.0228                             | .3622                                      | .5052                              | .8601                       |
| PEOU4                                | 165.4456                         | 674.5675                             | .2465                                      | .4370                              | .8625                       |
| PU1                                  | 165.2835                         | 655.8686                             | .5032                                      | .6799                              | .8572                       |
| PU2                                  | 165.3772                         | 662.7685                             | .4152                                      | .6073                              | .8590                       |
| PU3                                  | 165.7949                         | 662.5644                             | .2846                                      | .4756                              | .8622                       |
| PSE1                                 | 166.0608                         | 652.1790                             | .4097                                      | .4998                              | .8588                       |
| PSE2                                 | 166.2278                         | 636.5977                             | .5207                                      | .5551                              | .8555                       |
| PSE3                                 | 166.6734                         | 670.9514                             | .1845                                      | .4887                              | .8655                       |
| PSE4                                 | 166.8911                         | 663.6810                             | .2285                                      | .4715                              | .8647                       |
| PC1                                  | 166.0380                         | 657.5798                             | .3474                                      | .3262                              | .8604                       |
| PC2                                  | 165.6101                         | 657.6598                             | .4143                                      | .5672                              | .8588                       |
| PC3                                  | 165.4633                         | 651.1021                             | .5092                                      | .6249                              | .8567                       |
| PC4                                  | 165.7316                         | 656.1004                             | .4390                                      | .4181                              | .8582                       |
| PC5                                  | 165.3215                         | 659.0360                             | .4727                                      | .4575                              | .8579                       |
| PFC1                                 | 167.2911                         | 664.5673                             | .2309                                      | .4900                              | .8644                       |
| PFC2                                 | 167.0354                         | 654.4150                             | .3248                                      | .5343                              | .8614                       |
| PFC3                                 | 166.6051                         | 650.0416                             | .3714                                      | .5590                              | .8600                       |
| PNP1                                 | 166.2658                         | 649.5611                             | .3888                                      | .7651                              | .8594                       |
| PNP2                                 | 166.1063                         | 646.5775                             | .4224                                      | .7406                              | .8584                       |
| PNP3                                 | 166.4785                         | 638.1943                             | .4711                                      | .4767                              | .8569                       |
| PNP4                                 | 165.9797                         | 647.9742                             | .4208                                      | .5065                              | .8584                       |
| PNP5                                 | 165.9620                         | 651.7828                             | .3991                                      | .5600                              | .8590                       |
| ATA1                                 | 165.5494                         | 649.3751                             | .4612                                      | .6042                              | .8575                       |
| ATA2                                 | 165.6304                         | 657.8833                             | .4019                                      | .4564                              | .8590                       |
| ATA3                                 | 165.5899                         | 655.2984                             | .4297                                      | .4519                              | .8584                       |
| ATA4                                 | 165.5342                         | 650.6809                             | .4884                                      | .4547                              | .8570                       |
| ATA5                                 | 165.5241                         | 662.7780                             | .3634                                      | .4187                              | .8600                       |
| ITA1                                 | 165.3747                         | 658.1486                             | .4468                                      | .5474                              | .8582                       |
| ITA2                                 | 165.4152                         | 664.3602                             | .3947                                      | .4671                              | .8594                       |
| Reliability Coefficients             | 31 items                         |                                      |  |                                    |                             |
| Alpha =                              | .8634                            | Standardized item alpha =            | .8714                                      |                                    |                             |

Figure 4.1 Reliability Analysis of the questionnaire items

| Construct                    | Composite Reliability |
|------------------------------|-----------------------|
| Perceived ease of use        | 0.8864                |
| Perceived Usefulness         | 0.9159                |
| Perceived Self Efficacy      | 0.8870                |
| Perceived Credibility        | 0.9143                |
| Perceived Finance Cost       | 0.9284                |
| Perceived Normative Pressure | 0.9357                |
| Attitude Towards Adoption    | 0.9067                |
| Adoption                     | 0.9358                |

**Table 4.6 Composite Reliability**

Composite Reliability (Construct Reliability):

The formula for calculating the Composite Reliability is as follows:

$$p_c = \frac{(\sum \lambda)^2}{[(\sum \lambda)^2 + \sum(\theta)]}$$

Where  $p_c$  = composite reliability

$\lambda$  = indicator loadings

$\theta$  = indicator error variances

#### 4.7.2 Validity

Validity is concerned with whether the findings are really about what they appear to be about. Validity is defined as the extent to which data collection methods or methods accurately measure what they were intended to measure (Saunders and Thornhill, 2003).

The two elements convergent validity and discriminant validity are components of a larger scientific measurement concept known as construct validity (Straub et al., 2004). These two validities capture some of the aspects of the goodness of fit model, i.e., how well the measurement items relate to constructs.

Convergent validity is shown when each measurement item correlates strongly with its assumed theoretical construct. To establish convergent validity, you need to show that measures that should be related are in reality related. You should readily see that the item intercorrelations for all item pairings are very high (remember that correlations range from -1.00 to +1.00). Convergent validity is shown when each measurement item correlates strongly with its assumed theoretical construct. The ideal level of standardized loadings for reflective indicators 0.7 but 0.6 considered to be an acceptable level (Barclay et al., 1995).

| Construct                    | Indicator | Loading |
|------------------------------|-----------|---------|
| Perceived Ease of Use        | PEoU1     | 0.6715  |
|                              | PEoU2     | 0.6924  |
|                              | PEoU3     | 0.6631  |
|                              | PEoU4     | 0.6148  |
| Perceived Usefulness         | PU1       | 0.7411  |
|                              | PU2       | 0.7189  |
|                              | PU3       | 0.6332  |
| Perceived Self Efficacy      | PSE1      | 0.5197  |
|                              | PSE2      | 0.5748  |
|                              | PSE3      | 0.5399  |
|                              | PSE4      | 0.5429  |
| Perceived Credibility        | PC1       | 0.4575  |
|                              | PC2       | 0.5716  |
|                              | PC3       | 0.6204  |
|                              | PC4       | 0.5584  |
|                              | PC5       | 0.5609  |
| Perceived Financial Cost     | PFC1      | 0.7080  |
|                              | PFC2      | 0.7070  |
|                              | PFC3      | 0.6917  |
| Perceived Normative Pressure | PNP1      | 0.6562  |
|                              | PNP2      | 0.6632  |
|                              | PNP3      | 0.5754  |
|                              | PNP4      | 0.5844  |
|                              | PNP5      | 0.6248  |
| Attitude Towards Adoption    | ATA1      | 0.5776  |
|                              | ATA2      | 0.5144  |
|                              | ATA3      | 0.5258  |
|                              | ATA4      | 0.4992  |
|                              | ATA5      | 0.5426  |
| Adoption                     | A1        | 0.7950  |
|                              | A2        | 0.7950  |

**Table 4.7 Inter – item Correlation.**

Discriminant validity is shown when each measurement item correlates weakly with all other constructs except for the one to which it is theoretically associated.

Discriminant validity is shown when two things happen:

1. The correlation of the latent variable score with measurement item need to show an appropriate pattern of loading, one in which the measurement item load highly on their theoretically assigned factor and not highly on other factors.

| Scale Item | Perceived Ease of Use | Perceived Usefulness | Perceived Self Efficacy | Perceived Credibility | Perceived Financial Cost | Perceived Normative Pressure | Attitude Towards Adoption | Adoption      |
|------------|-----------------------|----------------------|-------------------------|-----------------------|--------------------------|------------------------------|---------------------------|---------------|
| PEoU1      | <b>0.6720</b>         | 0.1890               | 0.1793                  | 0.1554                | 0.0927                   | 0.0806                       | 0.2534                    | 0.2165        |
| PEouU2     | <b>0.6925</b>         | 0.1480               | 0.2138                  | 0.1640                | 0.0900                   | 0.0846                       | 0.2246                    | 0.1625        |
| PEoU3      | <b>0.6633</b>         | 0.1407               | 0.1085                  | 0.1644                | 0.1507                   | 0.0966                       | 0.1410                    | 0.1260        |
| PEoU4      | <b>0.6148</b>         | 0.1483               | 0.0078                  | 0.1204                | 0.0997                   | 0.0376                       | 0.0612                    | 0.0556        |
| PU1        | 0.2405                | <b>0.7410</b>        | 0.1490                  | 0.2498                | 0.1407                   | 0.2268                       | 0.1822                    | 0.2605        |
| PU2        | 0.1923                | <b>0.7190</b>        | 0.1568                  | 0.2546                | 0.0477                   | 0.1392                       | 0.1456                    | 0.2320        |
| PU3        | 0.050                 | <b>0.6333</b>        | 0.2235                  | 0.1238                | 0.1770                   | 0.1180                       | 0.0612                    | 0.0155        |
| PSE1       | 0.1500                | 0.1547               | <b>0.5198</b>           | 0.1378                | 0.0173                   | 0.2058                       | 0.1774                    | 0.2370        |
| PSE2       | 0.1398                | 0.2513               | <b>0.5750</b>           | 0.1890                | 0.2613                   | 0.2723                       | 0.1974                    | 0.1670        |
| PSE3       | 0.6325                | 0.1490               | <b>0.5400</b>           | 0.0798                | 0.0343                   | 0.0145                       | 0.0656                    | 0.1065        |
| PSE4       | 0.2050                | 0.1507               | <b>0.5428</b>           | 0.0708                | 0.0310                   | 0.0910                       | 0.0012                    | 0.0305        |
| PC1        | 0.3658                | 0.1039               | 0.1346                  | <b>0.4575</b>         | 0.1319                   | 0.0941                       | 0.1972                    | 0.1479        |
| PC2        | 0.1920                | 0.1995               | 0.1036                  | <b>0.5716</b>         | 0.0190                   | 0.0589                       | 0.3124                    | 0.2569        |
| PC3        | 0.2433                | 0.2535               | 0.1024                  | <b>0.6204</b>         | 0.1333                   | 0.1175                       | 0.2991                    | 0.2708        |
| PC4        | 0.1730                | 0.2313               | 0.1370                  | <b>0.5584</b>         | 0.0829                   | 0.1326                       | 0.2274                    | 0.2005        |
| PC5        | 0.0710                | 0.2586               | 0.1441                  | <b>0.5609</b>         | 0.1102                   | 0.1271                       | 0.2360                    | 0.2239        |
| PFC1       | 0.0710                | 0.0840               | 0.0306                  | 0.0255                | <b>0.7080</b>            | 0.1428                       | 0.0432                    | 0.1060        |
| PFC2       | 0.0892                | 0.1038               | 0.0557                  | 0.0748                | <b>0.7070</b>            | 0.2068                       | 0.0983                    | 0.0527        |
| PFC3       | 0.1288                | 0.1776               | 0.1153                  | 0.1861                | <b>0.6917</b>            | 0.0713                       | 0.1800                    | 0.1116        |
| PNP1       | 0.0174                | 0.1546               | 0.2290                  | 0.0459                | 0.0922                   | <b>0.6562</b>                | 0.0632                    | 0.0889        |
| PNP2       | 0.0470                | 0.1555               | 0.1589                  | 0.0859                | 0.1631                   | <b>0.6632</b>                | 0.0961                    | 0.1394        |
| PNP3       | 0.1325                | 0.1632               | 0.1825                  | 0.1427                | 0.1685                   | <b>0.5754</b>                | 0.1553                    | 0.510         |
| PNP4       | 0.1025                | 0.2123               | 0.0569                  | 0.1205                | 0.1538                   | <b>0.5844</b>                | 0.1972                    | 0.1452        |
| PNP5       | 0.0855                | 0.1094               | 0.0685                  | 0.1352                | 0.1239                   | <b>0.6248</b>                | 0.1117                    | 0.2038        |
| ATA1       | 0.1898                | 0.1537               | 0.0722                  | 0.2730                | 0.1087                   | 0.1064                       | <b>0.5776</b>             | 0.4425        |
| ATA2       | 0.1933                | 0.1151               | 0.0976                  | 0.2221                | 0.0578                   | 0.1063                       | <b>0.5144</b>             | 0.3961        |
| ATA3       | 0.1313                | 0.1043               | 0.1322                  | 0.2563                | 0.1632                   | 0.1066                       | <b>0.5258</b>             | 0.3047        |
| ATA4       | 0.2330                | 0.1030               | 0.1150                  | 0.2899                | 0.1927                   | 0.1541                       | <b>0.4992</b>             | 0.3640        |
| ATA5       | 0.1030                | 0.0890               | 0.0592                  | 0.2308                | 0.0134                   | 0.1502                       | <b>0.5426</b>             | 0.2534        |
| A1         | 0.1348                | 0.1909               | 0.0505                  | 0.2133                | 0.1119                   | 0.1963                       | 0.3729                    | <b>0.7950</b> |
| A2         | 0.1455                | 0.1478               | 0.0962                  | 0.2266                | 0.0643                   | 0.0950                       | 0.3314                    | <b>0.7950</b> |

**Table 4.8 correlation between Latent Variables**

- Establishing discriminant validity requires an appropriate AVE (Average variance Extracted) analysis, we test to see if the square root of every AVE (there is one for every latent construct) is much larger than any correlation among any pair of latent construct. As a rule of thumb, the square root of each construct should be much larger than the Correlation of the specific construct with any of the other constructs in the model (Chin, 1998) and should be at least 0.5 (Fornell and Larcker, 1981). This is shown in Table 4.9, Table 4.10 shows the correlations between latent variables and appendix C the correlations between questionnaire items.

| Construct                    | Average Variance Extracted | Square Root AVE |
|------------------------------|----------------------------|-----------------|
| Perceived Ease of Use        | 0.5630                     | 0.7503          |
| Perceived Usefulness         | 0.6180                     | 0.7861          |
| Perceived Self Efficacy      | 0.3944                     | 0.6280          |
| Perceived Credibility        | 0.4095                     | 0.6399          |
| Perceived Financial Cost     | 0.6235                     | 0.7896          |
| Perceived Normative Pressure | 0.5015                     | 0.7082          |
| Attitude Towards Adoption    | 0.3773                     | 0.6142          |
| Adoption                     | 0.7551                     | 0.8689          |

**Table 4.9 Average Variance Extracted**

|                              | Perceived Ease of Use | Perceived Usefulness | Perceived Self Efficacy | Perceived Credibility | Perceived Financial Cost | Perceived Normative Pressure | Attitude Towards | Adoption |
|------------------------------|-----------------------|----------------------|-------------------------|-----------------------|--------------------------|------------------------------|------------------|----------|
| Perceived Ease of Use        | 0.6604                |                      |                         |                       |                          |                              |                  |          |
| Perceived Usefulness         | 0.4204                | 0.6977               |                         |                       |                          |                              |                  |          |
| Perceived Self Efficacy      | 0.3332                | 0.3922               | 0.5443                  |                       |                          |                              |                  |          |
| Perceived Credibility        | 0.3981                | 0.4126               | 0.3398                  | 0.5538                |                          |                              |                  |          |
| Perceived Financial Cost     | 0.3918                | 0.4109               | 0.3335                  | 0.3598                | 0.7021                   |                              |                  |          |
| Perceived Normative Pressure | 0.3601                | 0.4152               | 0.3785                  | 0.3467                | 0.4070                   | 0.6209                       |                  |          |
| Attitude Towards Adoption    | 0.3785                | 0.3588               | 0.3288                  | 0.3986                | 0.3567                   | 0.3505                       | 0.5317           |          |
| Adoption                     | 0.4442                | 0.4597               | 0.3810                  | 0.4372                | 0.4228                   | 0.4411                       | 0.4799           | 0.7952   |

**Table 4.10 Correlations of Latent Variables**



## CHAPTER FIVE

### DATA ANALYSIS AND DISCUSSION

#### 5.1 Introduction

In this chapter we will analyze the data collected based on basis of framework of reference of this project. Structural equation modeling method is applied in analyzing the collected data and validating the research model. Analysis of demographic data is conducted in SPSS 16.

#### 5.2 Demographic Statistics

All the 395 respondents of the questionnaire were users of Mobile Banking. The following table represents the demographic characteristics of the respondents. Appendix B represents the demographic characteristics of the data collected.

The result shows that most of the respondents are; male (52%), within the age group 21 – 30yrs (47.60%), Married (46.8%), are skilled/ semiskilled (27.30%), are diploma holders (40.50%), Monthly Income range from 10,001 – 20, 000 (31.10%), have not used Mobile Banking for more than one year (63%), and use the services less than once per week (43.70%).

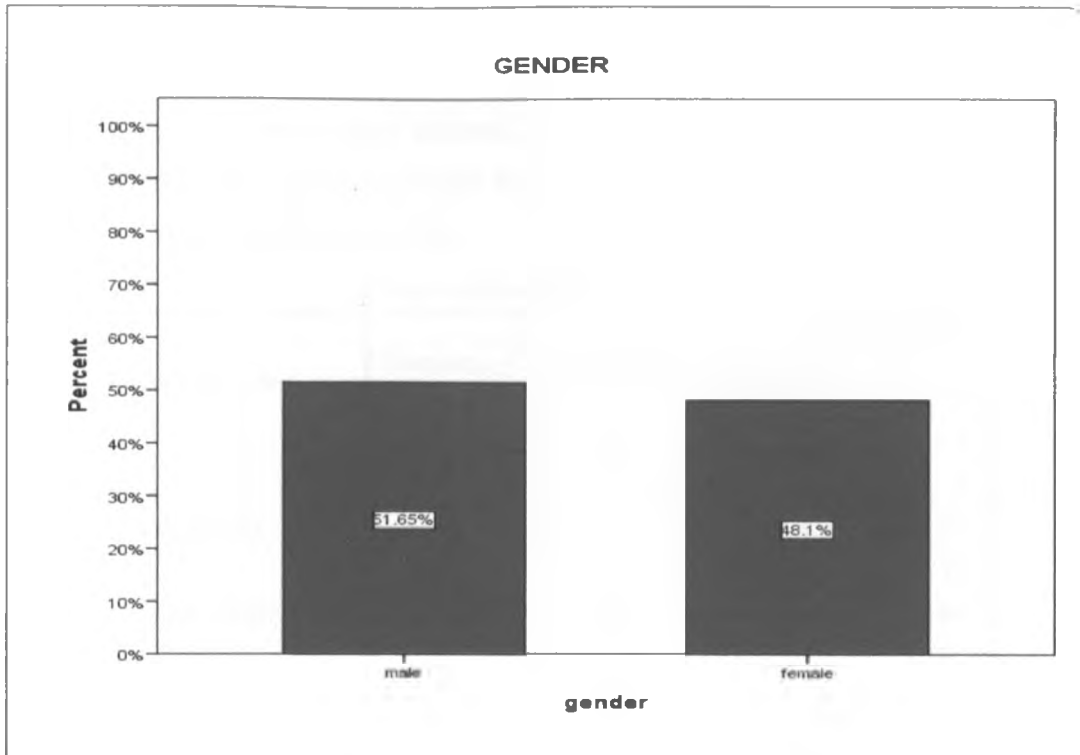
##### 5.2.1 Gender

The result shows that the the distribution of questionnaires was balanced on the gender, but male respondent were more than female respondents. This is an indication that we have more men than women using M- Kesho. The representation based on gender is however quite satisfactory.

**Gender Distribution**

|         | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-----------|---------|---------------|--------------------|
| Valid 0 | 1         | .3      | .3            | .3                 |
| male    | 204       | 51.6    | 51.6          | 51.9               |
| female  | 190       | 48.1    | 48.1          | 100.0              |
| Total   | 395       | 100.0   | 100.0         |                    |

**Table 5.1: Gender Distribution**



**Figure 5.1: Gender Comparison**

### 5.2.2 Age

It is observed that Mobile Banking adoption is embraced differently among people of different age groups. However these results indicate that majority Mobile Banking usage is highly used by people of 21- 30 years. This is satisfactory since Mobile Banking is a new technology and therefore the young generations easily embrace new technology as compared to the older generations.

#### Age Distribution

|                | Frequency | Percent | Valid Percent | Cumulative Percent |
|----------------|-----------|---------|---------------|--------------------|
| Valid 21-30yrs | 188       | 47.6    | 47.6          | 47.6               |
| 31-40yrs       | 154       | 39.0    | 39.0          | 86.6               |
| 41-50yrs       | 40        | 10.1    | 10.1          | 96.7               |
| 51- and above  | 13        | 3.3     | 3.3           | 100.0              |
| Total          | 395       | 100.0   | 100.0         |                    |

**Table 5.2: Age Distribution**

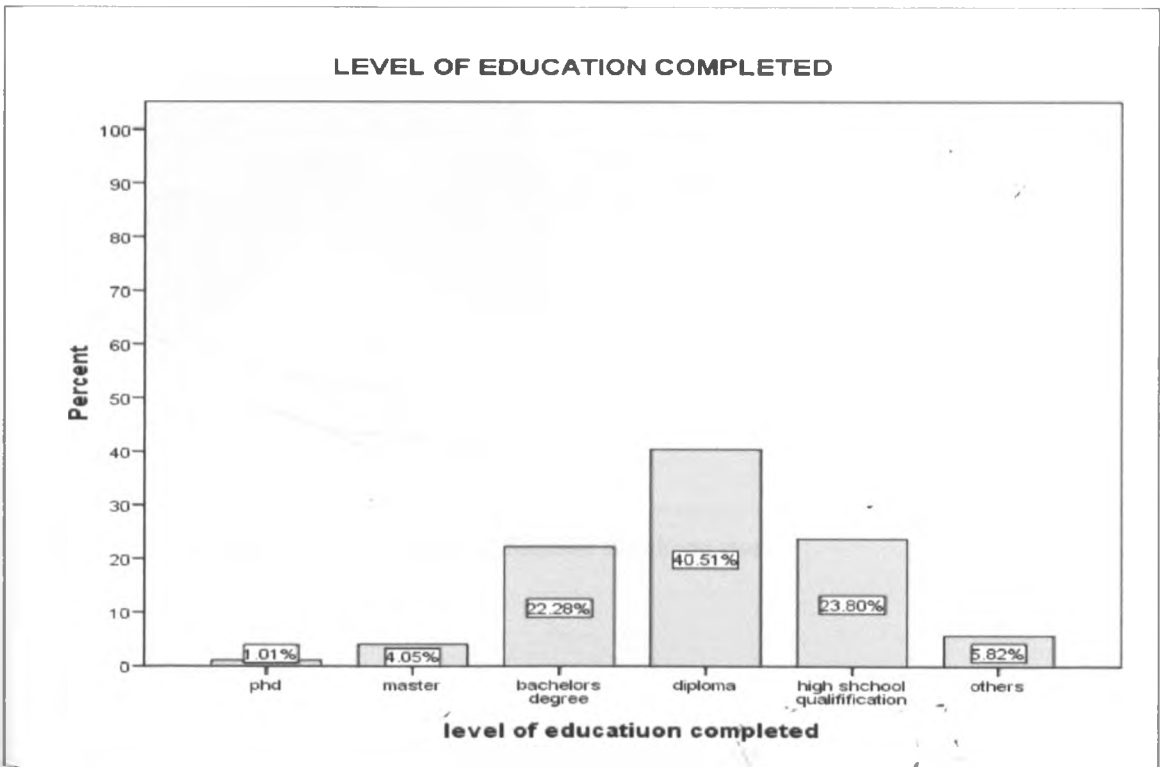
**5.2.3 Level of Education Completed**

The research also identified the level of education of the respondent. The data showed that majority of the respondents have attained high school qualification and above with the highest population being diploma holders 40.5%. The results indicate that education is a key contributor to Mobile Banking adoption.

**Level of Education**

|                           | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------------------|-----------|---------|---------------|--------------------|
| Valid 0                   | 10        | 2.5     | 2.5           | 2.5                |
| phd                       | 4         | 1.0     | 1.0           | 3.5                |
| master                    | 16        | 4.1     | 4.1           | 7.6                |
| bachelors degree          | 88        | 22.3    | 22.3          | 29.9               |
| diploma                   | 160       | 40.5    | 40.5          | 70.4               |
| high school qualification | 94        | 23.8    | 23.8          | 94.2               |
| others                    | 23        | 5.8     | 5.8           | 100.0              |
| Total                     | 395       | 100.0   | 100.0         |                    |

**Table 5.3: Level of Education completed**



**Figure 5.2: Comparison of Level of Education Completed**

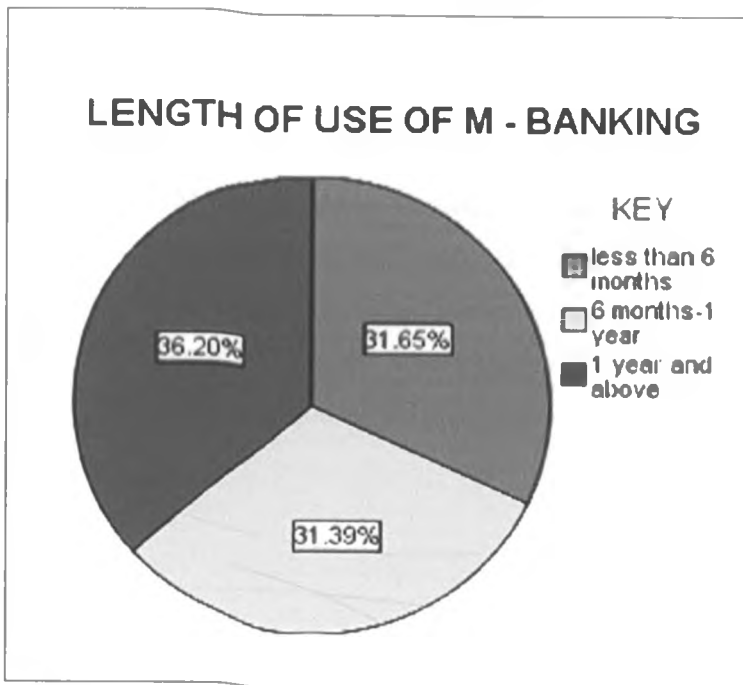
### 5.2.4 Length of Use of Mobile Banking

**Length of use of Mobile Banking**

|                    | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------------|-----------|---------|---------------|--------------------|
| Valid 0            | 3         | .8      | .8            | .8                 |
| less than 6 months | 125       | 31.6    | 31.6          | 32.4               |
| 6 months-1 year    | 124       | 31.4    | 31.4          | 63.8               |
| 1 year and above   | 143       | 36.2    | 36.2          | 100.0              |
| Total              | 395       | 100.0   | 100.0         |                    |

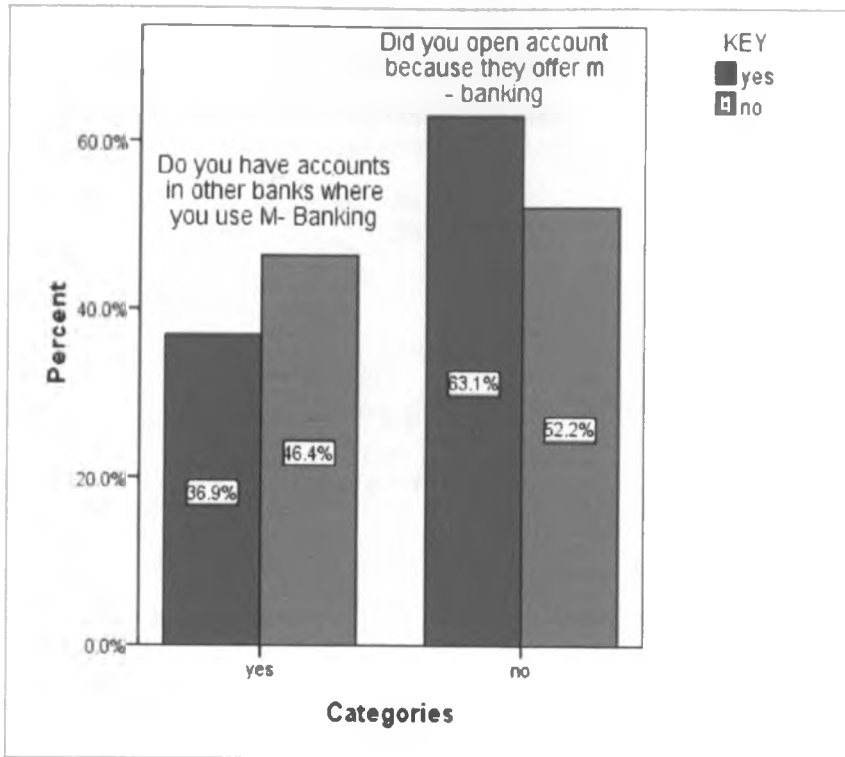
**Table 5.4: length of use of Mobile Banking**

The result indicated most of the respondents have used Mobile Banking for less than one year, 63%. The research was conducted seven months after the launch of M- KESHO services; this indicates that the collaboration of Safaricom and Equity bank to link the M-PESA accounts and an Equity bank account has enhanced Mobile Banking.



**Figure 5.3: Comparison of Length of Mobile Banking use**

### 5.2.5 Number of Mobile Banking Accounts

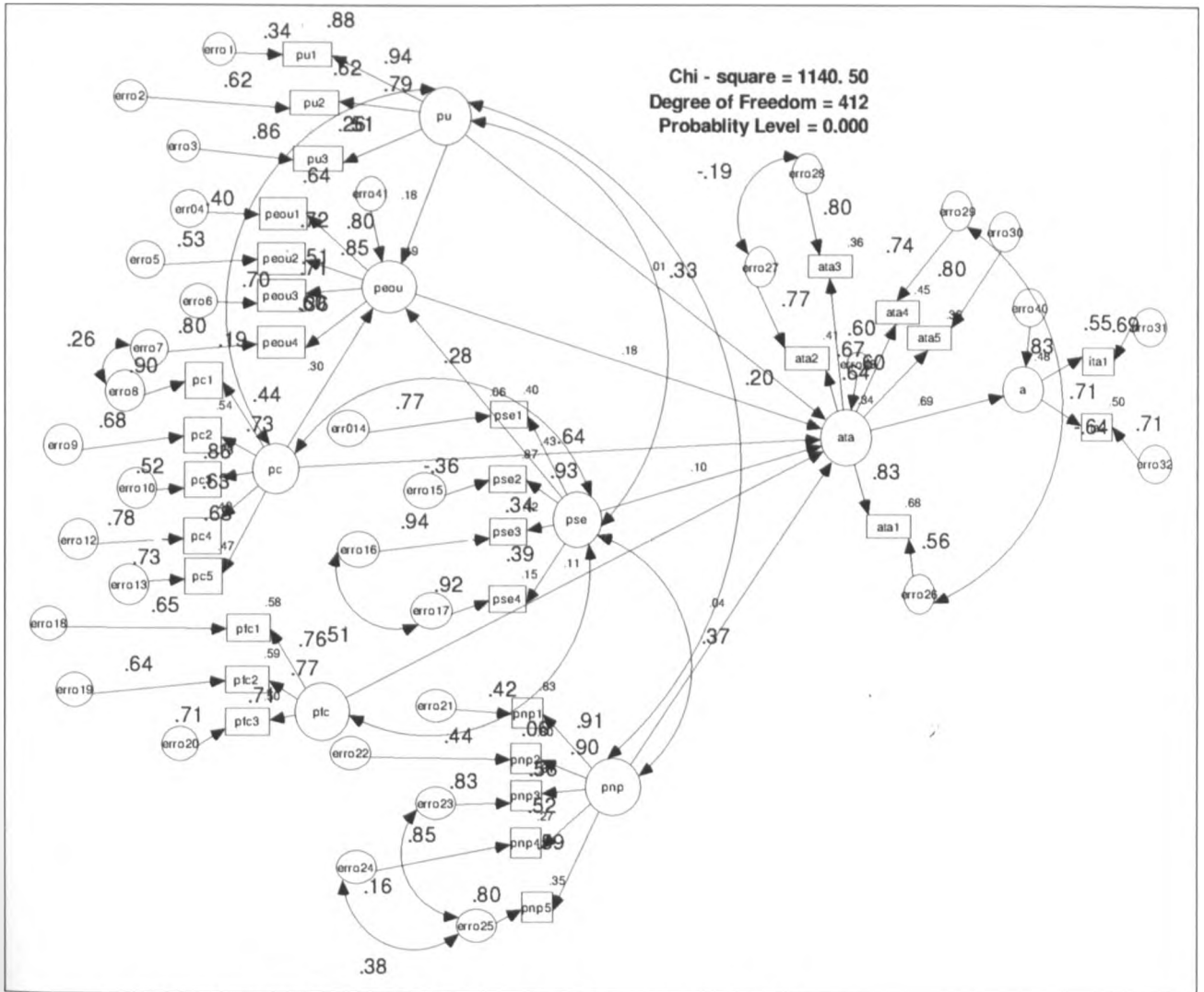


**Figure 5.4: Mobile Banking Accounts Comparison**

The result indicated most of the respondents opened the M – Kesho account, 63.10% because of the Mobile Banking services. It also indicated the majority of M- Kesho users have no bank accounts in other banks where they use Mobile Banking services, 46.40%. This result indicates mobile adoption is still at its infancy stage in Kenya.

### 5.3 Hypotheses Testing

The following graphic represents the result of testing the structural links of the research model using Analysis of Moment Structures (AMOS 16). The estimated path coefficients are given along with the standardized regression weights.



**Figure 5.5 Standardized Extended Technology Acceptance Model.**

Structural equation modeling is well suited to test a group of hypotheses simultaneously in the form of a model with significant level 0.05. It helps to reveal these hypotheses and to consider each one individually.

| Hypothesis |          | Effects   | B     | Sig   |
|------------|----------|-----------|-------|-------|
| H1         | ATA→A    | Supported | 0.69  | ***   |
| H2         | PU→ATA   | Supported | 0.008 | 0.909 |
| H3a        | PU→PEoU  | Supported | 0.202 | 0.003 |
| H3b        | PEoU→ATA | supported | 0.199 | 0.001 |
| H3c        | PC→PEoU  | Supported | 0.332 | ***   |
| H4         | PC→ATA   | Supported | 0.528 | ***   |
| H5         | PNP→ATA  | Supported | 0.045 | 0.485 |
| H6         | PFC→ATA  | Supported | 0.086 | 0.230 |
| H7a        | PSE→ATA  | Supported | 0.135 | 0.131 |
| H7b        | PSE→PEoU | Supported | 0.062 | 0.340 |

**Table 5.5 Result of hypotheses Test**

The results shows that the adoption of Mobile Banking is predicted **Attitude** ( $\beta = 0.69$ ,  $p = 0.001$ ). Attitude Toward Adoption is predicted by **Perceived Usefulness** ( $\beta = 0.08$ ,  $p = 0.05$ ), **Perceived Ease of Use** ( $\beta = 0.199$ ,  $p = 0.001$ ), **Perceived Credibility** ( $\beta = 0.528$ ,  $p = 0.001$ ), **Perceived Self Efficacy** ( $\beta = 0.117$ ,  $p = 0.05$ ), **Perceived Financial Cost** ( $\beta = 0.135$ ,  $p = 0.05$ ), and **perceived normative pressure** ( $\beta = 0.045$ ,  $p = 0.05$ ). Perceived Ease of Use is predicted by **Perceived Usefulness** ( $\beta = 0.202$ ,  $p = 0.05$ ), **Perceived Credibility** ( $\beta = 0.332$ ,  $p = 0.001$ ) and **Perceived Self Efficacy** ( $\beta = 0.062$ ,  $p = 0.05$ ).

### 5.3.1 Explaining the Adoption of Mobile Banking

The adoption of Mobile Banking is predicted by Attitude to Adoption ( $\beta = 0.69$ ). These variables totally accounts to 48% of the variance to adoption of Mobile Banking ( $R^2 = 0.69$  coefficient of determination). This is an indication of the good explanatory power of the model for model adoption. While comparing the result with previous studies on Technology Acceptance Model like the studies conducted by Davis, this construct is higher in this research.

Attitude to adoption has significant effect on adoption and there by supporting **Hypothesis 1**. This emphasis the role an individual's attitude has towards the adoption of Mobile Banking which supports previous research done on this construct.

### 5.3.2. Explaining Attitude Toward Adoption

Attitude towards adoption is predicted by Perceived Usefulness ( $\beta = 0.008$ ), Perceived Ease of Use ( $\beta = 0.199$ ), Perceived Credibility ( $\beta = 0.528$ ), Perceived Self Efficacy ( $\beta = 0.117$ ), Perceived Financial Cost ( $\beta = 0.135$ ) and Perceived Normative Pressure ( $\beta = 0.045$ ). The Adjusted  $R^2$  is 34 %, which means that the model, or the drivers of attitude, significantly explains 34 percent of variance in the attitude towards use of Mobile Banking services. This is a very good proportion for this research, and hence it shows that the model has been well constructed.

These constructs were found to have a positive influence on the attitude towards use of Mobile Banking. The positive influence of PEOU and PU, suggested by TAM is confirmed by the findings. Similarly PC, and PFC suggested by Luarn and Lin (2004) are also confirmed. This suggests that adoption of Mobile Banking is strongly determined by the attitude towards the adoption. The construct Perceived Normative Pressure suggested in this research has a positive standardized regression weight  $R^2 = 04$  which accounts for 4 percent of the model. This explains that Mobile Banking adoption is significantly influenced by the social pressure; people will adopt Mobile Banking depending on the social influence.

The path between Perceived Usefulness and attitude was found to be significant ( $\beta = 0.008$ ) there by supporting **Hypothesis 2**. The path between Perceived Ease of Use and attitude to adoption was found to be significant ( $\beta = 0.199$ ) there by supporting **Hypothesis 3b**. The path between Perceived Self Efficacy and attitude was found to be significant ( $\beta = 0.117$ ) there by supporting **Hypothesis 7a**. The path between Perceived Credibility and attitude was found to be significant ( $\beta = 0.43$ ) there by supporting **Hypothesis 4**. The path between Perceived Financial Cost and attitude was found to be significant ( $\beta = 0.11$ ) there by supporting **Hypothesis 6**. The path between Perceived Normative Pressure and attitude was found to be significant ( $\beta = 0.04$ ) there by supporting **Hypothesis 5**.



### 5.3.3. Explaining Perceived Ease of Use

Perceived Ease of Use is explained by Perceived Usefulness ( $\beta = 0.18$ ), Perceived Credibility ( $\beta = 0.30$ ), and Perceived Self Efficacy ( $\beta = 0.06$ ). The standardized regression weight for these variables  $R^2$  is 19%, which means that the model, or the drivers of adoption, significantly explains 19 percent of variance in the adoption of Mobile Banking. These constructs were all found to have positive standardized estimates therefore prove the reliability of the model.

The path coefficient between Perceived Ease of Use and Perceived Usefulness was found to be significant ( $\beta = 0.18$ ), therefore the **hypothesis 3a** is accepted in this research. The path coefficient between Perceived Ease of Use and Perceived Credibility was found to be significant ( $\beta = 0.30$ ), therefore the **hypothesis 3c** is accepted in this research. The path coefficient between Perceived Ease of Use and Perceived Normative Pressure was found to be significant ( $\beta = 0.06$ ), therefore the **hypothesis 7b** is accepted in this research.

There are enough evidence associated with causal relationship between independent variables and dependent variables in the model which facilitates the effort to understand the dynamics between the constructs. The analyses showed that PSE and PFC are correlated. The reason for such correlation in the relationships is likely due to the advanced stage of adoption and ongoing use of technology. Thus, the Modification Indices of AMOS 16 suggest the independent variable to be correlated, Table 5 below shows the correlation result of the independent variables.

| Variables   | Estimate |
|-------------|----------|
| Pse <-> pfc | 0.058    |
| Pc <-> pse  | 0.280    |
| Pse <-> pu  | 0.326    |
| Pc <-> pu   | 0.395    |
| Pse <-> pnp | 0.371    |
| Pnp <-> pu  | 0.201    |

**Table 5.6 Correlations of independent variables**

#### 5.4 Measure of Fit

The proposed research model incorporates aspects of technology acceptance model and IS success model. The model presents 31 observed or exogenous variables (pc1, pc2, pc3, pc4, pc5, pse1, pse2, pse3, pse4, pfc1, pfc2, pfc3, pnp1, pnp2, pnp3, pnp4, pnp5, peou1, peou2, peou3, peou4, pu1, pu2, pu3, ata4, ata3, ata5, ita2, ita1, ata1, ata2) and 3 unobserved, endogenous variables (peou, ata, a). Endogenous variables (or dependent variables), depend on other variables, and have single-headed arrows pointing to them. Exogenous variables (or independent variables), do not depend on other variables, and do not have single headed arrows pointing to them (Arbuckle, 2005). The model after testing and modification is called the Extended Technology Acceptance Model throughout the rest of this research.

Before analysing the structural model, it is necessary to understand how to evaluate the models. Fit measures are grouped into various types and each type has its specific capability in model evaluation, such as measures of parsimony, minimum sample discrepancy function, measures based on the population discrepancy, comparison to a baseline model, and a goodness of fit index (GFI) and other related measures. Arbuckle mentions that model evaluations is one of the most difficult and unsettle issues related to structural equation modeling. In this research the model is validated using confirmatory factor analysis (CFA).

The CFA is carried out using SEM software AMOS 16. The objective of the CFA is to construct a structural model which aligns the tested measures to the specific constructs, by constraining the variance of each measure to the specific latent construct it should represent. In addition to assess the degree to which each measure contributes to its latent construct, the CFA also tests the separation between constructs by evaluating the fit in the overall model. There are four groups of fit measures. The fit measures within each group give the same rank of ordering of models (Arbuckle 2005). The first group is RMSEA and TLI, the second groups is CFI, the third group is CMIN and NFI, and the fourth group is GFI, and AGFI. Among the many measures of fit, five popular measures are: Chi-square, normed chi-square ( $\chi^2/df$ ), goodness of fit index (GFI), Tucker-Lewis Index (TLI) and Root Mean-Square Error of Approximation (RMSEA). Figure 4.2 shows the initial research model before it was fit to the research data (unstandardized).

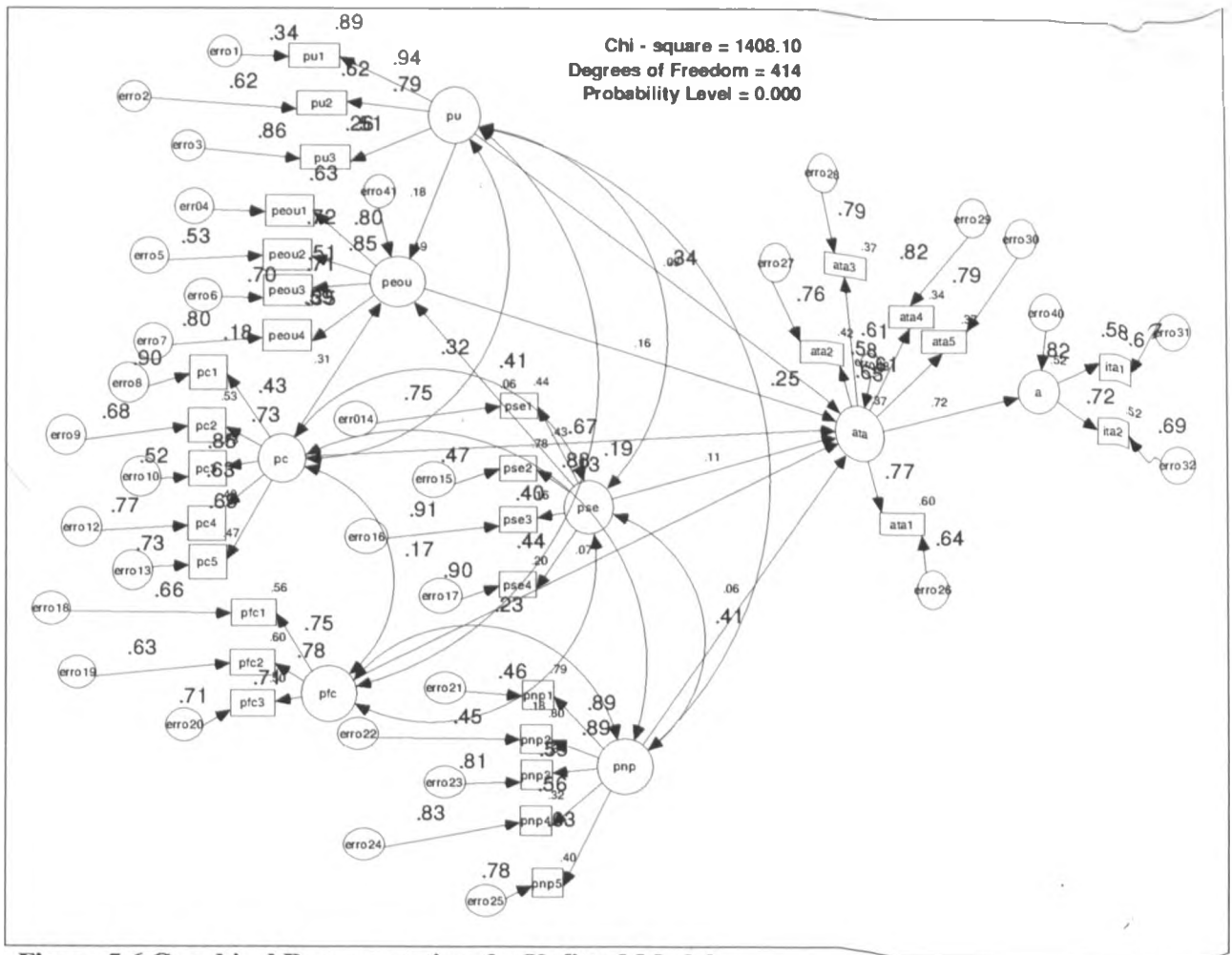


Figure 5.6 Graphical Representation the Unfitted Model

Table 5.7 shows the measures of fit. The overall fit for the model is not good with Chi-sq/df is 3.401, at 413 df and is significant and P value 0.00

| Fit Measures | Standards Fit  | Model Fit |
|--------------|--|-----------|
| X2/df        | A value close to 1 and not exceeding 3 indicates a good fit. | 3.401     |
| IFI          | IFI values close to 1 indicate a very good fit.              | 0.811     |
| TLI          | a value close to 1 indicates a very good fit.                | 0.786     |
| NFI          | TLI values close to 1 indicate a very good fit.              | 0.752     |
| CFI          | a value close to 1 indicates a very good fit.                | 0.809     |
| RFI          | RFI values close to 1 indicate a very good fit               | 0.721     |
| RMSEA        | A value should not greater than 0.1                          | 0.078     |

Table 5.7 Fit Indices for the Unfitted Model

### 5.4.1 Modification Indices

You can test various modifications of a model by carrying out a separate analysis for each potential modification, but this approach is time-consuming. Modification indices allow you to evaluate many potential modifications in a single analysis. They provide suggestions for model modifications that are likely to pay off in smaller chi-square values. Appendix C shows the modification index for this model.

The column heading M.I. in this table is short for Modification Index. The modification indices produced are those described by Jöreskog and Sörbom (1984). The first modification index listed (6.984) is a conservative estimate of the decrease in chi-square that will occur if erro31 and erro32 are allowed to be correlated. The new chi-square statistic would have 413 degrees of freedom and would be no greater than 1401.12 (1408.10 – 6.984). The actual decrease of the chi-square statistic might be much larger than 6.984. The column labeled Par Change gives approximate estimates of how much each parameter would change if it were estimated rather than fixed at 0. Amos estimates that the covariance between erro31 and erro32 would be -0.182. Based on the small modification index, it does not look as though much would be gained by allowing erro31 and erro32 to be correlated. Besides, it would be hard to justify this particular modification on theoretical grounds even if it did produce an acceptable fit.

The largest modification index in the model is 97.925. It indicates that allowing erro16 and erro17 to be correlated will decrease the chi-square statistic by at least 97.925. This is a modification well worth considering because it is quite plausible that these two variables should be correlated. Erro16 represents variability in pse3 that is not due to variation in PSE. Similarly, erro17 represents variability in pse4 that is not due to variation in PSE. Pse3 and pse4 are scale scores on the same instrument. If these scale measures different variables other than PSE, you would expect to find a nonzero correlation between erro16 and erro17. The correlation should be positive, which is consistent with the fact that the number in the Par Change column is positive. The result of this correlation is shown below. Other variables considerations are used to fit the model.

**The added covariance between erro16 and erro17 decreases the degree of freedom by 1**

| Computation of degrees of freedom (Default model) |     |
|---|-----|
| Number of distinct sample moments:                | 527 |
| Number of distinct parameters to be estimated:    | 114 |
| Degrees of freedom (527 - 114):                   | 413 |

**The chi-square statistic is reduced by substantially more than the promised 40.911.**

| Result (Default model)   |
|--------------------------|
| Minimum was achieved     |
| Chi-square = 1296.496    |
| Degrees of freedom = 413 |
| Probability level = .000 |

Table 5.8 shows the measures of fit. The overall fit for the model is good with Chi-sq/df is 3.401, at 413 df and is significant and P value 0.00

| Fit Measures | Standards Fit  | Model Fit |
|--------------|--|-----------|
| $\chi^2/df$  | A value close to 1 and not exceeding 3 indicates a good fit. | 2.768     |
| IFI          | IFI values close to 1 indicate a very good fit.              | 0.862     |
| TLI          | a value close to 1 indicates a very good fit.                | 0.842     |
| NFI          | TLI values close to 1 indicate a very good fit.              | 0.799     |
| CFI          | a value close to 1 indicates a very good fit.                | 0.860     |
| RFI          | RFI values close to 1 indicate a very good fit               | 0.773     |
| RMSEA        | A value should not greater than 0.1                          | 0.067     |

**Table 5.8 Fit Indices for Standardized Model**

The raw parameter estimates must be interpreted cautiously since they would have been different if different identification constraints had been imposed.

Note the large critical ratio associated with the new covariance path. The covariance between erro16 and erro17 is clearly different from 0. This explains the poor fit of previous model, in which that covariance was fixed at 0.

## CHAPTER SIX CONCLUSION AND RECOMMENDATIONS

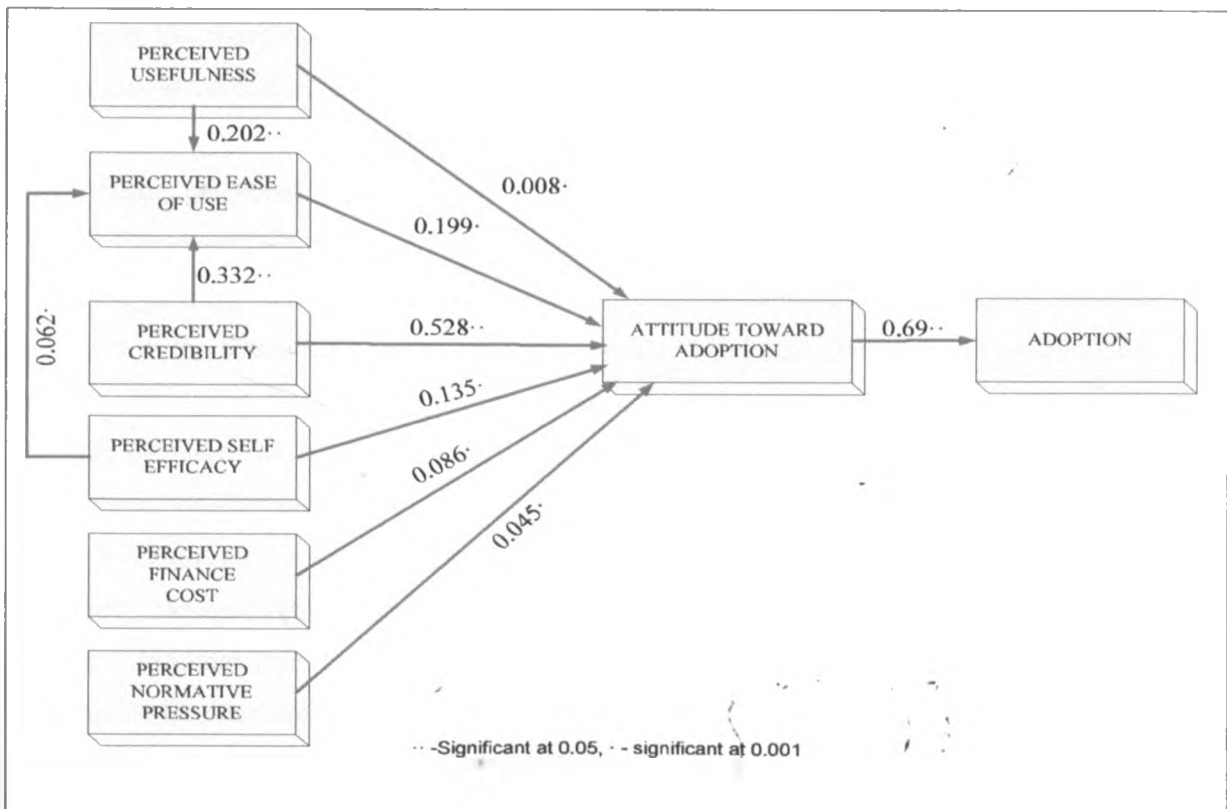
### 6.1 Introduction

Based upon the findings of the research, this final chapter will first present findings on the research objectives, theoretical and practical implication of the research will be presented. Next, the academic contribution of the study will be presented followed up by the research limitations and recommendations for future research.

### 6.2 Research Objectives

#### 6.2.1 Framework for Assessing Mobile Banking in Kenya

The framework presented in Fig 6-1, has been developed for assessing Mobile Banking adoption in Kenya. This framework has eight constructs that were found to significantly influence the adoption of Mobile Banking services. The framework can be used as a guide when assessing the adoption of a Mobile Banking service. Some of the construct exhibited stronger significance than others. The framework is generic and can be used in any developing country.



**Figure 6.1** The Extended Technology Acceptance Model

### **6.2.2 Perception of Mobile Banking Success among Mobile Banking Users.**

The level of Mobile Banking acceptance was accessed. Of the 395 responses received, 15.20% use the service one to three times per week, 22.60% use the services several times per week, and 7.10% use the services once per day while 10.70% use Mobile Banking services several times per day. These findings indicate that Mobile Banking adoption in Kenya has not fully matured despite the advancement in the technology with new products being launched into the market frequently.

### **6.2.3 Relationship among Constructs of Acceptance Behavior for Mobile Banking.**

The other objective was to find out the factors affecting adoption of Mobile Banking in Kenya. As validated in the previous chapter, perceived ease of use, perceived usefulness, perceived self efficacy, financial cost, normative pressure and attitude have a positive and significant effect on adoption of Mobile Banking services. These construct had different regression weights thus affects the adoption of Mobile Banking at varying proportions.

### **6.3 Theoretical and Practical Implication**

This study has significant implications for research on Mobile Banking. The results suggest that factors identified are capable of providing an adequate explanation of consumer adoption decision making process to the Mobile Banking. The study validates the constructs perceived ease of use, perceived usefulness and attitude proposed from research models by Davis (1989). Perceived credibility, perceived self efficacy and perceived financial cost proposed by Luam and Lin (2004) were also validate. The construct perceived normative pressure proposed in the theory of planned behavior was also validated. One question posed to the respondents asking them to suggest issues they deemed important in adoption of Mobile Banking services, a number of factors were raised viz. cost, awareness, delay during transaction, security and access were raised. These new aspects will hopefully spark more research into the factors that influence adoption of Mobile Banking.

This study has shed light on some of the main factors which influence use of Mobile Banking services. Findings from this research can be considered by the industries which are directly responsible for developing Mobile Banking applications as well as financial institutions. The model validated in this research can be used by financial institutions to assess the adoption of Mobile Banking applications they roll out.

#### 6.4 Academic Contributions of the Study

This study makes significant contribution towards the area of Mobile Banking adoption and usage research and practice. These contributions are:

- i. The development of a conceptual model that explains and predicts the factors that influence the adoption of Mobile Banking.
- ii. The empirical support for proposed hypotheses based on the integrative research framework and the literature;
- iii. It is potential to be generalized to nation-wide general organizational study. The result is an indication of the good explanatory power of the model for adoption and can be used as a research model for further study on Mobile Banking adoption.

#### 6.5 Limitations and Directions for Future Research

There are several factors that could have led to some weaknesses in this study. However, the study contains some strength, too. First, study was only being limited to M- Kesho, given time and resources future researchers should consider widening the scope of the research and include other Mobile Banking models and find the correlation between these groups.

Secondly the study utilized a convenience sampling method. The study was conducted within Nairobi; the population was diverse in terms of ethnic background, job experience, and age. This had its advantage in the fact that it was easy to collect the data for fast responses and simple access to the response group. As a result, collecting the data lead to a high response rate. However, the study sample that consists of 395 respondents may limit the generalizability of results. Therefore, although the measures and the model used in the present study perform well with the selected sample, further studies are necessary to confirm the causal relationships between constructs by using a broader sample in order to increase generalizability of the research findings.

Another limitation is that this study did not include demographic variables in the analysis. No attention was paid to variables like gender, age, income, occupation, education and marital status. This variables may influence the adoption of these services. There is a need to search for additional variables that can improve the ability to more accurately predict adoption. This can be an interesting challenge for the future researchers.



## REFERENCE

- Adams, D., Nelson, R., and Todd, P. (1992). "Perceived usefulness, Ease of Use, and Usage of Information technology: A Replication". *MIS Quarterly*, vol. 16, No. 2, pp. 227-247.
- Arbuckle, J. A. (1995). Amos 16 Users Guide. <http://amosdevelopment.com>. Accessed 17<sup>th</sup> November 2010.
- Azjen, I. (1985) 'From intentions to actions: a theory of planned behaviour'. Kuhl, J. and Beckman, J. (eds). *Action-Control: From Cognition to Behaviour*. Heidelberg: Springer. pp. 11-39.
- Azjen, I. (1991). 'The theory of planned behaviour'. *Organizational Behaviour and Human Decision Processes*. Vol. 50. pp. 179-211.
- Ajzen, I. (2002). Perceived behavior control, self-efficacy, locus of control and the theory of planned behavior. *Journal of Applied Social Psychology*, 32, 1-20.
- Bandura, A. (1982). Self Efficacy mechanism in Human Agency. *American Psychologist*, 37(2) 122-147.
- Bangens, Dr. L., and Soderberg, B. (2008). "Mobile Banking – Financial Services for the Unbanked?" The Swedish Program for ICT in Developing Regions, SPIDER.
- Chin, W. W. (1998). "The Partial Least Squares Approach for Structural Equation Modeling," Lawrence Erlbaum Associates, pp. 295-336,
- Dishaw, M.T. & Strong, D.M. (1999). "Extending the technology acceptance model with task-technology fit constructs" *Information and Management*; Vol.36, Iss.1, p9-21
- Davis, F. (1989), Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3): 319-340.
- Easterby-Smith, M., Thorpe, R., and Lowe, A. (1991). *Management Research: An Introduction*, Sage Publications, London.
- Fishbein, M., and Ajzen, I. (1975). "Belief, Attitude, Intentions and Behavior: An Introduction to Theory and Research". Boston: Addison-Wesley.
- Fornell, C. and Larcker, D. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, *Journal of Marketing Research*, 28 (Feb), pp. 39-50.
- Grefen, (2003). *IEEE Transactions on Engineering Management*, VOL. 50, NO. 3, August 2003, 307.

- Harris, W. (2010). "How Mobile Banking Works". How Stuff Works. <http://money.howstuffworks.com/personal-finance/online-banking/mobile-banking3.htm> 15<sup>th</sup> December 2010.
- Jöreskog, K. G., and Sörbom, D. (1984). LISREL-VI user's guide. 3rd ed. Mooresville, IN: Scientific Software.
- Julio, P., Jose A. M., Jose, M. C., and Hernandez. (2010). "Mobile Banking: proposition of an integrated adoption intention framework", International Journal of Bank Marketing, Vol. 28 Iss: 5.
- Jupiter Research  
(<http://www.clickz.com/stats/sectors/wireless/article.php/3505981>, 03.02.2006). Accessed 17<sup>th</sup> December 2010.
- Kabukuru, W. (2010) "Mobile Banking Kenya leading a new revolution". New African FindArticles.com. [http://findarticles.com/p/articles/mi\\_qa5391/is\\_201004/ai\\_n53506746/](http://findarticles.com/p/articles/mi_qa5391/is_201004/ai_n53506746/). Accessed 17<sup>th</sup> September 2010.
- Keen P., and Mackintosh R. (2001). "The Freedom Economy: Gaining the M-Commerce Edge in the Era of the Wireless Internet". New York, Osborne/McGraw-Hill
- Kothari, C. R. (2004). Research Methodology: Methods and Techniques. 2nd Ed, New Delhi, India: New Age International Publishers.
- Koufaris, M. (2002). Applying the technology acceptance model and flow theory to online consumer behaviour. Information Systems Research, 13(2), 205–223.
- Knight, S.A. (2004) "TAM & the Internet: An Investigation into the changing face of the TAM and its application to Internet Search Engines". Proc. of the 5<sup>th</sup> working with e-Business Conference; Nov 2004. Perth, Western Australia.
- Lederer, L.A., Mauphin, J.D., Sena, P.M., & Zhang, Y. (2000). The technology acceptance model and the World Wide Web. Decision Support Systems, 29, 269-282.
- Luarn, P., and Lin, H.H. (2004). Toward an understanding of the behavioral intention to use mobile banking. Computer in Human Behavior, 21(6), 340-348.
- Luarn, P. and Lin, H.H. (2005). Toward an understanding of the behavioral intention to use Mobile Banking. Computers in Human Behavior, 21, 873–891.
- Manstead, A. and Parker, D. (1995). Evaluating and Extending the Theory of Planned Behavior. European Review of Social Psychology 6, pp.69-95.

Mathieson, K. (1991). "Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior", *Information Systems Research*, Vol.2, No. 3, pp.173-191.

Mathieson, K., Peacock, E. and W. W. Chin. (2001). Extending the technology acceptance model: the influence of perceived user resources. *Data Base for Advances in Information Systems*, 32(3): 86-112

Mugenda, M. O., & Mugenda, G. A. (2003). *Research Methods. Quantitative & Qualitative Approaches*; Acts press; Nairobi, Kenya.

Mtaa, T. (2010).M-Kesho: "Super Bank Account" from Safaricom and Equity Bank.  
<http://www.techmtaa.com/2010/05/18/M-KESHO-super-bank-account-from-safaricom-and-equity-bank/> Retrieved 15<sup>th</sup> January 2011

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

Moore, C.G., and Benbasat, I. (2001). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 2(3), 192-222.

Morris, M., Dillon, A (1997). How user perceptions influence software use. *IEEE Software* 14 (4), 58–65.

McFarland, D. J., and Hamilton, D. (2006). Adding contextual specificity to the technology acceptance model. *Comput Hum Behav* 22(3):427–447.

Macintosh, G., Lockshin, L.S. (2001). "Retail relationships and store loyalty: a multi-level perspective", *International Journal of motivation in Internet usage Research in Marketing*, Vol. 14 ,No. 5,pp. 487–497.

Ndubisi, N.O., and Sinti, Q. (2006). "Consumer attitudes, system's characteristics and Internet banking adoption in Malaysia", *Management Research News*, Vol. 29 No.(1/2),PP. 16-27.

Nysveen, H., Pedersen, P.E., & Thorbjornsen, H. (2005). Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons. *Academy of Marketing Science; Journal; Summer 2005*; 33, 3; ABI/INFORM Global.

Nysveen, H., Pedersen, P.E. and Thorbjornsen, H. (2005). Explaining Intention to Use Mobile Chat Services: Moderating Effects of Gender, *Journal of Consumer Marketing*, 33, 5, 247–256

Onyiego, M. (2010). Mobile Banking Gives Kenyans New Weapon Against Poverty <http://www1.voanews.com/english/news/africa/Mobile-Banking-Gives-Kenyans-New-Weapon-Against-Poverty-94942564.html>. Accessed 15th January 2011.

Porteous D. (2006). "The Enabling Environment for Mobile Banking in Africa", London: DFID.

<http://www.bankablefrontier.com/assets/ee.mobil.banking.report.v3.1.pdf>

Prensky, M. (2004). "What can you learn from a cell phone? Almost anything!", Journal of Online edn., Retrieved September 10, 2007 from (<http://www.elearningsource.info>).

Rogers, E.M. and Shoemaker, F.(1971). "Communications in Innovation", Free Press, New York, NY.

Saga, V. L., and Zmud, R. W. (1994). The nature and determinants of IT acceptance, routinization, and infusion. In L.Levine (Ed.), Diffusion, transfer and implementation of information technology. Pittsburgh, PA: Software Engineering Institute, 67–86.

Saunders, M., and Thornhill, A.(2003),Organizational justice, trust and the management of change an exploration, Personnel Review Vol.32,No.3, pp.360-375

Straub, D., M.-C. Boudreau, and D. Gefen (2004) "Validation Guidelines for IS Positivist Research," Communications of the Association for Information Systems (14) pp. 380-426.

Straub, W., Limayem, M., and Karahanna, E. (1995). Measuring Systems Usage: Implications for IS theory testing. Management Science, 41(8), 1328-1342.

Taylor S., and Todd P. (1995). "Understanding Information Technology Usage: A Test of Competing Models". Information Systems Research, Vol. 6, No. 2, pp. 143-176.

Taylor, Shirley; Todd, Peter (1995) "Assessing IT Usage: The Role of Prior Experience". MIS Quarterly, Vol.19, Iss.4, p561. Dec 1995.

Venkatesh, V., Davis, F.D. (2000), "A theoretical extension of the technology acceptance model: four longitudinal field studies", Management Science, Vol. 46 No.1, pp.186-204.

Venkatesh, V., Morris, M., Davis, G. & Davis, F. (2003). User Acceptance of Information Technology: Toward a Unified View, MIS Quarterly, 27, 3, 425-478.

Wang, Y. S., Y.-M. Wang, H., Lin, H., and T. I. Tang (2003). Determinants of user acceptance of internet banking: An empirical study. International Journal of Service Industry Management, 14(5): 501-519

Werts, C., Linn, R. L. and Jöreskog, K. G. (1974), "Interclass reliability estimates: testing structural assumptions", Educational and Psychological Measurement, Vol. 34, No. 1, pp. 25-33

## APPENDIX A: Research Questionnaire



UNIVERSITY OF NAIROBI  
SCHOOL OF COMPUTING & INFORMATICS  
MASTER OF SCIENCE INFORMATION SYSTEMS

### SURVEY RESEARCH QUESTIONNAIRE

#### A survey on:

**Assessing the adoption of Mobile Banking in Kenya**

Dear Participant,

My name is Isaiah Lule. I am a Master of Science in information System student. I am conducting a research study in order to complete my Master's programme

The main purpose of this research is to find out the acceptance/adoption of Mobile Banking in Kenya.

Mobile Banking is an application of mobile computing which provides customers with the support to do banking anywhere/anytime using a mobile handheld device such as a mobile phone.

All personal information which is collected about you during the course of the research will be kept strictly confidential.

Completing this questionnaire indicates that you have understood the information provided about this research project and that you have been given the opportunity to ask any questions and/or clarify certain points.

Kind regards

ISAIAH LULE

**Student Researcher:** Isaiah Lule ([luleisasy@yahoo.com](mailto:luleisasy@yahoo.com))

**Researcher Supervisor:** Tonny K. Omwansa ([tomwansa@gmail.com](mailto:tomwansa@gmail.com)).

**SECTION A: DETERMINANTS OF ADOPTION BEHAVIOUR**

The following set of statements describes the determinants on Mobile Banking services. For each statement, please indicate your level of agreement or disagreement with the following statements.

-“1” indicate strongly disagree.

-“7” indicate strongly agree.

-Numbers in the middle indicate varying levels of agreement.

Please tick [√] in the boxes of the scale that best describe the following

|                                |   | Strongly Disagree        |                          |                          |                          |                          | Strongly Agree           |                          |
|--------------------------------|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Perceived ease of use          |   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
| 1                              | Learning to use Mobile Banking services is easy to me   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2                              | It is easy to access the Mobile Banking applications on my phone and make a transaction.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3                              | Using Mobile Banking takes less time.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4                              | Using Mobile Banking is less frustrating. It is easy to remember the access code to do further banking transaction each time. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Perceived usefulness</b>    |   |                          |                          |                          |                          |                          |                          |                          |
| 5                              | Using Mobile Banking makes me a modern customer   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6                              | Using Mobile Banking makes my transaction easier  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7                              | Mobile Banking does not substitute other banking options.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Perceived Self efficacy</b> |   |                          |                          |                          |                          |                          |                          |                          |
| 8                              | When I hear about new Mobile Banking technology I look for possibilities to experiment it                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9                              | I am usually fast to try new Information technology on mobile services  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10                             | I use Mobile Banking because I have seen someone else using it.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11                             | I use Mobile Banking because someone has shown me how to do it.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>Perceived Credibility</b>   |   |                          |                          |                          |                          |                          |                          |                          |
| 12                             | Mobile Banking is a secure way of transacting   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13                             | Mobile Banking is a faster way of bank transacting  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14                             | Mobile Banking is more accessible than visiting a bank  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15                             | It is not easy for my money to be stolen when using Mobile Banking  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16                             | I have a positive perception about using Mobile Banking services  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|   |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
|---|---|-----------------------------------|-----------------------------------|-----------------------------------|--------------------------|--------------------------|---------------------------------|-------------------------------------|
|   |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
| <b>Perceived Finance Cost</b>   |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
| 17  | There are financial barriers to my using Mobile Banking.  | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 18  | Using Mobile Banking reduces my banking costs.  | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 19  | Using Mobile Banking fits well with the way I like to control and manage my banking transactions. | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| <b>Perceived Normative Pressure</b>   |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
| 20  | Most people who are important to me think I should use Mobile Banking.                            | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 21  | People important to me think that I should use Mobile Banking                                     | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 22  | My peers think I should use Mobile Banking  | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 23  | It is expected people like me to use Mobile Banking services                                      | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 24  | People I look up expect me to use Mobile Banking  | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| <b>Attitude Towards Adoption</b>  |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
| 25  | Using Mobile Banking services is a good idea  | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 26  | My attitude towards Mobile Banking services is favorable  | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 27  | I think that using Mobile Banking services is beneficial to me                                    | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 28  | I like the idea of using Mobile Banking services  | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 29  | Using Mobile Banking services would be pleasant   | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| <b>Intention to Adoption</b>  |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
| 30  | I will frequently use Mobile Banking services in the future                                       | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| 31  | I will strongly recommend others to use Mobile Banking services                                   | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>        |                                     |
| <b><u>SECTION B : RESPONDENT BACKGROUND</u></b>   |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
| The following questions are for statistical purposes and used only to interpret your responses on other questions. Please tick [√] in the box that best describe you. |   |                                   |                                   |                                   |                          |                          |                                 |                                     |
| 32  | Gender  | <input type="checkbox"/> Male     |                                   |                                   |                          |                          | <input type="checkbox"/> Female |                                     |
| 33  | Age   | <input type="checkbox"/> 21-30yrs | <input type="checkbox"/> 31-40yrs | <input type="checkbox"/> 41-50yrs |                          |                          |                                 | <input type="checkbox"/> 51 & above |
| 34  | Marital Status  | <input type="checkbox"/> Single   | <input type="checkbox"/> Married  |                                   |                          |                          |                                 | <input type="checkbox"/> Other      |

|    |   |
|----|---|
| 35 | <p>Current occupation</p> <p><input type="checkbox"/> Professional (Doctor/Lawyer/Accountant etc)</p> <p><input type="checkbox"/> Manager</p> <p><input type="checkbox"/> Senior Executive</p> <p><input type="checkbox"/> Supervisor/Clerical officer</p> <p><input type="checkbox"/> Skilled and semi – skilled worker</p> <p><input type="checkbox"/> others _____ (Please specify)</p>  |
| 36 | <p>level of education completed</p> <p><input type="checkbox"/> Phd <span style="margin-left: 300px;"><input type="checkbox"/> Diploma</span></p> <p><input type="checkbox"/> Master <span style="margin-left: 250px;"><input type="checkbox"/> High school qualification</span></p> <p><input type="checkbox"/> Bachelor's Degree <span style="margin-left: 200px;"><input type="checkbox"/> others _____ (Please Specify)</span></p>                    |
| 37 | <p>Monthly income (in KSH) range</p> <p><input type="checkbox"/> Below 10,000 <span style="margin-left: 250px;"><input type="checkbox"/> 10,000 – 20,000</span></p> <p><input type="checkbox"/> 20,001 – 50,000 <span style="margin-left: 200px;"><input type="checkbox"/> 50,001 – 100,000</span></p> <p><input type="checkbox"/> Above 100,000</p>  |
| 38 | <p>Did you open a bank account with Equity Bank because they provide Mobile Banking services</p> <p><input type="checkbox"/> Yes <span style="margin-left: 300px;"><input type="checkbox"/> No</span></p>   |
| 39 | <p>Do you have bank accounts in other Banks where you use Mobile Banking services?</p> <p><input type="checkbox"/> Yes <span style="margin-left: 300px;"><input type="checkbox"/> No</span></p>   |
| 40 | <p>How long have you used Mobile Banking</p> <p><input type="checkbox"/> Less Than 6Months <span style="margin-left: 100px;"><input type="checkbox"/> 6 Months– 1year</span> <span style="margin-left: 100px;"><input type="checkbox"/> 1 year and above</span></p>   |
| 41 | <p>How often do you check your Bank balance or do Bank transaction per week?</p> <p><input type="checkbox"/> less than once/wk <span style="margin-left: 50px;"><input type="checkbox"/> 1-3/wk</span> <span style="margin-left: 50px;"><input type="checkbox"/> several times/wk</span> <span style="margin-left: 50px;"><input type="checkbox"/> once/day</span> <span style="margin-left: 50px;"><input type="checkbox"/> several times/day</span></p> |
| 42 | <p>Are there any suggestions and recommendations about the improvement or development of Mobile Banking?</p> <p>i. _____</p> <p>_____</p> <p>ii. _____</p> <p>_____</p> <p>_____</p>  |



## APPENDIX B : Demographic Characteristics

| Variable   | Classification of Variables | Frequency | Percentage |
|--|-----------------------------|-----------|------------|
| <b>Gender</b>  | Male                        | 204       | 52%        |
|  | Female                      | 190       | 48%        |
| <b>Age</b>   | 21 – 30 yrs                 | 188       | 47.60%     |
|  | 31 – 40 yrs                 | 154       | 39%        |
|  | 41 – 50 yrs                 | 40        | 10.10%     |
|  | Above 51 yrs                | 13        | 3.30%      |
| <b>Marital Status</b>  | Single                      | 181       | 45.80%     |
|  | Married                     | 185       | 46.80%     |
|  | Other                       | 27        | 6.80%      |
| <b>Current Occupation</b>  | Professionals               | 21        | 5.30%      |
|  | Manager                     | 23        | 5.80%      |
|  | Senior Executive            | 22        | 5.60%      |
|  | Supervisor/Clerical Officer | 66        | 16.70%     |
|  | Skilled and Semi skilled    | 108       | 27.30%     |
|  | Other                       | 130       | 32.90%     |
| <b>Level of Education Completed</b>  | PhD                         | 4         | 1.0%       |
|  | Masters                     | 16        | 4.10%      |
|  | Bachelors Degree            | 88        | 22.30%     |
|  | Diploma                     | 160       | 40.50%     |
|  | High School Qualification   | 94        | 23.80%     |
|  | Others                      | 23        | 5.80%      |
| <b>Monthly Income Range</b>  | Below 10,000                | 99        | 25.10%     |
|  | 10,001 – 20,000             | 123       | 31.10%     |
|  | 20,001 – 50,000             | 90        | 22.80%     |
|  | 50,001 – 100,000            | 31        | 7.80%      |
|  | Above 100,000               | 10        | 2.50%      |
| <b>Did you open an account because they offer Mobile Banking</b>             | Yes                         | 157       | 39.70%     |
|  | No                          | 233       | 59.00%     |
| <b>Do you have Bank accounts in other banks where you use Mobile Banking</b> | Yes                         | 252       | 63.80%     |
|  | No                          | 138       | 34.90%     |
| <b>How long have you used Mobile Banking</b>                                 | Less than 6 months          | 125       | 31.60%     |
|  | 6 months – 1 year           | 124       | 31.40%     |
|  | 1 year and above            | 143       | 36.20%     |
| <b>How often do you do transaction per week</b>                              | Less than once/week         | 172       | 43.70%     |
|  | 1 – 3times/week             | 60        | 15.20%     |
|  | Several times/week          | 89        | 22.60%     |

|   |   |    |        |
|---|---|----|--------|
|   | Once/day  | 28 | 7.10%  |
|   | Several times/day   | 42 | 10.70% |
| <b>Suggestion on improvement and commends on Mobile Banking</b> | <ul style="list-style-type: none"> <li>• Improve on security levels. not only PIN codes</li> </ul>  |    |        |
|   | <ul style="list-style-type: none"> <li>• Inter network transaction should be encouraged for many people to use the services</li> </ul>    |    |        |
|   | <ul style="list-style-type: none"> <li>• Expensive services, educate people to eliminate fear of technology</li> </ul>                    |    |        |
|   | <ul style="list-style-type: none"> <li>• Its good and not frustrating</li> </ul>  |    |        |
|   | <ul style="list-style-type: none"> <li>• Improve on system delay</li> </ul>   |    |        |
|   | <ul style="list-style-type: none"> <li>• Improve system so that people can open accounts online</li> </ul>                                |    |        |
|   | <ul style="list-style-type: none"> <li>• Have customer desk where one can collect hardcopy receipt can request of transactions</li> </ul> |    |        |

**APPENDIX C : Modification Indices (Group number 1 - Default model)**

Covariances: (Group number 1 - Default model)

|                    | M.I.   | Par Change |
|--------------------|--------|------------|
| erro31 <--> erro30 | 6.984  | -.182      |
| erro28 <--> erro30 | 7.057  | .148       |
| erro28 <--> erro31 | 4.316  | -.143      |
| erro29 <--> erro26 | 43.871 | -.395      |
| pu <--> erro31     | 4.817  | .136       |
| erro1 <--> erro28  | 5.589  | -.231      |
| erro6 <--> erro26  | 5.401  | -.146      |
| erro6 <--> erro31  | 4.367  | -.148      |
| erro6 <--> erro32  | 4.682  | .134       |
| erro6 <--> erro28  | 5.238  | -.131      |
| erro6 <--> erro7   | 12.763 | .201       |
| erro5 <--> erro7   | 4.285  | -.133      |
| pnp <--> erro31    | 6.383  | .160       |
| erro25 <--> erro26 | 6.036  | -.147      |
| erro25 <--> erro31 | 19.550 | .300       |
| erro25 <--> erro29 | 10.055 | .172       |
| erro25 <--> erro3  | 16.967 | -.218      |
| erro25 <--> erro1  | 4.780  | .210       |
| erro24 <--> erro30 | 12.175 | .189       |
| erro24 <--> erro28 | 5.888  | .132       |
| erro24 <--> erro29 | 6.285  | .135       |
| erro24 <--> pu     | 13.007 | .175       |
| erro24 <--> erro1  | 6.173  | .236       |
| erro24 <--> erro25 | 56.856 | .400       |
| erro23 <--> pnp    | 4.365  | -.104      |
| erro23 <--> erro25 | 14.525 | .203       |
| erro23 <--> erro24 | 7.205  | .142       |

|                    |        |       |
|--------------------|--------|-------|
| erro22 <--> erro3  | 8.266  | -.186 |
| erro22 <--> erro25 | 6.539  | -.165 |
| erro22 <--> erro23 | 5.286  | -.148 |
| erro21 <--> erro29 | 4.409  | -.138 |
| erro21 <--> pu     | 4.892  | -.131 |
| erro21 <--> erro3  | 31.445 | .358  |
| erro21 <--> erro1  | 10.970 | -.383 |
| erro21 <--> erro25 | 5.266  | -.146 |
| erro21 <--> erro24 | 13.575 | -.234 |
| erro21 <--> erro23 | 4.390  | -.133 |
| erro21 <--> erro22 | 10.774 | .226  |
| pfc <--> erro30    | 7.366  | -.157 |
| pfc <--> erro28    | 4.475  | .122  |
| pfc <--> erro29    | 7.646  | .159  |
| pfc <--> erro3     | 6.978  | .147  |
| pfc <--> erro2     | 7.154  | -.159 |
| pfc <--> erro21    | 8.579  | -.200 |
| erro20 <--> erro28 | 14.801 | .229  |
| erro20 <--> erro3  | 10.694 | .188  |
| erro20 <--> erro7  | 4.510  | .125  |
| erro20 <--> pnp    | 7.614  | -.150 |
| erro20 <--> erro21 | 4.484  | -.149 |
| erro19 <--> erro28 | 4.835  | -.141 |
| erro19 <--> erro23 | 7.464  | .170  |
| erro18 <--> erro22 | 5.209  | .169  |
| erro18 <--> erro21 | 5.979  | -.179 |
| pse <--> erro31    | 6.021  | -.158 |
| pse <--> erro32    | 4.422  | .118  |
| pse <--> erro3     | 4.458  | .106  |

|        |      |        |        |       |
|--------|------|--------|--------|-------|
| pse    | <--> | erro7  | 5.746  | -.123 |
| pse    | <--> | erro6  | 4.206  | .110  |
| pse    | <--> | erro24 | 6.041  | -.124 |
| pse    | <--> | erro23 | 14.017 | .190  |
| pse    | <--> | erro22 | 13.625 | -.230 |
| pse    | <--> | erro21 | 13.359 | .224  |
| pse    | <--> | erro19 | 6.088  | .147  |
| pse    | <--> | erro18 | 4.600  | -.123 |
| erro17 | <--> | erro28 | 4.892  | .120  |
| erro17 | <--> | erro3  | 19.412 | .230  |
| erro17 | <--> | erro2  | 10.031 | .176  |
| erro17 | <--> | erro1  | 20.353 | -.428 |
| erro17 | <--> | erro25 | 7.644  | -.147 |
| erro17 | <--> | erro24 | 4.983  | -.117 |
| erro17 | <--> | erro20 | 10.674 | .188  |
| erro17 | <--> | erro19 | 9.682  | -.193 |
| erro16 | <--> | erro3  | 23.268 | .251  |
| erro16 | <--> | erro2  | 11.543 | .188  |
| erro16 | <--> | erro1  | 20.202 | -.424 |
| erro16 | <--> | pnp    | 4.818  | -.108 |
| erro16 | <--> | erro25 | 8.753  | -.156 |
| erro16 | <--> | erro23 | 8.237  | -.151 |
| erro16 | <--> | erro21 | 8.811  | .189  |
| erro16 | <--> | erro20 | 14.114 | .216  |
| erro16 | <--> | erro19 | 26.118 | -.316 |
| erro16 | <--> | erro17 | 97.925 | .517  |
| erro15 | <--> | erro29 | 5.711  | .194  |
| erro15 | <--> | erro1  | 8.031  | .405  |
| erro15 | <--> | erro20 | 5.586  | -.205 |

|                    |        |       |
|--------------------|--------|-------|
| erro15 <--> erro19 | 25.763 | .475  |
| erro15 <--> erro16 | 4.805  | -.169 |
| err014 <--> erro32 | 10.260 | .197  |
| err014 <--> erro24 | 5.387  | -.128 |
| err014 <--> erro23 | 12.146 | .193  |
| err014 <--> erro22 | 5.365  | -.158 |
| err014 <--> erro21 | 5.059  | .151  |
| err014 <--> pfc    | 5.363  | -.136 |
| err014 <--> erro17 | 5.442  | -.128 |
| pc <--> erro25     | 4.793  | .112  |
| pc <--> erro23     | 4.572  | .109  |
| pc <--> erro21     | 9.440  | -.190 |
| pc <--> erro20     | 11.775 | .191  |
| pc <--> erro18     | 6.273  | -.145 |
| erro13 <--> erro26 | 9.241  | -.188 |
| erro13 <--> erro3  | 4.484  | .116  |
| erro13 <--> err014 | 4.151  | .118  |
| erro12 <--> erro3  | 5.514  | .126  |
| erro12 <--> erro1  | 5.172  | -.222 |
| erro12 <--> erro5  | 4.368  | -.138 |
| erro12 <--> erro20 | 10.456 | .192  |
| erro12 <--> erro17 | 7.089  | .144  |
| erro10 <--> erro31 | 4.737  | .180  |
| erro10 <--> erro32 | 4.052  | -.146 |
| erro10 <--> erro28 | 5.753  | -.161 |
| erro10 <--> erro29 | 5.170  | .151  |
| erro10 <--> erro19 | 7.582  | .211  |
| erro10 <--> erro17 | 7.653  | -.180 |
| erro10 <--> erro16 | 8.668  | -.190 |

|                    |        |       |
|--------------------|--------|-------|
| erro9 <--> erro30  | 4.455  | .122  |
| erro9 <--> erro31  | 4.143  | -.146 |
| erro9 <--> erro3   | 17.338 | -.232 |
| erro9 <--> erro2   | 11.246 | .199  |
| erro9 <--> pfc     | 7.559  | -.165 |
| erro9 <--> erro20  | 5.074  | -.139 |
| erro9 <--> err014  | 7.210  | -.158 |
| erro9 <--> erro13  | 10.066 | -.184 |
| erro8 <--> erro7   | 22.989 | .255  |
| erro8 <--> erro25  | 4.179  | .108  |
| erro8 <--> erro20  | 20.428 | .259  |
| erro8 <--> erro19  | 5.349  | -.143 |
| erro8 <--> erro16  | 15.184 | .203  |
| erro8 <--> erro12  | 4.688  | .116  |
| erro27 <--> erro26 | 11.565 | .205  |
| erro27 <--> erro28 | 19.173 | -.246 |
| erro27 <--> erro6  | 4.481  | .123  |
| erro27 <--> erro24 | 9.245  | -.167 |
| erro27 <--> erro23 | 7.455  | .150  |
| erro41 <--> erro29 | 4.319  | .121  |
| erro41 <--> erro3  | 7.912  | -.160 |
| erro41 <--> erro23 | 4.468  | .121  |
| erro41 <--> erro16 | 8.006  | -.161 |
| erro43 <--> erro29 | 7.607  | -.170 |
| erro43 <--> erro3  | 10.418 | -.196 |
| erro43 <--> erro7  | 9.054  | -.187 |
| erro43 <--> erro6  | 6.324  | -.163 |
| erro43 <--> erro24 | 9.368  | .187  |