IMPACT OF MOBILE BANKING RISKS ON FINANCIAL INCLUSIVENESS: AN MPESA STUDY.

BY

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A Research Project Submitted in Partial Fulfillment of the Requirements for the Award of Master of Business Administration (MBA) Degree, School of Business, University of Nairobi.

November, 2012

DECLARATION

This research project is my original work and has not been presented for a degree in any other University.

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ACKNOWLEDGEMENT

DEDICATION

This is dedicated to the Almighty God for enabling me complete this research. To my late Mother Elizabeth Nyaboke for laying a great foundation for my education and inspiring me. To my family for being there for me and for their invaluable encouragement and support –God bless you.

ABSTRACT

Mobile banking has been considered to be one of the most value-added and important mobile services currently available. Considering the fact that the penetration of this technology is undefined well, particularly in developing country, this study sought find out the influence of perceived mobile banking risks on the benefits derived from usage. The research did an empirical study in Nairobi investigating the impacts of risks on mobile banking and the influence it possess to financial inclusion and sought to find out the risks m-banking users are exposed to. Data was collected from 357 respondents and the findings identified some eminent risks transactions; withdrawal via ATM, high value cash deposits/ withdrawals and customer to customer transactions. The study found out that there is a direct relationship between risks and the impacts on financial inclusion. The uptake of Mpesa, agent's growth and turnover of funds were growing on a steady state since the service started.

The uptake of mobile phones in Kenya has been unprecedented. The most significance is rapid absorption of mobile based banking services. This trend of continued reliance on mobile devices to execute monetary transactions is steadily gaining momentum. In an effort to gauge the implications of these mobile phone phenomena, this study set out to bring to light the critical risks and impacts arising from the emergent mobile technology innovations on financial inclusion. Two risks were identified; fraudulent calls and fake text messages. This paper is structured to offer insights into the current state of mobile phone banking service as well as a review of emerging risks and impacts on financial inclusion. Illuminative cases are also featured to drive home the fundamental paradigms of concern in this study. The paper is based on a study conducted on existing mobile banking service- mpesa in Kenya.

The study cited security measures to safeguard customer as strict adherence to safaricom vetting procedures on transacting and educating customers on keeping the mpesa pin confidential.

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LIST OF ACRONYMS

ATM   -Automated teller machine

CBK   -Central bank of Kenya

CCK   -Communication commission of Kenya

DOI   -Diffusion of Innovation

M-banking   -Mobile banking

PIN   -Personal Identification Number

SME's   -Small and medium enterprises

SMS   -Short message services

TAM   -Technology Acceptance Model

TPB   -Theory of planned behavior

SPSS   -Statistical Package for social science

USSD   -Unstructured supplementary service data

WAP   -Wireless access point

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Mobile banking is defined as provision and availability of banking services with the help of mobile telecommunication devices such as mobile phones (Mallat, 2004).The services include depositing, withdrawing, sending and saving money as well as making payments. According to Porteous (2006) m-banking is separated into two categories, additive and transformational, where additive model uses m-banking as an extra access channel for existing clients. The transformational category draws upon existing telecommunication and agent/representatives infrastructure run by new or alternative banking actors. This has a geographic coverage and pricing with potential to attract previously unbanked segments. Further, it may also have a transformational effect in terms of formalizing previously informal transactions and hence bring people and their financial assets into the formal economy an act of financial inclusiveness. Financial inclusion is the delivery of banking services at affordable costs to vast sections of disadvantaged and low income groups including households, enterprises, small and medium enterprises (SME's) and traders.

The additive m-banking is offered by retail banks to existing customers as an add-on service. The reason for investing is to provide services to the current customer base. This sector has however lately changed m-banking objectives in favour of extending services to the unbanked (van wyk, 2008). Most efforts to reach out to the unbanked are transformational banking predominantly done by telecommunication companies (Telco's) such as Safaricom. This form of m-banking will be the domain for this study.

According to Olga (2003), we can now conduct payment and banking transactions via our mobile phones. This is due to the electronic development that is emerging and advancing rapidly in all areas of financial intermediation and financial markets such as electronic finance, electronic-insurance, electronic-exchange and even electronic-supervision. Other typical functions include viewing account balances, transferring funds from one account

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to another, receiving alerts and paying bills. M-banking cannot support all banking functions, for instance cash can only be withdrawn at physical branches thus, m-banking cannot fully replace banking channels (Barnes and corbitt 2003).One may consider m-banking to be complementary and sometimes, competing with the existing channels. It can provide "anytime and anywhere" banking services unlike branch offices.

According to Wambari (2009) in order for banks to view the poor as viable customers new ways of serving them profitably needs to be explored extending branch network is rather expensive. The development of appropriate technologies has provided an answer to this gap through use of mobile financial transactions to reach the masses. Mobile phone transaction has gained immense usage an option that offers impeccable potential for reaching all.

Mpesa a recent safaricom financial service allowing users to transfer money using mobile phones, pay bills, book airline tickets and even pay other obligations to financial and non-financial institutions. It's a solution aimed at mobile customers who do not have access to a bank account typically because they do not have access to a bank account or they do not have sufficient income to justify a bank account. This solution has brought significant financial inclusiveness to the poor in the economy through its innovative payment solution that enables customers to complete simple financial transactions by mobile phones at any time and place with cell coverage. Many people already have access to mobile phones a positive perspective of mobile phones that mobile service providers can reach remote areas at low cost. People often have greater familiarity and trust with mobile service providers than formal banking institutions further a mobile handset can easily be adapted to handle banking transactions. (www.safaricom.co.ke)

1.1.1 Impacts of m-banking
M-PESA facilitates safe storage and transfer of money. It has facilitated trade, making it easier for people to pay for and receive payment for goods and services. Electricity bills can be paid with a push of a few buttons instead of travelling to an often distant office with a fistful of cash and waiting in a long queue; consumers can quickly purchase cell

phone credit ("airtime") without moving; and taxi drivers can operate more safely, without carrying large amounts of cash, when they are paid electronically. Remittances received via M-PESA are less visible than those transmitted by other means, such as delivery by a friend or relative. Granted this information advantage, recipients are in a position to keep more of the funds they receive. (Jack and Tavneet 2011).

According to the central bank of Kenya (CBK), the number of micro-accounts increased over five times to about 11.2 million last September from about 2.1 million in 2005. The number of deposit accounts also increased to nearly 12 million from 2.55 million over the same period. The CBK attributed the growth to reduced costs of maintaining micro accounts and introduction of innovative instruments such as mobile money transfer. As at the end of September last year, M-Pesa had transferred Sh68.02 billion with 28.45 million transactions since 2007.Banks which have largely been left behind by the telecommunication firms in mobile money innovations have partnered with the providers so as to grow their customers.CBK data shows that since the launch of a partnership between Safaricom and Equity Bank, 700,000 M-Kesho accounts had been opened as at the end of September last year with approximately Sh400 million mobilised.(David, M. 2011).

M-banking has dramatically reduced the cost of delivering financial services. Demonstrated by the 85% score of M-baking customers who have registered lower transactional costs. CBK (2007) statistics put the average monthly cost of operating a current account with a Kenyan commercial bank at over Kshs 900 ($13). M-banking has reduced the cost of basic banking services to customers with over 60 percent from what it would cost through traditional channels. The electronically managed transactions have resulted in huge cost savings, the benefits of which are transferred to the users. Cash transactions, account opening and other transactions can be conducted online. This has made it easy to subscribe and accounts for the high customer concurrence of 91%. Ultimately transformational banking has boosted access to formal finance particularly, in rural areas where many poor people live. The total 876branches operated by financial institutions in Kenya 314 are in Nairobi. M-banking has opened a different access door for the unbanked. The absence of opening account balance boosts preference for the

service. Availability of multiple outlets across the country gives more points of contact with customers unlike traditional banking hall set up. The flexible operating hours of the M-Banking agents has given them greater opportunities to satisfy banking requirements arising any time. On the contrary Kenyan banks operate for an average of seven hours per day. The supplementary Automated Teller Machines (ATMs) do not have a sufficient outreach since they are only available in major towns. (Njenga, 2008)

The statistics on financial access before the launch of M-pesa in Kenya and Tanzania show some interesting differences. In Kenya 38% of people were excluded (didn't use any of financial service; formal, semi-formal or informal) (FinAccess 2006). Exclusion from financial services in Tanzania was much higher at 54% of the adult population (Finscope 2006) as cited by Njenga (2008). The use of formal and semi formal financial services in Kenya is two and a half times greater than in Tanzania. This indicates more access to financial services as a result of mobile banking.

The dominance of mpesa can also be observed in the financial statements of the competitors. Gikunji (2009) examined the financial statements of the postal corporation of Kenya and found that revenues and profits for its postapay money transfer service declined rapidly after introduction of mpesa and suggests that western union's and MoneyGram's profits have also declined over the same period. Faced with obsolescence, money transfer companies such as western union and MoneyGram have responded by cutting prices, even though they are still unable to match mpesa's superior convenience (Gikunji, 2009).On average the price charged for money transfers fell from approximately 7% in 2003 to 3% in 2010. However not entirely attributable to the competitive pressure induced by mpesa revolution as other factors such as general technological change could reduce transaction costs and thus reduce prices.

1.1.2 Mobile banking risks

Risk is the potential that a chosen action or activity (including the choice of inaction) will lead to a loss or an undesirable outcome. Many banks would have concerns when the prospects of introducing m-banking are discussed. Most of the concerns revolve around security controls around m-banking. Supporters of m-banking claim that while m-

banking is not as secure as other conventional banking channels like the ATM and internet banking m-banking channel is not intended to be used for very high risk transactions. The convenience of executing simple transactions and sending out information or alerting a customer on the mobile phone is often the overriding factor that dominates over the skeptics who tend to be overly bitten by security concerns (sachin, 2005).

Agents' liquidity has the potential to become a real risk. Normally agents finance M-Pesa transactions with liquidity from their other business activities, such as selling airtime, or merchandise in a small shop. When their own liquidity is not sufficient to cover for M-Pesa withdrawals for example on a payday, problems start. Agents may then have to leave their business to get more cash and then transport it back, which leads to both security and loss of income problems. Further, M-Pesa customers can get irritated when they cannot withdraw their cash at the vendor in question, whereby the vendor also may face the fact that his other business activities are being affected negatively. Regulatory issues may however pose a threat to M-Pesa because of the current unregulated situation and their disputed non-banking status. (Lennart et al 2008).

The financial sector deepening report (2009) found that fraud is a serious concern for mpesa agents. The three most prominent types of fraud (based on the first response only) were counterfeit money (40%), customers using fake Identification cards (28%) and false personal identification numbers (PIN) (13%), 90% of respondents claim their shops have never been broken into. When it happened, the reported frequency of break-ins was less than twice a year. The data also shows that the introduction of mpesa had no discernible impact on the occurrence of break-ins.

Tricksters and dishonest people have always existed in society. An m-pesa agent was a victim of a new line of mpesa fraud on February 2010 in a peri-urban setting 24 kilometers from the Nairobi city centre. A lady and gentleman visited the agent, claiming to be safaricom supervisors. The two wore valid looking m-pesa badges and even carried m-pesa promotional material for the outlet. It's normal for safaricom supervisors to

inspect various parameters on operations. A while after they left, an old man came to the outlet requesting to withdraw Ksh.35000. He was allowed to withdraw the desired ksh.35000 and initiated the withdrawal from his phone –as is normal procedure, the attendants received a short message service (SMS) purporting to record and authenticate the withdrawal transaction. (Kieti, J. 2010)

The SMS received by the attendant had a valid looking m-pesa transaction number and the purported names were verified against an original national identification presented. The attendant gave an initial Ksh.30000 and was reaching out for Ksh.5000 before the extra amount could be retrieved, the old man signed the outlet transaction book and walked away saying he would come for the remainder later. The attendant continued with the next customer, expecting their float to have increased by Ksh 35000 as a result of the withdrawal. The expected float was then not reflected in the valid m-pesa SMS after the next customer's transaction- raising a red flag to the attendant.

The attendant call 234-m-pesa service line for clarification and the service support person reported the transaction withdrawing Ksh.35000 was not in the system. A number of discrepancies has since been highlighted on the fake M-pesa SMS such as ''P47DT685 confirmed on 01/02/2010 at 2.20PM Give Ksh 35000 to Daniel Maina New M-Pesa balance is Ksh 42049 sender:M-pesa+254771831462''. These are some of the risks users are exposed to on their operations (Kieti, J. 2010).

1.2 Statement of the problem

Studies that have been done on m-banking in Kenya have not concentrated on risks and impacts on consumers of m-banking, perhaps m-banking as a solution to financial exclusiveness has not fully been explored. Otieno(2006)investigated the internet banking in Kenya, Ontunya (2006) did a survey on sms-banking application in commercial banks in Kenya that sought to examine the extent commercial banks in Kenya use SMS-banking besides the problems they encounter when using the service. Murugami (2008) did a survey of SMS banking applications in commercial banks in Kenya. The study found out that most challenges experienced in using SMS banking were security issues. Kimingi (2010) did a study on the effects of technological innovations on the financial performance of commercial banks in Kenya. The study outlined mobile banking

technologies as key innovations banks use in their operations. Abudullahi (2010) did a study on operations strategies used in mobile banking a case of mpesa service by safaricom that sought to determine operations strategies adopted for mpesa service and establish some of the challenges facing safaricom's mpesa service. The study found out that safaricom employs defensive strategies in order to keep the money transfer service very competitive in the market.

Munyasi (2010) did a study on the challenges of innovation strategy a case of mpesa product introduced by safaricom that sought to determine the challenges encountered in developing and implementing innovation strategy through m-pesa product. The findings showed that the company was facing threats from the external environment as a whole. Ngigi (2010) also did a study on the challenges of e-banking adoption where the study focused on banks in Kenya and sought to determine emerging challenges faced by commercial banks in Kenya when employing electronic banking. The study revealed that security was the most important attribute that could drive attitudes towards adoption of e-banking. This leaves consumer risks and impacts an area for further study.

There however seem a gap linking financial access for all, risks and impacts to users of m-banking. Does m-banking achieve financial access for all? Is it safe to use, are there fraud cases affecting users? What risks are users faced with? This research examined the extent to which mpesa services have attained financial inclusion, risks and impacts to the users noted so far and how the various stakeholders are responding to them.

1.3 Objectives of the study
To determine the risks which mpesa users are exposed to in m-transactions.

To investigate the risks and impacts of m-banking to users of the mpesa services.

1.4 Importance of the study
The study should be of interest to mobile financial service providers, whether banks, mobile network operators or non-banks who are considering introducing mobile financial services besides financial regulators who are increasingly interested in the risks of m-banking and the extent to which providers understand and manage these risks.

With regard to users of m-banking this study will investigate risk exposures mobile phone users face on accessing banking services. This will give recommendations to ensure safety to users of m-transactions to avoid occasional fraud losses.

Policy makers: the study seeks to identify gaps in the existing knowledge base around mobile banking and provide information that will help policy makers and practitioners focus their resources on creating an enabling environment for mobile banking, develop policy platforms that mitigate identified risks and thrives potential impacts of mobile banking towards an all-inclusive financial access.

The study findings will provide several important implications for banks, service developers, and software engineer with better strategic insights to design and implement mobile banking services to yield higher consumer acceptance towards mobile banking in Kenya. The findings of this study will provide marketing, finance managers and practitioners with more insight into mobile phone banking risks and impacts which is very useful in developing effective strategies in mobile phone banking management.

To academicians and researchers the findings contributes new knowledge for theoretical consumer modeling by extending traditional theory to new application areas hence giving new insights into the existing theory. The study contributes to both theory and practice. Lastly since mobile phones banking is comparatively a new field of academic research the study aims at increasing the understanding of various risks on electronic financial services and impacts on financial inclusiveness.

1.5 Scope of the study

The study covered M-pesa agents and Safaricom retail shops in Nairobi to find out how have facilitated financial inclusion besides its risks and impacts. Safaricom Mpesa was the domain of the study being a pioneer in mobile money transfer services in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Since the mid-1990s, there has been fundamental shift in banking delivery channels towards using self-service channels such as online banking services. During the past years online banking acceptance has been rapid and currently 55 percent of the private banking customers in Finland have an online banking technology and usage (sheshunoff, 2000). By comparison, at the end of 2000 only roughly 20 percent of the US banks offered online banking services. In the financial sector, the last decades have been under the signs of continuous liberalization and modernization.

It is without a doubt that technology is now the biggest strategic issue in the financial sector. One of the greatest revolutions created by the banking sector was through the use of new information and communication technologies, "under the guidance of the internet". Through this a new but sound and effective concept 'electronic banking commonly referred to e-banking evolved.

Mobile banking refers to provision and availment of banking and financial services with the help of mobile telecommunication devices. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customised information. The earliest mobile banking services were offered over SMS. With the introduction of the first primitive smart phones with wireless access point (WAP) support enabling the use of the mobile web in 1999, the first European banks started to offer mobile banking on this platform to their customers. Mobile banking has until recently (2010) most often been performed via SMS or the mobile web. (http://en.wikipedia.org/wiki/mobile_banking)

Transformational M-banking is the provision of banking services using a mobile phone in such a way that currently unbanked people are targeted. The term was first coined to differentiate this type of offering from additive m-banking options, where the mobile

phone is simply another channel. If m-banking extends financial access at sufficient scale to unbanked people, then the retail financial sector of a country is likely to be transformed (Porteous2006).

2.2 History of M-banking

The first mobile banking and payment initiatives were announced on the year 1999. The first major deployment was by a company called Paybox (largely supported financially by Deutsche Bank), which was founded by two young German's (Mathias Entemann and Eckert Ortwein) and successfully deployed the solution in Germany, Australia, Sweden, Spain and the UK. At about 2003 more than a million people were registered on Paybox and the company was rated by Gartner as the leader in the field. Unfortunately Deutsche Bank withdrew their financial support and the company had to reorganise quickly. All but the operations in Australia closed down.

(http://mbanking.blogspot.com/2007/11/perspective-on-history.html)

Another early starter also identified as a leader in the field was a Spanish initiative called Mobi Pago. Later changed to Mobi Pay and all banks and mobile operators in Spain were invited to join. The product was launched in 2003 and many retailers acquired to accept the special unstructured supplementary service data (USSD) payment confirmation. Because of the complex shareholding and the constant political challenges of the different owners, the product never fulfilled the promise that it had. With no marketing support and no compelling reason for adoption, this initiative is floundering at the moment.
(http://mbanking.blogspot.com/2007/11/perspective-on-history.html)

Many other players announced initiatives and ran pilots with big fanfare, but never showed traction all initiatives were ultimately discontinued. Some early examples are the famous vending machines at the Helsinki airport supported by a system from nokia. Nokia made announcements in conjunction with listed and high flying German e-commerce company, Brokat which won a lucrative Vodafone contract in 2002, but crashed soon afterwards when it ran out of funds. Israel produced a large number of mobile payment start-ups and of the many, only one survived- Trivnet. Others like Adamtech and paytt disappeared after a number of pilots. Initiatives in Norway, Sweden

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and France never got traction. France Telecom launched an ambitious product based on a special mobile phone with an integrated card reader. The solution worked well, but never became popular because of the unattractive, special phone that participants needed inorder to perform payments. Since 2004, mobile banking and payment industry came of age. Successful deployments with positive business cases and big strategic impact have been seen recently with Kenya on the lead through safaricoms Mpesa. (http://mbanking.blogspot.com/2007/11/perspective-on-history.html).

2.3 Evolution of Mobile Banking in Kenya

According to Njenga (2008) Mobile banking started with the creation of services by banks which could be accessed through mobile phones. These facilities aimed to enable customers' access information relating to their accounts. Subsequent innovations have seen the mobile banking phenomena continue to grow steadily. Mobile banking takes several dimensions of execution all representing a new distribution channel that allows financial institutions and other commercial actors to offer financial services outside traditional bank premises. The mobile banking services are available to mobile phone users of mobile service providers namely; safaricom's service branded ''M-pesa'' launched on March 2006 and Airtel's service branded ''Zap'' launched on February 2009.Essar Telecom whose brand is YU-Cash also launched on December 2009. The latest entrants are orange Telkom whose brand is orange money launched on November 2010.

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 centres. Currently Safaricom has over 23000 agents across the country; while Zain prides itself of having over 5000 agency set ups in the short span it has operated the Zap service. This translates to over 28000 mobile banking outlets around the country since inception. (Njenga, 2008).

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2.4 Theoretical background

This section reviews the literature which has formed the theoretical background for research viewpoints, i.e. viewpoints that have been selected to shed light on the main questions of this study.

2.4.1 Convergence of technology and financial services.

Mobile banking is an innovation both an intangible service and an innovative medium of service delivery employing high technology. From this perspective, it is obviously useful to examine research into technology and services.

2.4.2 Technology-based services

Betz (1998, 9) defines technology as *"the knowledge of the manipulation of nature for human purposes".* (As cited by Mari 2003 pp.22). Concepts of innovation and the diffusion of innovation become particularly intricate in a case where technology and service aspects affect characteristics of mobile banking services. Here, indeed, we have a complex interaction between an intangible service and technology-based service delivery (Black et al.2001).Today's banking industry is driven by technological innovations. It has been suggested that the traditional marketplace interaction has been replaced by a market space transaction. Meuter et al. (2000) defines market space as *"a virtual realm where products and services exist as digital information and can be delivered through information based channels".* (As cited by Mari 2003 pp.22).Electronic banking services and thus mobile banking are also a typical example of market space transactions that require no personal interaction.

2.4.3 Diffusion of innovation theory (DOI)

Rogers (1995) defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. Diffusion is a special type of communication concerned with the spread of messages that are perceived

as new ideas.*Rogers (1995) defines innovation as "an idea, practice, or object that is perceived as new by an individual"*. The diffusion of an innovation has traditionally been defined as the process by which that innovation *"is communicated through certain channels over time among the members of a social system"*. (Roger 1995).Considered in this way there are four key elements in the diffusion process: the innovation itself, channels of communication, time and the social system. Communication channels for their part are the means by which information is transmitted to or within the social system. Time is the relative speed with which innovation is adopted by members of the social system. The social system consists of those individuals, organizations, or agencies that share a common culture and are potential adopters of an innovation. The diffusion model is a conceptual paradigm with relevance to many disciplines; thus the diffusion approach provides common conceptual ground for mobile banking. Rogers (1995) further suggests that social scientists are interested is social change and the diffusion research offers a particularly useful means of gaining and understanding of change, since innovations are a type of communication message whose effects are relatively easy to isolate. Thus when studying mobile banking one is dealing with change in human behavior.

One of the key concepts in diffusion research is that change in consumer behaviour is affected by different forces, which can be driving or inhibiting, and which can lead to the adoption or non-adoption of a particular innovation. The research methodology implied by the classical diffusion model is clear-cut and relatively simple. Diffusion scholars have often emphasized quantitative research approaches; they have focused especially on characteristics related to individual innovativeness that can be arrived at through cross-sectional analysis (Rogers 1995) just as the idea of mobile money transfer emanated from the idea sharing of airtime where customers could pay lower value bills by transfer on airtime before Mpesa was developed.

2.4.4 Technology acceptance theory (TAM);

TAM is an adaptation of the theory of reasoned action (TRA) to the field of information systems.TAM posits that perceived usefulness and perceived ease of use determine an individual's intention to use a system with intention to use serving as a mediator of actual system use. Perceived usefulness is also seen as being directly impacted by perceived

ease of use. Researchers have simplified TAM by removing the attitude construct found in TRA from the current specification (Yulia and Chulmo2010). Attempts to extend TAM have generally taken one of three approaches: by introducing additional or alternative belief factors and by examining antecedents and moderators of perceived usefulness and perceived ease of use (Yulia and Chulmo2010).

TRA and TAM, both of which have strong behavioural elements, assume that when someone forms an intention to act, that they will be free to act without limitation. In practice constraints such as limited ability, time environmental and organizational limits, and unconscious habits will limit freedom to act. This gives insights why people pose risks to others using m-banking services and why others adopt it.

2.4.5 Theory of planned behavior (TPB)

The TPB helps to understand how we can change the behaviour of people. The TPB is a theory which predicts deliberate behaviour which can be deliberative and planned. Ajzenet al. (1991).TPB asserts that human action is guided by three kinds of considerations; Behavioural beliefs (beliefs about the likely consequences of the behaviour), Normative beliefs (beliefs about the presence of factors that may facilitate or impede performance of the behaviour)in their respective aggregates behavioural beliefs produce a favourable or unfavourable attitude towards the behaviour, normative beliefs give rise to perceived behavioural control, in combination, attitude towards the behaviour ,normative beliefs result in perceived social pressure or subjective norm, and control beliefs give rise to perceived behavioural control lead to the formation of a behavioural intention. As a general rule the more favourable the attitude and subjective norm and the greater the perceived control, the stronger should be the persons intention to perform the behaviour in question. This enables one to understand why consumers use m-banking and perhaps why others shy away from it which would be found out through this study via an analysis of impacts and risks of m-banking.

2.4.6 Empirical studies on Mobile Banking

Ching, M. et al (2011) did an empirical study on factors affecting Malaysian mobile banking adoption that aimed to investigate factors influencing Malaysians intention to adopt mobile banking using technology acceptance model (TAM).A self-administrated questionnaire was used. Results were analyzed using multiple regression and factor analysis. Factors such as perceived usefulness (PU), perceived ease of use (PEOU), relative advantages (RA) and personal innovativeness (PI) were found positively related with the intention to adopt mobile banking services. However, social norms (SN) were the only factor found insignificant. As was expected, perceived risks (PR) was negatively associated with the mobile banking adoption.

Nicole et al (2010) did a study on predicting young consumers up take of mobile banking services. The *Purpose* was to investigate the barriers for adopting mobile banking services. From a methodological perspective, this paper sought to build on two widely used models for technology adoption, the Technology Acceptance Model (TAM) and Innovation Diffusion Theory and to test a model that is better able to predict consumers' intention to use mobile banking. The research model extended TAM model by additionally examining the effects of compatibility, trust, credibility, perceived risk and cost on behavioural intention. The approach was based on an online survey of 263 young people in Germany, undertaken during August-September 2009. The data was analyzed using structural equation modelling. The results indicated that compatibility, perceived usefulness and risk are significant indicators for the adoption of m-banking services. Compatibility not only had a strong direct effect but was also identified as an important antecedent for perceived ease of use, perceived usefulness and credibility. Trust and credibility are crucial in reducing the overall perceived risk of m-banking. Nicole et al (2010).

Yulia and Chulmo (2010) did a study on Indonesia that sought to clarify the role of trust as a mediating variable on mobile banking environment. A sample data of 100 respondents was collected and it was found that trust mediated the effects of information quality to perceived usefulness and end-user satisfaction. Both relationships of system

quality and perceived usefulness and system quality and end user satisfaction were partially mediated by trust. A field survey for data collection was used to test the research model and data collected was analyzed using partial least square method. The study concluded that the quality of mobile banking and customers trust levels affect the degree of satisfaction and use of mobile banking

Mirza, et.al, (2009) revealed a significant difference between demographic and attitude of users and non-user groups. The majority of customers were very comfortable and willing to use internet banking services. Security concerns, lack of technological knowledge and awareness stood out being obstacles to adoption of internet banking.

Al-Hijriet al. (2008) examined various factors that might act to determine whether a given technology is likely to be adopted by the banking industry in developing country such as Oman by comparing it with a developed country such as Australia. The result indicated that relative advantage, organizational performance, consumer organizational relationship and ease of use, can shed light on the reasons for adoption of internet technology.

An exploration done by Singhal and Padhmabhan, (2008), revealed that utility request, security, utility transaction, ticket booking and funds transfer were factors contributing to internet banking adoption. Tat, et.al (2008) examined predictors of intention among users of internet banking to continue using internet banking services. It was revealed that trust was the strongest predictor followed by compatibility and ease of use.

Zhengh and Zhong (2005) examined the trend in the internet revolutions that have set the Chinese banking sector in motion and the factors which have influenced the adoption of internet banking in china. It was revealed the internet availability, awareness, attitude towards change, computer and internet access, cost, trust in one's bank, security concerns, ease of use and convenience were the major factors affecting the adoption.

These empirical studies attest that security concerns affect mobile banking. There seems a gap in the existing literature linking inclusive finance to mobile banking and the general

impacts it has besides the risks posed. This study will attempt to bridge this gap in the Kenyan context by focusing on Mpesa.

2.5 M-pesa concept

Safaricom ltd is the leading mobile network operator in Kenya. It was formed in 1997 as a fully owned subsidiary of Telkom Kenya. In May 2000, Vodafone group plc of the United Kingdom, the world's largest telecommunication company, acquired a 40% stake and management responsibility for the company. Following an initial public offering in 2008, the shareholding structure for safaricom is 35%; Vodafone 40%; free float 25%.Safaricom is in the business of provision of mobile telecommunication services namely voice, messaging, data, mpesa money transfer and fixed broadband. Safaricom is a quoted company in the Nairobi stock exchange. (http:www.safaricom.co.ke).

Safaricom has had various initiatives among which the mobile money transfer called mpesa adopted for various applications. M stands for mobile and Pesa a Swahili name for money is the product name of a mobile phone based money transfer service whose initial concept and design was Kenyan and later developed by Sagentia for Vodafone. The development was initially sponsored by the UK-based department for international development (DFID) in 2003-2007. Mpesa is a mobile money transfer financial service where the money is in electronic value and is stored and conveyed through mobile phones. The electronic transactions are conducted over safaricom network and the individual account transactions are managed by Sagentia in Europe for Vodafone within safaricom mpesa is supported by a wide range of staff covering most aspects revolving around it. These include technical, sales and marketing, legal, customer support, financial controls, information technology among others.(http://www.vodafone.com/start/media-relations/news).

The popular forms of transactions on mpesa are remote payments for goods and services by taking advantage of the convenience of network coverage as on alternative to travelling long distances or achieving faster response from a transaction. Mpesa is run

through a SIM (Subscriber Identity Module) toolkit application that is enabled on safaricom subscribers SIM cards. The application makes use of the short messaging service which is a store and forward technology. The project faced formidable financial, social, cultural, political, technological and regulatory hurdles. A public sector challenge grant helped subsidize the investment risk. To implement, Vodafone through safaricom had to marry the incredibly divergent cultures of global telecommunications companies, banks, and micro-finance institutions and cope with their massive and often contradictory regulatory requirements. (Philip, A. and Iqbal, Z. 2011).

At last, the project had to quickly train, support and accommodate the needs of customers who were unbanked, unconnected often semi-literate, and who faced routine challenges to their physical and financial security. Safaricom had no roadmap, but created solutions as it went and preserved when a pilot slated to take several months took almost two years.

As part of the millennium development goals, many of the world's leading nations have committed to reduce poverty by 50% by 2015. Traditionally the realm of state organisations, development is today understood to be unachievable without the engagement of the private sector. There are now more than two billion mobile phone users word-wide and for the vast majority of people the first phone call they ever make will now be on a mobile device. This formed a key objective for Vodafone through safaricom to implement (Hughes, N.et al 2007). Safaricom had a fair idea of what they wanted the service to do, but were not sure how to do it. The first big decision was to buy or build? If they could buy software off the shelf to meet their needs it would make sense to buy. So safaricom went shopping and found a multitude of financial service platforms with fairly similar range of functionality. Therein lay the problem: they had all been designed with western banking infrastructure as the point of reference, and then added on other features. It became clear that safaricom would have to make some significant compromises around the functionality and user experience if it bought one of the proprietary products, safaricom then reluctantly decided that it would have to bite the bullet and build its own service from scratch.

The decision raised a key point which has reappeared regularly in every aspect of the project. There is a fundamental difference between the way banks and telecoms operate. Mobile networks operators are relatively young; entrepreneurial companies that have experienced rapid growth and high profits through huge volumes of low-value transactions. Banks tend to be mature organisations with well-established business practices and a reasonably cautious attitude to change their business is based upon fewer transactions that generate relatively high margins. The net result is that when a telecom decides to create a financial service such as Mpesa, there is a collusion of philosophies. So Safaricom decided to build an M-pesa service.(Philip, A. and Iqbal, Z. 2011).

2.6 Mobile Banking Business Models

A wide spectrum of mobile/branchless banking models is evolving. However, no matter what business model, if mobile banking used to attract low-income populations in often rural locations, the business model will depend on banking agents, i.e., retail or postal outlets that process financial transactions on behalf of Telco's or banks. The banking agent is an important part of the mobile banking business model since customer care service quality, and cash management will depend on them. Many Telco's will work through their local airtime resellers. However, banks in Colombia, Brazil, Peru and other markets use pharmacies and bakeries.

The models differ primarily on the question that who will establish the relationship (account opening, deposit taking and lending) to the end customer, the bank or the non-bank/telecommunication company (Telco). Another difference lies in the nature of agency agreement between bank and the non-bank. Models of branchless banking are classified into three broad categories- bank focused, Bank-led and nonbank-led.

Bank-focused model: The bank-focused model emerges when a traditional bank uses non-traditional low-cost delivery channels to provide banking services to its existing customers. Examples range from use of automatic teller machines (ATMs) to internet banking or mobile phone banking to provide certain limited banking services to banks' customers. This model is additive in nature and may be seen as a modest extension of conventional branch banking. (Tanui et al, 2011)

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Bank-led model: The bank-led model offers a distinct alternative to conventional branch-based banking in that customer conducts financial transactions at a whole range of retail agents (or through mobile phone) instead of bank branches or through bank employees. This model promises the potential to substantially increase the financial services outreach by using a different delivery channel (retailers/mobile phones), a different trade partner (telco/chain store) having experience and target market distinct from traditional banks, and may be significantly cheaper than the bank –based alternatives. The bank-led model may be implemented by either using correspondent arrangement or by creating a journal voucher between bank and Telco/non-bank. In this model customer account relationship rests with the bank.

Non-bank-led model: the non-bank led model is where a bank has a limited role in the day-to-day account management. Typically its role in this model is limited to safe-keeping of funds. Account management functions are conducted by a non-bank (e.g. Telco) who has direct contact with individual customers. (Tanui et al, 2011).

2.7 Summary

The uptake of mobile phones in Kenya has been unprecedented. The most significance is rapid absorption of mobile based banking services. This trend of continued reliance on mobile devices to execute monetary transactions is steadily gaining momentum. In an effort to gauge the implications of these mobile phone phenomena, this study set sets out to bring to light the critical risks and impacts arising from the emergent mobile technology innovations on financial inclusion. This paper is structured to offer insights into the current state of mobile phone banking service as well as a review of emerging risks and impacts on financial inclusion. Illuminative cases are also featured to drive home the fundamental paradigms of concern in this study. The paper is based on a study conducted on existing mobile banking service mpesa in Kenya.

A very brief literature on mobile banking made it very clear that this field is still in evolving stage and requires further research. This study attempts to advance research into mobile banking. The survey of empirical studies indicates that many researchers have examined factors affecting internet banking adoption, trends in different countries but not in Kenya. This study therefore, is sought to focus on impacts of mobile banking on financial inclusiveness and the risks accruing to mobile banking users.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology that was used in gathering data, analyzing data and reporting the results. Here the researcher aims at explaining the methods and tools to be used to collect and analyze data to get proper and maximum information related to the subject under study.

3.2 Research design

A descriptive survey study was used with an aim of establishing the impacts of mobile banking risks on financial inclusiveness. This study adopted a survey design as a strategy which has been used before successfully in other empirical studies on commercial banks Murugami (2008).This is because surveys are relatively inexpensive (especially self-administered surveys). Surveys are useful in describing the characteristics of a large population. No other method of observation can provide this general capability. Consequently, very large samples are feasible, making the results statistically significant even when analyzing multiple variables. Otieno (2006) used survey design in the investigation into internet banking technology adoption among Kenyan commercial banks. Murugami (2008) also used survey in a study of sms banking applications in commercial banks in Kenya.

3.3 The population

The study focused on 5063 Mpesa dealers and 12 safaricom retail shops in Nairobi offering mpesa services where a sample was taken for the study. This is largely because they are frontiers in implementing m-transactions and is reported to handle phenomenally huge amounts both linked to the banks and normal fund transfers. The month on December last year alone mpesa reported a turnover of funds transfer of 116.6 billion shillings. The period of the study was from July 2012 which reflected recent impacts of mobile banking risks on financial inclusiveness.

3.4 Sample size

The study used non probability (purposeful) and probability (systemic) sampling techniques to create a sampling frame. Dane (1990) points out the advantage of purposeful sampling as it allows the researcher to home in on wide variety of population. This technique enabled identification of dealers with high population densities of all. For instance selection of those operating in Nairobi and the safaricom shops formed the first selection criteria. There were 5063 mpesa dealers and 12 safaricom shops in the highly populated Nairobi; these formed the sampling frame.

A sample of 357 respondents to represent mpesa dealers and 12 safaricom shops was taken from the sampling frame having satisfied the selection criteria. The selection of the sample size was based on Krejcie and Morgan's (1970) table for determining sample size. The sample size was deemed suitable, as the sample population approximated the qualities and characteristics of the general population. Systemic sampling technique was used since the population of study was available as a list derived from Mpesa authorized agents in Nairobi. The respondents were operational staff in the selected shops/dealers. The technique ensured that the data collected was not biased.

3.5 Data collection

The study collected primary data through questionnaires addressing the study objectives; to investigate the risks and impact of m-banking to users of the mpesa services, to determine the risks which mpesa users are exposed to in m-transactions. This was addressed to mpesa agents in Nairobi. The questionnaires were accompanied with letters of introduction from university and the researcher. The questionnaires were distributed to the respondents through direct administration to the staff and users of mpesa services. Secondary data was also obtained from central bank of Kenya website on how mpesa has performed since 2006 in getting the masses on the formal financial system.

3.6 Data analysis

The data collected by the questionnaire was analyzed using descriptive statistics.

The data was coded into the statistical package for social sciences (SPSS) version 10. The basis of using descriptive measure was to give a basis for determining the weights of

variables under study. Relationships among variables; mobile-banking risks and impacts on inclusive finance were compared and interpretations were made. The findings were presented using tables, pie charts and bar graphs for easier interpretation for recommendations and conclusion of the study. A trend analysis for the secondary data was done and interpretations made on inclusive finance. A regression model was used to analyze the risk exposure of m-banking users and the impact it possess to inclusive finance for the primary data. Where inclusive finance is a dependent variable on independent variables risks of m-banking.

According to (David 2005) linear regression, the model specification is that the dependent variable y_i is a linear combination of the parameters (but need not be linear in the independent variables). For example, in simple linear regression for modelling n data points there is one independent variable: x_i, and two parameters, β_0 and β_1: This study will adopt this model.

Straight line: $y_i = \beta_0 + \beta_1 x_i + \varepsilon_i, \quad i = 1, \ldots, n.$

Where:

y_i: is the dependent variable inclusive finance.

β_0: is the independent variable risk1 on M-banking (Fraud calls)

$\beta_1 x_i$: is the independent variable risk2 on M-banking (Fake texts)

x_i: is the dependent variable inclusive finance.

n : is a data point there is one independent variable x_i.

CHAPTER FOUR

RESEARCH FINDINGS

4.1: Introduction

This chapter presents and discusses the analysis of data collected from various respondents who filled the questionnaires. Results of the data analysis provided information that formed the basis for discussion, conclusion, and interpretation of the findings and recommendations of the study.

4.2: Response Rate

A total of 357 questionnaires representing the sample size, were administered to various mpesa dealers. However, only 250 questionnaires representing a response rate of approximately 70% were returned. This response rate was excellent and representative and conforms to Mugenda and Mugenda (1999) stipulation that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. The response based on agents branch network in Naroibi indicated that most agents operate 2 to 4 branches in Nairobi as indicated on the table 4.0.

Table 4.1: Branch network in Nairobi

Branches	< 2	2 to 4	4 to 6	> 6
Frequency	52	112	69	17
Percent (%)	20.8	44.8	27.6	6.8

Source: research findings

The study sought to establish the agent's commission earnings per month, According to the findings the majority of respondents were earning less than ksh.50000 per month as commission shown by 46.8%, while 8.8 of the respondents earned more than ksh. 150000 per month.

Table 4.2: Agents commission earnings per month

Commission proceeds				
NET INCOME PER MONTH	< 50000	50000-100000	100001-150000	>150000
Frequency	117	65	46	22
Percent %	46.8	26	18.4	8.8

Source: research data

The study found out that agent's profitability is determined by the number of customers served in a month and the general turnover of funds on the mpesa till. The more the funds flow either through deposits or withdrawals the more commission the agent cumulates.

4.3 Distribution of respondents by period of service

The research sought to determine the length of time the agents have been providing the service. Responses based on period of service provision to clients were as below.

Table 4.3: Years of service

Years of service	< 2	2 - 4	> 4
Frequency	73	98	79
%	29.2	39.2	31.6

Source: research data

According to the frequencies those agents who have served for 2 to 4 years represents 39% being the highest rating as opposed to the least service provision of 29.2% representing less than two years. This implies that they have done the business for quite a while and that their experience in handling electronic money and cash money can be trusted to conclude a study based on the information they provided through the questionnaires. This shows that the respondents were well versed with information on the subject matter on this study given that they were in charge of service provision. The study further sought to determine the flow of customers per day. The distribution of respondents based on feet flow of customer per day was also as below.

Table 4.4: Number of customers served per day

Feet flow per day	< 100	100-200	> 200
Frequency	19	142	89
%	7.6	56.8	35.6

Source: research data

Based on the findings obtained, on average a great % of feet flow per day is 100-200 forming a 56.8% a few agents serve less than 100 customers in a day while customers over 200 is represented by 35.6% especially on near bus stops and shopping centre/malls.

4.4 Responses based on risk exposure

The study sought to determine the risks which mpesa users are exposed to in m-transactions. Respondents were required to indicate by a way of ticking on YES or NO the risks they are experiencing. The findings were as distributed here below.

Table 4.5: Responses based on risk exposure

Risk	Yes	% for yes	No	% for NO
Money laundering	102	40.8	81	32.4
Cash losses	53	21.2	141	56.4
Fraud cases (calls)	107	42.8	140	56
Operational (system delays/failures)	204	81.6	44	17.6
Cash problems/Liquidity risk	68	27.2	150	60
Informational risks	112	44.8	75	30
Float problems	153	61.2	41	16.4
Fake currency	19	7.6	169	67.6
Fake mpesa text messages	201	80.4	47	18.8

Source: research data

The respondents indicated that the risks were eminent but there were risks which were more alarming such as; operational system delays and failure with 81.6%, fake mpesa text messages with 80.4% and float problems with 61.2%.

The research sought to find recommendations from respondents on what ought to be done to minimize on the risks identified To minimize this risks 78 % of the respondents suggested customer education and 22% strict regulations.

Further the study sought to find out major financial risks affecting dealers the findings obtained indicates that cash losses, float issues and fake text sms were concerns raised.

The research found out that high risk transactions cited were ATM withdrawals, high value deposits/ withdrawals and customer to customer transactions.

The study cited security measures to safeguard customer were strick adherence to safaricom vetting procedures on transacting and educating customers on keeping the mpesa pin confidential

4.5 Impacts of Mobile banking findings

The research sought to investigate the risks and impacts of m-banking to users of the mpesa services. The findings obtained indicted on table 4.5

Table 4.6: Impact of mobile banking

Statement	Yes	% of Yes	No	% of No
Mpesa has enabled me access other financial services	211	84.4	37	14.8
I pay most of my bills via mpesa service	171	68.4	78	31.2
I can access my bank account via mpesa	164	65.6	81	32.4
Mpesa has impacted on the cost of money transfer positively	176	70.4	66	26.4
Mpesa has helped me perform my transactions with ease and at "anytime anywhere convenience"	206	82.4	45	18
Mpesa dealers are conveniently located making it an easy access to the clients	209	83.6	42	16.8
I pay school fees via mpesa services	221	88.4	32	12.8
I did not have a bank account when I registered with Mpesa	69	27.6	181	72.4
I do not queue in banking halls because I can access my bank account via Mpesa	217	86.8	25	10

Source: research data

The study sough to find out major aspects of mobile banking that has impacted on the users. The findings indicate that payment of school fees was the major impact with 88.4 %, users have resorted to transfer funds from mpesa to their bank accounts and vice versa

at 86.8%, access of mpesa dealers was also key at 83% giving a boost to financial inclusion.

4.6 Influence of risks on m-banking

The study tested the effect of certain risks on the general usage of mobile banking and found out that fraud cases was a major hit on usage at 78.8%, fake test messages were also a great negative influence at 73.2 %. However as much as these risks exists on mobile banking there is still growth on agents' network and the turnover of funds as shown on table 4.6.

Table 4.7: Influence of risks on m-banking

Risk	YES	% for yes	NO	% for NO
Money laundering	56	22.4	191	76.4
Cash losses/Robbery	102	40.8	142	56.8
Fraud cases	197	78.8	52	20.8
Operational (system delays/failures	113	45.2	129	51.6
Cash problems/Liquidity risk	121	48.4	117	46.8
Informational risks	69	27.6	71	28.4
Float problems	98	39.2	100	40
Fake currency	83	33.2	91	36.4
Fake mpesa text messages	183	73.2	59	23.6

Source: Research findings

4.7 Regression analysis

The researcher performed a regression analysis to establish the relationship between the independent variables with the dependent variable.

The regression model was as follows:

$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$

Whereby Y = Financial inclusion

$\beta 0$ = a constant amount (financial inclusion without risks);

X_1=Risk1 (Fraud calls)

X_2=Risk2 (Fake texts)

ε = Std. Error of the Estimate

4.8 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.896[a]	.965	.847	2.12756

   a. Predictors: (Constant), risks(fraud and fake texts)

The R-Square indicates that only 96.5% of financial inclusion of M-banking is explained by the risks (fraud calls and fake texts). The adjusted R-Square of 84.7% also indicates that level of financial inclusion do explain the level of risks. This means that there is relationship between financial inclusion and the risks associated with M-banking.

4.9 ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	93.144	4	23.286	79.730	.000[a]
	Residual	53.739	56	.292		
	Total	146.884	60			

a. Predictors: (Constant), Risks (Fraud and fake texts)

b. Dependent Variable: Financial inclusion

Source: Research data 2012

ANOVA findings (P- value of 0.00) in indicates that there is a relationship between the predictor's variables (fraud and fake texts) and response variable (Financial inclusion). An F ratio is calculated which represents the variance between the groups, divided by the variance within the groups. The large F ratio (79.730) indicates that there is more

variability between the groups (caused by the independent variable) than there is within each group.

4.9.1 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.876	.258		.930	.354
	Risk 1(Fraud)	.654	.077	.297	3.798	.000
	Risk 2(Fake texts)	.425	.070	.188	3.290	.001

a. Dependent Variable: Financial inclusion

The researcher conducted a linear regression analysis so as to determine the relationship between financial inclusion and risks.

The established linear regression equation was:

$Y = 0.876 + 0.654X_1 + 0.425X_2 + 2.12756$

Where

Constant = 0.876, implies that without the risks (fraud and fake texts), financial inclusion would be would be 0.876

$X_1 = 0.654$, implies that one unit change in fraud results in 0.654 units increase in financial inclusion.

$X_2 = 0.425$, implies that one unit change in fake texts results in 0.425unit increase financial inclusion of M-banking.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary, conclusion and recommendations of the study. The summary mainly contains the key findings. Conclusions and recommendations on its parts are based on the research objective and the key findings of the study respectively.

5.2. Summary of findings

Even though several studies found that security issues are not the main inhibitor in mobile banking this study found that there is significant relationship between the perceived risk and mobile banking which in turn affects financial inclusion. This implies that individual's perceived risk and uncertainty incurred in mobile banking affects their usage. Therefore it's vital for service providers to project higher security when providing mobile banking services in order to yield higher customer confidence to attain full financial inclusion. Service providers ought continuously innovate and offer better security and reliable applications to enhance user's confidence towards mobile banking.

5.3 Conclusion

The study concluded that there is a direct relationship between mobile banking risks and financial inclusion. There were identified risks such as fraud and fake texts which were tested to have a direct relationship with usage of mobile banking. However, as much as this existed there was significant growth of agent's network and turnover of funds throughout the period the service has existed.

5.4 Limitations

There are limitations evidenced in this study. These limitations should be considered for future research and improvement. Firstly, the empirical evidence of this study was collected from several studies done outside Kenya i.e. Malaysia, South Africa and india and the results may not be generalized. The usage of mobile banking differs from place to

place for instance users in Nairobi do more of deposit transactions than withdrawals as opposed to other local places which have more withdrawals than deposits. Now that the study was based in Nairobi the risks could be unique depending on the region and usage.

Secondly most agents were hesitant to give the information fully for fear of being victimized by the service provider as much as the letter of introduction assured them of confidentiality of information shared.

5.5 Recommendations

The study found out that use of fake text messages for fraud is a risk that is eminent therefore recommends that further action by service provider can be done to avoid loss of funds. Secondly a customer education campaign was recommended to sensitize customer on the rise of the risks. The study recommends that a similar study be conducted on a wide spectrum to have empirical evidence that can be used to generalize the findings.

5.6 Suggestions for further studies

The study recommends that further studies can be done based on the eminent risks identified (fraud and fake text messages) and narrow down to how each risk affects financial inclusion. The study can also be repeated in other areas to find out if the risks identified in Nairobi are experienced in other parts of the country.

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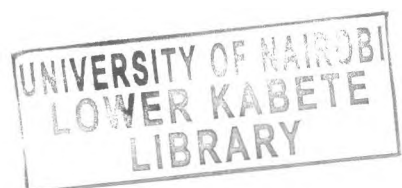
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APPENDICES

Appendix I: Letter of Introduction

RONALD NYAKEMWA

THE UNIVERSITY OF NAIROBI

P.O BOX 30197-00100

NAIROBI

TEL:0726425377

Dear Respondent,

I am a master of Business Administration (MBA) student of the University of Nairobi.

As a partial requirement of the coursework assessment, I am required to submit a research project report on some management problem. My research topic is: Impacts of mobile banking risks on financial inclusiveness: An mpesa study.

I would greatly appreciate if you could kindly spare your time to complete the questionnaire attached herein.

The results of the project will be used solely for academic purposes and will be treated with utmost confidence.

Thank you.

Ronald Nyakemwa   Martin Odipo

                               Lecturer, school of business, University of Nairobi

                               Project Supervisor.

Appendix II: Questionnaire

This questionnaire is aimed to determine the impacts of mobile banking risks on financial access for all from an mpesa view point. Filling it takes less than 15 minutes. Your assistance in completing will be highly appreciated.

1. How many branches do you have in Nairobi? (Tick as applies)

    Less than 2   ( )
    2-4   ( )
    4-6   ( )
    More than 6   ( )

2. What is your net commission income per month as a dealer for mpesa service? (Tick as applies)

Less than 50,000   ( )

50001-100,000   ( )

100001-150000   ( )

More than 150000   ( )

3. How long have you operated an mpesa service dealer? (Tick as applies).

Less than 2 years   ( )

2-4 years   ( )

More than 4   ( )

4. How many customers on average do you serve per day? (Tick as applies)

Less than100   ( )

100-200   ( )

More than 200   ( )

5. What financial risks are you currently facing as an mpesa dealer? State the risk by ticking as applies.

Risk	Yes	No
Money laundering		
Cash losses		
Fraud cases		
Operational (system delays/failures		
Cash problems/Liquidity risk		
Informational risks		
Float problems		
Fake currency		
Fake mpesa text messages		

6. What can you recommend to be used to minimize customer risk exposure? Tick as applies

a) Customer education   ( )

b) Use of strict regulations   ( )

7. What are the financial risks that most affect your earnings as mpesa dealers? Names three risks.

....

....

....

8. Fill in the table below by ticking appropriately under "Yes" or "No" on the statements below.

Statement	Yes	No
Mpesa has enabled me access other financial services		
I pay most of my bills via mpesa service		
I can access my bank account via mpesa		
Mpesa has impacted on the cost of money transfer positively		
Mpesa has helped me perform my transactions with ease and at "anytime anywhere convenience"		
Mpesa dealers are conveniently located making it an easy access to the clients		
I pay school fees via mpesa services		
I did not have a bank account when I registered with Mpesa		
I do not queue in banking halls because I can access my bank account via Mpesa		

9. What are the possible high risk transactions that the customer is likely to face? Name three

transactions...

....

....

10. What security measures as an agent have you put to safeguard the customer from financial losses?

....

....

11. Customers prefer not to use mpesa and other M-transactions because of the risk stated. Tick as applies on the table below.

Risk	YES	NO
Money laundering		
Cash losses/Robbery		
Fraud cases		
Operational (system delays/failures		
Cash problems/Liquidity risk		
Informational risks		
Float problems		
Fake currency		
Fake mpesa text messages		

Appendix III: Sample Selection Table

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size

"S" is sample size.

Krejcie, Robert V., Morgan, Daryle W., "Determining Sample Size for Research Activities", Educational and Psychological Measurement, 1970.

Formula: table was determined from the formula;

$$S = X2NP (1-P)/ d2 (N-1) + X2P (1-P)$$

Where S = required sample size, X2 = the table value of chi-square for one degree of freedom at the desired confidence level, N = the population size, P = the population proportion (assumed to be .50 since this would provide the maximum sample size) and d = the degree of accuracy expressed as a proportion (.05).