

**EFFECT OF FINANCIAL INNOVATIONS ON FINANCIAL DEEPENING IN
KENYA**

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DECLARATION

This research paper is my original work that has not been presented for a degree in any other University, for any other award and where other peoples research was used, they have been fully acknowledged.

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Signature ----- Date-----

This research paper has been submitted as part fulfilment of the requirements for the award of a Masters of Business Administration degree, University of Nairobi with my approval

Signature----- Date-----

Dr. Josiah O. Aduda
Supervisor

DEDICATION

I dedicated this study to my father, Kenyoru Sibwoga for teaching me the value of education and especially for his sacrifice and commitment to give us good education. Your words of wisdom are always an inspiration.

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ABSTRACT

Over three billion people in developing countries are still without effective access to financial services. The problem is particularly acute in Sub-Saharan Africa, where only between five and twenty-five percent of households have a formal relationship with a financial institution. Lack of access to financial services is therefore one of the largest constraints to private sector development in Africa. In responding to these changes, the Kenyan market in has recently witnessed a host of changes in the financial sector as a result of changes in the legal, regulatory, institutional framework. Fast changing technology has also greatly influenced access to financial services and increased channels through which financial services are provided. The objective of the research was to examine empirically the link between financial innovations and financial deepening by assessing the effect of increasing financial innovations in Kenya on financial sector development, the extent to which changes in regulation and increasing rollout of new products such as mobile money payment systems, mobile banking and agency banking affect access to financial services to the Kenyan population. The study used secondary data on use of financial services. The data collected was analysed using regression method with the help of SPSS edited for accuracy, uniformity, consistency, completeness and arranged to enable and tabulated. The analysis was presented in frequency and descriptive tables and graphs.

The study concluded that financial innovation has an insignificant positive impact on financial deepening. Both mobile money innovations and mobile banking have insignificant effects on financial deepening in Kenya. This means that the rise in mobile money transactions as well as in m-banking in Kenya do not significantly influence financial deepening. The study recommends that for financial deepening in Kenya to be enhanced, there is need for policy makers to relook at the approach of mobile money penetration in impacting use of formal financial services as this is seen to have an insignificant impact on financial deepening.

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LIST OF ABBREVIATIONS

ACH	–	Automated Clearing House
ATM	–	Automated Teller Machines
EFTPOS	–	Electronic Funds Transfer
FSD	–	Financial Sector Deepening
GDP	–	Gross Domestic Product
IFC	–	International Finance Corporation
IMF	–	International Monetary Fund
KPOSB	–	Kenya Post Office Savings Bank
LDC	–	Less Developed Countries
MFI	–	Microfinance Institutions
MSEs	–	Micro and Small Enterprises
NGOs	–	Non-Governmental Organizations
ROSCAs	–	Rotating Savings and Credit Associations
SACCOs	–	Savings and Credit Cooperatives

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Financial development is vital in determining economic growth in any economy. Various sectors of the economy depend on the financial sector for growth and without the input of the financial sector, economic growth seems unrealistic since no economy performs without finances. The financial sector is therefore a key component of economic development in any country. It provides intermediation services by bringing together savers and investors by channeling funds to investments that guarantee positive return. A stable and efficient financial system pools, transfers and minimizes risks while at the same time increasing liquidity and information sharing through the use of more sophisticated financial products and technology.

The financial sector is composed of the formal and informal segments. The formal segment of the sector comprises of banking, pension, insurance, capital markets, SACCOs, Societies and Development Finance Institutions like Industrial Development Banks and the Agricultural Finance Corporation. It also consists of financial infrastructure that facilitates trading, payments and settlements systems. The informal segment of the sector on the other hand comprises of unregulated financial services providers ranging from Rotating Savings and Credit Associations (ROSCAs), merry go rounds or chamas, shopkeepers and informal moneylenders, among others. The regulator is the Central Bank of Kenya. There is a widespread consensus that there is still limited access to financial services for the majority of Kenyans, though in reality the situation has improved markedly in recent years. According to the FinAccess Survey 2009, 22.6% of the adult populations now have access to formal financial services through banks, compared with 18.9% in 2006. A further 17.9% are served by other formal institutions (MFIs and SACCOs) compared with only 7.5% in 2006. The proportion of adult Kenyans that depend primarily on informal financial service providers has declined from 35.2% in 2006 to 26.8% in 2009. Overall, the proportion of adult Kenyans that are excluded from accessing financial services and products shrank from 38.4% in 2006 to 32.7% in 2009. (FSD Kenya Impact Assessment, 2010)

The Kenyan market has recently witnessed a host of changes in the financial sector as a result of changes in the legal, regulatory, institutional framework and fast changing technology and

its influence in provision of financial services. The increasing development of the financial services sector has allowed many people to have access to financial services, especially those without prior access to these services. The main driver of this change has been mainly new technologies such as mobile phones and ATM machines, which have facilitated access to these services. These technological innovations have transformed the Kenyan financial sector landscape in the past decade, by helping to extend financial services to millions of poor people at relatively low cost. For example, since 2006, automated teller machines (ATMs) have become a major feature of the landscape, with the number of ATMs increasing to 2,291 ATMs in the country by June 2012. (Annual Report of the Central Bank of Kenya, 2012)

Mobile telephone money transfer services have also emerged strongly, allowing mobile phone users to make financial transactions or transfers across the country conveniently and at low cost. For Instance M-PESA, a pioneer mobile phone-based payment system launched by Safaricom in 2007 has experienced phenomenal growth since then. By the end of 2008, M-PESA had over five million users, making it the largest single supplier of financial services overtaking banks that for many years were the main providers of financial services in the country. The value transferred through mobile money transfer services increased by 50.29 percent in one alone from Ksh919.22 billion in the year to June 30, 2011 to Ksh 1,375.83 billion for the year to June 30, 2012. (Annual Report of the Central Bank of Kenya, 2012)

The adoption of mobile phones has occurred at perhaps the fastest rate and to the deepest level of any consumer level technology in history.” (Buku and Meredith, 2013) The fixed line telephone, the predecessor to mobile phones took 100 years to reach only 80 percent of the population in developed countries while mobile phones have been adopted more than five times as fast. The benefit and impact of widely available mobile phone technology has been more apparent than in Africa, where networks of both fixed line communication and physical transportation infrastructure are often inadequate, unreliable, and dilapidated.

The adoption of mobile phone technology in Africa has increased from 3 percent in 2002 to 51 percent today, and is expected to reach 72 percent by 2014. However the positive impact of the adoption of cellular technology has not been limited to the communications or information technology sectors of developing countries. The successful development of mobile money services in Kenya provides a unique and interesting case study of how access to mobile phones can revolutionize and democratize the financial and banking industries of developing nations. (Mas & Radcliffe, 2011)

Currently, there are more Kenyans who own a mobile phone than have access to a bank account. This lack of access to financial services, combined with the increasingly widespread use of mobile phones, has given rise to an informal practice of using mobile phones as an alternative to traditional banking systems. Mobile phone users can transfer funds to other users through pre-paid mobile phone credits sent via short message service communication. Upon receipt, these credits are exchanged for cash or traded for goods and services in a type of informal, mobile phone based economy that provides basic financial services to otherwise unserved or unbanked populations.

This paper seeks to examine the role played by these increasing financial innovations in Kenya, the extent to which changes in regulation, increasing rollout of new products and technology and competition affect access to financial services to the Kenyan population. It discusses the role of recent progress in the Kenyan financial system in expanding financial access to the Kenyan population.

The paper will seek to determine the increase in access to financial services in the recent past by discussing key financial innovations including M-Pesa, M- banking and agency banking.

1.1.1 Financial Innovation

Financial innovation is used to refer broadly to any change in the financial system that improves the screening of technological entrepreneurs. Thus, financial innovation is neither limited to the invention of new financial instruments, nor is it limited to innovation by financial institutions. Financial innovation also includes more mundane financial improvements, such as the new financial reporting procedures that facilitated the screening and monitoring of railroads in the 19th century, improvements in data processing and credit scoring that enhanced the ability of banks to evaluate borrowers since the 1970s, and the adoption and upgrading of private credit bureaus around the world during the last few decades (Laeven, Levine, and Michalopoulos, 2012).

Scholars in financial markets have made various arguments regarding the main triggers of financial innovation. In some instances, new financial products are engineered from existing products. This demonstrates that the new instruments need not add new price risk to the system, but by adding liquidity and new intermediaries they may contribute additional credit or liquidity risks. An analysis of the demand for financial market services in an assumed perfect capital market setting supports an argument that financial market innovations are

attempts to overcome real-world market imperfections while making a distinction is between imperfections that are man-made such as taxes, regulatory barriers, and information disclosure versus those that segment domestic markets and are naturally present such as transaction costs, heterogeneous expectations, and heterogeneous consumption/investment/risk preferences. Innovations that overcome the former may directly frustrate national economic policies, including useful prudential policies, while innovations that overcome the latter tend to increase economic allocational efficiency.

Ho (2006), describes financial innovation as the emergence of new financial products or services, new organisational forms or new processes for a more developed and complete financial markets that reduce costs and risks, or provide an improved service that meets particular needs of financial system participants. Ho further argues that the centrality of finance in a modern economy and its importance in economic growth naturally raise the requirement for financial innovation. Since finance is an input to virtually all production activities and most consumption activities, improvement in the financial sector will have positive, direct ramifications throughout the economy.

According to Luc, Ross and Stelios (2012) financial innovation refers broadly to any change in the financial system that improves the screening of technological entrepreneurs. Thus, financial innovation is neither limited to the invention of new financial instruments, nor is it limited to innovation by financial institutions. Similar to the arguments by Laeven, Levine, and Michalopoulos, (2012), they further argue that financial innovation also includes more mundane financial improvements, such as the new financial reporting procedures that facilitate the screening and monitoring improvements in data processing and credit scoring that enhances the ability of banks to evaluate borrowers and the adoption and upgrading of private credit bureaus around the world during the last few decades.

Financial innovation influences the structure of financial markets, the financial behaviour of economic agents and the types of financial products traded. It therefore influences the entire monetary transmission mechanism, and adds uncertainty to the financial environment in which central bank conducts monetary operations. (Ho, 2006)

In their report on innovative financial inclusion from the access through innovation, the subgroup of the G20 financial experts group describe innovative financial inclusion as a means of improving access to financial services for poor people through the safe and sound

spread of new approaches. They describe innovative financial inclusion as the delivery of financial services outside conventional branches of financial institutions by using information and communication technologies and non-bank retail agents and other new institutional arrangements to reach those who are financial excluded. They contend that for financial innovation that enhances inclusion to be successful, it needs to follow nine principles including leadership, diversity in approaches that promote competition and provide market-based incentives for delivery of sustainable financial access and usage of a broad range of affordable services such as savings, credit, payments and transfers, insurance as well as a diversity of service providers. Other principles to be followed include innovation, protection, development of financial literacy and financial capability, cooperation, knowledge that utilizes improved data to make evidence-based policy, measured progress, “test and learn” approach by both regulators and service providers, proportionality and a regulatory framework that reflects international standards, national circumstances and support for a competitive landscape.

Boot & Marino (2011) however suggest a cautious approach to innovations and their adoption in the banking sector. They assert that considering the herding behaviour and more impulsive decisions that financial markets may facilitate including possibly the boom-bust nature of financial markets, they argue that the increased linkages between banks and the financial markets have augmented instability in banking and bank-based systems may have felt this most. One could say that the institutional structure including regulation has not kept up with the enhanced marketability and ‘changeability’ of the industry.

1.1.2 Financial Deepening

Financial deepening refers to the degree to which financial services are available without price and other non-trade barriers. It is a measure access and use of financial services. Jao (1976) argues that financial deepening together with investment & labour are the key enablers of economic growth. This role of money and finance in economic development has been examined by economists from different angles and with various degrees of emphasis. In particular, the writings Ngugi, Amanja and Maana (2009) show a positive correlation between capital market, and the financial access and depth factors. The same is indicated by the various components of capital markets. For example, the measure of capital development is highly correlated with the depth of the financial sector than the access factor. While this is more pronounced for the stock market, it is almost balanced for the bonds market. In their

observation access variables, capital markets are highly correlated with the financial market sophistication while the depth measure the capital market is highly related to the private sector debt and also private sector credit.

Indeed, the economic growth and development of a country depends greatly on this role, the role of financial deepening. In Kenya, recently there have been efforts to enhance financial sector deepening; commercial banks have demonstrated that it is possible to reach millions of low-income clients with affordable transaction accounts. Competition from Safaricom's M-Pesa mobile money service, for instance has pushed other banks further down market where they are exploring innovative agency banking. Despite the quick success of M-Pesa, building the platform's now 27,000-agent network involved huge up-front costs.

The view that financial deepening is a necessary pre-condition for economic growth rests on many premises (Darrat, 1999). This hypothesis contends that well-functioning financial institutions can promote overall economic efficiency, create and expand liquidity, mobilize savings, enhance capital accumulation, transfer resources from traditional sectors to the more modern growth inducing sectors and also promote a competent entrepreneur response in these modern sectors of the economy. This hypothesis is usually labelled "supply leading" since it postulates that the presence of efficient financial markets increases the supply of financial services in advance of the demand for them in the real sector of the economy. Ngugi, Amanja and Maana (2009), argue that when the financial system has achieved depth then availability of and access to financial services is possible to achieve. The size and depth is viewed as important in determining saving and investment behaviour. Furthermore, access and size and depth has significant implications on the real activity, economic growth and welfare.

According to Ndebbio (2004), financial deepening as well as liberalization enables interest and exchange rates to reflect relative scarcities, stimulate savings, and discriminate more efficiently between alternative investments. In turn, this may induce replacement of capital intensive processes and technology by labour intensive ones. Indeed, if financial deepening is high for any country, that country is likely to have the potential to generate positive employment, improved productivity and growth. He introduces another perspective by arguing that financial deepening means an increase in the supply of financial assets in the economy, it is important to develop some measures of the widest range of financial assets, including money. This will involve identifying these financial assets, determining their

measures and summing them up. The sum total of all the financial assets is one broad measure that represents financial deepening.

1.1.3 Financial Innovation and Financial Deepening

The traditional innovation growth view suggests that financial innovations help reduce agency costs, facilitate risk sharing, complete the market, and ultimately improve allocative efficiency and economic growth, thus focusing on the bright side of financial innovation (Allen and Gale, 1994). The innovation fragility view, on the other hand, focuses on the 'dark' side and has identified financial innovations as the root cause of the recent Global Crisis, by facilitating an unprecedented credit expansion that helped feed the boom and subsequent bust in housing prices (Brunnermeier 2009), by engineering securities perceived to be safe but exposed to neglected risks (Gennaioli et al. 2012), and by helping banks and investment banks design structured products to exploit investors' misunderstandings of financial markets (Henderson and Pearson 2011). Paul Volcker, former chairman of the Federal Reserve, claims that he can find very little evidence that the financial innovations in recent years have done anything to boost the economy.

The effect of financial innovations on economic growth is presented by (Tufano, 2002) in three functions. First is that financial innovations mitigate the lack of free movement of funds across time and space in incomplete markets and allow risk sharing among individuals. Secondly, innovations address agency concerns and information asymmetry with invention of new contracts like common stock which provides some mechanisms to squeeze information from firms, a warranty offered by a seller and income bonds linked to the availability of accounting information. Lastly, they minimize searching and marketing cost. This is the role of ATMs, smart cards, ACH technologies and many other new businesses. These financial functions influence savings, investment decisions, technological innovations and hence economic growth. Better functioning financial systems ease the external financing constraints that impede firm and industrial expansion. This implies that the creation of financial institutions and their services occurs in advance of demand for them. Thus, the availability of financial services stimulates the demand for these services by the entrepreneurs in the modern, growth-inducing sectors.

McKinnon (1973) and Shaw (1973) developed a robust model of financial development appropriate to LDCs, through which financial development affects positively economic growth. Known as complementarity hypothesis, the McKinnon (1973) and Shaw (1973)

model is based on the positive relationship between real deposit rate of interest and investment, contrary to previous thought where this link was negative. The model stresses the negative effects of financial repression on economic growth, characterizing developing economies.

In fact, they argue that financial repression through interest rate ceilings, directed credit, exchange rate controls, control on the source of finance of banking institutions and other forms of financial repression result in negative real deposit rate of interest. This reduces the supply of loanable funds and force banking institutions to apply credit rationing in front of excess demand of loanable funds. The outcome is the allocation of funds not based on the productivity of investment rather on other factors like transaction costs and apparent risk of default. This scenario leads to economy being allocating credit to non-productive investments which decreases investment productivity and efficiency, thus slowing down economic growth. Bernanke (2007) argues that financial innovations help complete the market. The notion that financial innovation is good for economic growth is based on the idea that such innovations will improve the allocation of capital. He maintains that the increasing sophistication and depth of financial markets promote economic growth by allocating capital where it can be most productive.

However Hsu, Tian and Xu (2010) investigate the reverse relationship between the two variables. In their baseline analysis of cross country evidence on financial development and innovation, they suggest that a nation's equity market development is positively and significantly associated with its subsequent growth in innovation productivity. Specifically, increasing a country's stock market capitalization by one standard deviation increases its growth in innovation productivity measured by the number of filed patents by 3.01~5.78%. However, a country's credit market development measured by its domestic credit to private sectors normalized by GDP is negatively associated with its subsequent growth in innovation productivity. The evidence suggests that increasing a nation's credit to private sectors by one standard deviation results in a decrease in its innovation productivity growth rate in the following year by 3.47~5.62%

1.1.4 Financial Innovation and Financial Deepening in Kenya

The rapid pace of technical change in the financial sector has led to the development of new products and forms of payment. In Kenya, mobile phone payment platforms such as M-Pesa

dramatically changed the financial landscape by offering customers a simple efficient and cost-effective method to transfer money and make payments. In addition, government regulations such as the Kenyan National Payment System have also spurred investments in technologies that facilitate the instantaneous flows of finances between institutions. Specifically the production of the real Time Gross settlement system and the production of the electronic check clearing system have improved the efficiency of the banking system. (Weil, Mbiti & Mwega, 2012)

While there is evidence that these changes have increased consumer welfare (Aker and Mbiti (2010), Jack and Suri (2011), Mbiti and Weil (2011)) there is limited evidence on the impacts of these technological developments on monetary aggregates and relations. This report reviews the literature on economic impact of ICT developments in the financial sector on the conduct of monetary policy in East Africa. It further examines the development and adoption of various products in East Africa and examines factors that drive the demand for these products. Using a combination of data the report discusses the implications of the rapid adoption of these products on the conduct of monetary policy in East Africa.

Informal surveys in Kenya by Rutherford (2010) emphasize the use of MPESA for informal financial services. The ease and low cost of MPESA have facilitated informal borrowing, perhaps even boosting it because it is so reliable. Wilson, Harper and Griffith (2010) also observe informal savings groups using MPESA for transfers. Rutherford contend that with such a strong boost to its effectiveness, informal finance looks to have many thriving years ahead of it in Kenya. Although most of the research on mobile money's impact has been focused on the largest deployment, MPESA, some attention has been placed on other initiatives, such as the Filipino cases mentioned above.

1.2 Problem Statement

Financial innovation is a key feature of the world economy and has important implication for management of risk, and for securities and political system yet it remains little studied outside the economics and business studies (The Economist, 2005).

Since the financial turmoil in the United States of America and several other European countries between 2007 and 2009 was associated with the widespread use of novel financial products, many have sought to understand the role of financial innovation in triggering the crisis (Laeven, Levine, and Michalopoulos, 2012). Recent economic theories suggest that

financial innovation in conjunction with investors who neglect small risks (Gennaioli, Shleifer, and Vishny, 2012), investors with biased expectations or institutionalized constraints (Shleifer and Vishny, 2010), or excessively competitive banking markets (Thakor, 2012) can lead to financial and economic instability.

Allen and Carletti (2006) presciently warned that financial innovations, such as securitization, that transfer credit risk can hinder the effective screening of borrowers, boosting financial fragility. Consistent with these views, (Dell’Ariccia, Igan, and Laeven 2012), Keys, Mukherjee, Seru, and Vig (2010), and Mian and Sufi (2009) find that securitization reduced lending standards and increased loan delinquency rates, while simultaneously boosting the supply of loans and financier profits effectively enhancing financial deepening (Loutskina and Strahan, 2009), and Henderson and Pearson (2010) show that financial institutions engineered financial products that exploited investors’ misunderstanding of the payoffs to these products.

These studies may suggest a negative correlation between financial innovations and financial sector growth. In this paper, the objective is to move from these vital questions concerning the recent crisis and financial innovation and instead focus on the long-run relationship between financial innovation and financial deepening.

As more research on financial inclusion continues to be done, few studies have been done focusing on financial innovation in Kenya and especially how it has been impacted by the various innovations in the financial sector. Nevertheless, this paper adds to the growing literature on financial inclusion by examining the impact of financial innovations on financial deepening in Kenya.

1.3 Objectives of the Study

The following are the objectives that guided the study.

1. To establish the nature of financial innovations in Kenya’s financial sector.
2. To determine the effect of financial innovations on financial deepening in Kenya.

1.4 Value of the Study

Financial innovation is critical for any financial systems in an economy. Some of the outright benefits of financial innovation are broadening, deepening, diversification and financialization of markets and economy. Financial innovation also exploits profit opportunities and reduces market inefficiencies.

However few studies have been done in this topical area in Kenya. Findings from this study will be of relevance to researchers, policy organs of government with interests in the development of the financial sector. The findings of this study are be important to the following stakeholders as follows:

1.4.1 Regulatory Authorities

The study is important in facilitating understanding the nature of financial innovation in the markets and how to foster the same.

1.4.2 Investors

The investors would be made more aware of the recent trends and existing opportunities as new financial products are developed.

1.4.3 Researchers

The study builds on the existing body of knowledge and points out area for further research work. Researchers who wish to study the area of financial innovation and inclusion is made aware of the relationship, impact and challenges facing innovation in Kenya and financial access to the public.

1.4.4 The Public

The general public may wish to read the study to further their knowledge in the area of financial innovation and access to finance.

1.4.5 Financial Academics and Practitioners

Financial innovation in developed markets is different from the one in emerging markets, although the principles of how financial innovation occurs ifs the same in both markets. There are many factors, which hinders and stimulates financial innovation although their magnitude is not the same. Financial innovation and practitioners can as such learn invaluable information on how the impact of their work in development of the financial system,

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Much of the existent literature portrays financial innovations as helping economic agents achieve a desired function in the presence of one or more market inefficiencies or imperfections. For example, new securities may be created to allow investors to achieve desired payoffs not spanned by the previously available financial instruments, or loosely to complete markets. Ross (1976) takes this spanning view of financial innovation in arguing that the introduction of option contracts improves allocative efficiency when the previously existing set of securities fails to span the state space. Other research presents financial innovations as arising to ameliorate imperfections such as agency conflicts (Ross (1989)), to reduce transactions costs (Ross (1989), McConnell and Schwartz (1992), and Grinblatt and Longsta (2000)), and to minimize the impact of taxes or regulations (Miller (1986) and Santangelo and Tufano (1996)). Dynan, Elmendorf, and Sichel (2006) suggest financial innovation has played a key role in reducing the volatility of economic activity. A common element in these papers is that financial innovations arise in response to market inefficiencies or imperfections and provide the benefit of ameliorating at least one inefficiency or imperfection. This generally benign view of financial innovation is unsurprising, since, as noted by Tufano (2003), bringing new securities to market requires the voluntary cooperation of both issuers and investors."

2.2 Review of Theories

2.2.1 Keynesian Theory

Although financial deepening concepts were brought into salience with the seminal work of McKinnon (1973) and Shaw (1973), these ideas can be found in the Keynesian theories. In the Keynesian theory, financial deepening occurs due to an expansion in government expenditure. In order to reach full employment, the government should inject money into the economy by increasing government expenditure. An increase in government expenditure increases aggregate demand and income, thereby raising demand for money.

This disequilibrium is resolved by reducing private investments resulting from higher interest rates. Since higher interest rates lower private investment, an increase in government

expenditure promotes investments and reduces private investments concurrently (Dornbusch and Fischer 1978, Chap.4).

McKinnon and Shaw came up with a rival hypothesis that depicts a positive relationship between interest rate and financial deepening. According to them, developing countries have repressed economies with ceilings on interest rates and limitations in credit availability which impose restrictions on growth.

The Post-Keynesians have developed a sequential analysis in which saving appears as a by-product of the income creation process. Thereby setting up the sequence finance-investment-saving-funding, which they have used to demonstrate the logical antecedence of investment in relation to saving and to develop an alternative view of the role of banks, saving and financial markets in the growth process

(Chick, 1983, 1998 ; Davidson, 1996)

2.2.2 Economic Theory

Economic theory suggests that financial markets and intermediaries exist mainly because of two types of market frictions: information costs and transaction costs. These frictions lead to the development of financial intermediaries and financial markets, which perform multiple functions. These functions include assisting in the trading, hedging, diversification, and pooling of risk; providing insurance services; allocating savings and resources to the appropriate investment projects; monitoring managers and promoting corporate control and governance; mobilizing savings efficiently; and facilitating the exchange of goods and services. Economic theory proposes that a strong institutional environment exists to alleviate information and transaction costs.

Much empirical work has tackled issues related to the importance of institutions and their impact on economic activity in general. The presence of legal institutions that safeguard the interests of investors is an integral part of financial development. The theory, suggests that stock markets encourage long-run growth by promoting specialization, acquiring and disseminating information, and mobilizing savings in a more efficient way, thus promoting investment. (The Financial Development Report 2011)

2.2.3 Endogenous Growth Theory

This model demonstrates how economic growth performance is related to financial development, technology, innovations and income distribution (Caporale et al, 2003). Greenwood and Jovanovic (1990) consider a model that allows examining the relation between growth and income distribution, as well as between financial structure and economic development. The authors assume a positive two-way causal relationship between financial development and growth. On the one hand, financial institutions collect and analyse information in order to find the investment opportunities with the highest return. They channel funds to the most productive uses, thereby increasing the efficiency of investment and growth. On the other hand, growth provides the means needed to implement and develop a costly financial structure.

King and Levine (1993) identify innovation as the engine of growth. They argue that an efficient allocation of funds from financial intermediaries to entrepreneurs is able to lower the cost of investing in productivity enhancement and stimulates economic growth. Financial intermediaries and securities markets enable particular entrepreneurs to undertake innovative activity, which affects growth through productivity enhancement. Financial systems can influence the decision of entrepreneurs to invest in productivity enhancing activities by evaluating entrepreneurs, pooling resources, diversifying risk and valuing the expected profits from innovative activities. Therefore, financial markets help the efficient allocation of resources which increase the probability of successful innovation. The rate of innovation is reduced with the existence of distortions like deposit rate ceilings or high reserve requirements.

2.3 Review of Empirical Studies

According to Scott (2001), surprisingly few empirical studies of financial innovation have been done (39), with most (23) having been conducted since 1998. Especially striking is that only test hypothesis advanced in many descriptive articles as to the economic (environmental conditions that encourage financial innovation).

Juhkam (2001) in his study of financial markets in Estonia defines financial innovation as a positive change in financial intermediation, financial system, financial institutions, (commercial banks, insurance companies, investment and pension funds and investment banks) and in financial markets (debt instrument market and derivative market). UNEP FI

African task Force (2002) notes that the contribution of any financial innovation lies in the extent to which it helps to complete the set of financial contracts available for financing or investing, positioning or hedging. These financial innovations are introduced in response to some market imperfections.

Financial innovation is viewed as the engine driving the financial system towards its goal of improving the economy. Merton (1986) cites the U.S national mortgage market, the development of international markets for financial derivatives and the growth of the mutual funds and investment industries as examples where financial innovation has produced enormous social welfare gains.

The aim of financial innovation is to make different services (loans, deposits, investment fund units, debt instruments, shares, derivatives for risk management, currency exchange, payments and etc.) offered by financial system cheaper and more available for clients and to increase their quality, which is an assumption for a long run sustainable growth of economy (Campbell, 1988; Tufano, 2003). As a result of financial innovation the financial systems ability to fulfil following functions will improve: to determine the market price of financial instruments, to guarantee liquidity for instruments (financial markets), to be a source of companies' capital (loans, new stock and debt issues), to encourage savings and investments (risk-taking) through risk sharing and diversification (investment funds, pension funds); to offer risk management products (derivatives and insurance).

Miller (1989), Harris and Raviv (1989), Allan and Gale (1994), Tufano (1997) and Lawrence and White (2001) contend that the benefits of financial innovation are: avoiding regulations and optimizing taxes, reducing transaction costs and increasing liquidity of market-based products, reducing agency costs between executive management and shareholders and between shareholders and creditors, reducing informational asymmetry between corporate insiders (majority shareholder/executive management) and outsiders (creditors, minority shareholders), increasing risk sharing opportunities (derivatives, investment funds) and making capital intermediation more efficient and cheaper for clients. Financial innovations have improved market integration and efficiency of international markets by bringing broader and more flexible range of instruments. This has resulted in improved allocation of financial resources and better distribution of portfolio risks. Also, substitution of direct transaction in securities for bank credits and competition has reduced intermediation cost.

However, innovation and its consequences have also created new concern as observed by Simpson and Parkinson (1988), about the functioning and management of international and domestic financial systems. With new benefits new risk came into view. These risks relate to the quality of the banks' assets, the pricing of new instruments, and the aggregate liquidity of the system, the risk transfer mechanism and the effects of innovation on markets volatility. In a qualitative sense, however, financial innovation increases uncertainty about the structure of the economy and there are potential effects of financial innovation process on the supply of and the demand for money, interest rates and the transmission mechanism of the monetary policy. Under pressures from financial innovation, the concept of money is in danger of losing its operational value. It is becoming difficult to distinguish between narrow and broad definitions of money observe Campbell (1988).

Aduda and Kalunda (2012), in their study of Financial Inclusion and Financial Sector Stability contend that it is clear from the theoretical and empirical literature that majority of the words population is financially excluded. This financial exclusion is a subset of social exclusion. Those financially excluded cannot participate in social and economic activities of the country leading to inequality which breeds many other vices. It is only through deliberate effort on social inclusion like financial inclusion that all can be brought to the economic playground of the country. The study highlights the need to address the issue of financial inclusion expeditiously to avoid creating financial instability. The role of the government should also be carefully defined as studies show excess intervention from government can yield more harm than good. The study proposes designs of proper banking models with appropriate products as the benefits of financial inclusion are immense.

A study on financial inclusion in Kenya discloses that the levels of financial inclusion have increased in Kenya though marginally. (FinAccess, 2006). Even for those with access, the distribution to the products varies with some having marginal financial services encompassing merely a bank account. The people who lack access to financial services are frequently also excluded in other ways, and financial exclusion often reinforces other aspects of social exclusion. (Sarma and Pias, 2011)

Cracknell (2012) in his studies of policy innovations and their impact on financial access in Kenya notes that Equity Bank has demonstrated both in Kenya and beyond, the power of matching market responsive processes with technology, systems and word of mouth. Few

have been able to recreate the Equity Bank's market responsive formula, but all banks are interested in learning more. There has been an increase in the pace of innovation and change in Kenyan banking appears to be extremely fast. Financial institutions are moving to new high end banking systems, which provide them with the ability to compete in a fast changing environment. Infosys, Flexcube, Craft Silicon, Equinox, Terminos and others all have a client base in Kenya. Equity Bank was the first to market its partnership m-banking product M-Kesho with Safaricom, within weeks, similar products were available in Postbank, Kenya Commercial Bank (KCB), Cooperative Bank, Family Bank and NIC Bank. In his studies of MPESA, he argues that the service has been one of the most successful innovations with visible results. In a case study, he notes that Safaricom's M-Pesa product is in a class of its own. No other m-payments solution, worldwide, even M-Pesa in other countries, has recorded these results. G-Cash and SMART the two highly successful m-payment products in the Philippines, a country with twice the population of Kenya, have only around one million registered users each while M-Pesa has over 18 Million registered users.

Cracknell (2004) identified four dimensions that when addresses will accelerate the uptake of financial services through electronic banking for the poor. First is customer value proposition which argues that the compelling factor, that some refer to as a pain point that moves users from a product which is easy to understand, and free to use "cash" to a product which is both more expensive, and more difficult to understand.

First is to consider multiple business cases, a mobile banking product requires multiple commercial partnerships. The mobile network operator, agents, financial institutions, systems providers and security specialists all need to be carefully analysed and their impact on any new information. Ensuring that each partner benefits financially from the solution, especially when the likely performance of the solution is uncertain, is challenging, but vital.

Secondly, the Retail environment is also an important dimension; mobile banking relies upon agents to provide points of access. These agents should be used to handling large volumes of cash, which they are willing to convert into electronic money.

Thirdly, the Regulatory environment plays a key role which looks at the attitude of regulators towards electronic payments, conservative regulators who wish to preserve the current system within the bounds of conventional banking, and current mechanisms for managing risk will be hesitant to provide for innovations that will benefit. Lastly, whether or not the

regulator is transformational who tries to create a new system, with appropriate but different mechanisms for managing risk, which have the potential to bank the unbanked is also an important factor

In examining Safaricom's M-Pesa, it has been demonstrated how these four factors and others, come together and provide the circumstances for transformational growth.

2.4 Conclusion

It is clear that there has been a shift in service availability and products driven by recent financial innovations. But it is also evident that further innovation will be necessary to generate a level of access and transactions costs that make services - especially savings - appropriate and affordable for poor people handling, at most, a few hundred shillings a day. (FSD Kenya Impact Assessment, 2010)

Volcker (2009) in his article in 'The Times' opposes this view arguing that as bankers were demanding that new regulation should not stifle innovation, the biggest innovation in the industry over the past 20 years had been the cash machine. He went on to attack the rise of complex products such as credit default swaps (CDS). Suggesting that there's no shred of neutral evidence that financial innovation has led to economic growth '

However available literature indicates that there is some relationship between financial innovations and its impact on financial deepening and perhaps its implications on economic growth. Although many studies have been carried out to determine the impact of financial development on economic growth, few studies have been carried out to assess the impact of recent financial innovations on financial sector development.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter sets out various stages and phases that were followed in completing the study. It is an outline for the collection, measurement and analysis of data. This section is an overall scheme, plan or structure conceived to aid in answering the raised research question. In this stage, most decisions about how research was executed and how respondents were approached, as well as when, where and how the research was completed. Therefore in this section the research identifies the procedures and techniques that were used in the collection, processing and analysis of data. Specifically the following subsections are included; research design, target population, data collection instruments, data collection procedures and finally data analysis.

3.2 Research Design

Research design refers to the way the study is designed, that is, the method used to carry out a research. The research used secondary data to address research questions through the analysis of data collected for other purposes and reports. According to Cooper and Schindler (2003), a descriptive study is concerned with finding out the what, where and how of a phenomenon. Descriptive research design was chosen because it enabled the researcher to generalise the findings to a larger population. This study therefore is able to generalise the findings of the impact of financial innovations on financial deepening among the Kenyan population.

3.3 Target Population

Target population for in statistics is the specific population about which information is desired. According to Ngechu (2004), a population is a well-defined or set of people, services, elements, and events, group of things or households that are being investigated. This definition ensures that population of interest is homogeneous. Population studies are more representative because everyone has equal chance to be included in the final sample that is drawn according to Mugenda and Mugenda (1999). The target population is the total adult population in Kenya

3.4 Data Collection

The study used secondary data from documents or materials including Central Bank of Kenya Reports, World Bank and IMF statistics data, Safaricom and Airtel annual reports, newspapers, books and magazines available in the libraries were visited as well as information from the websites. The questions that were addressed when evaluating secondary data sources for this purpose include the appropriateness of the study's unit of analysis and sampling, the variables and their values, and levels of measurement. Additional secondary data were obtained directly from reports published by government agencies such as Census Bureau from their periodic national surveys, published or unpublished research reports, articles, interview reports, field notes, and books.

3.6 Data Analysis

Data collected was purely quantitative in nature from secondary sources. The descriptive statistical tools helped to describe the data and determine the extent used. Analysis was done quantitatively and qualitatively by use of descriptive statistics. This included frequency distribution, tables, percentages, mean mode, median etc. Data analysis used SPSS and Microsoft excel, percentages, tabulations, means and other central tendencies. Tables were used to summarize responses for further analysis and facilitated comparison. This generated quantitative reports through tabulations, percentages, and measure of central tendency. Cooper and Schindler (2003) notes that the use of percentages is important for two reasons; first they simplify data by reducing all the numbers to range between 0 and 100. Second, they translate the data into standard form with a base of 100 for relative comparisons. The information were presented by use of bar charts, graphs and pie charts.

The independent to be measured in this research are the Mobile money Transfer, Agency Banking and Mobile Banking. In all variables the researcher assessed the number and value of transactions using each of the channels. In addition to its advance statistical techniques and inferential statistics was also used. A multiple regression model was used to test relationship among variables (independent) on performance.

The model used was borrowed from FSD studies on financial inclusion in Kenya, survey results and analysis from FinAccess (2009). The regression equation used in this research was

$(Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon)$, where;

Y = Financial Inclusion (No. of depositors with commercial banks and other financial institutions (per 1000 adults)

β_0 = Other factors such as government expenditure, interest rates and economic growth

X_1 = Mobile Money Innovations (number of transactions)

X_2 = Agency Banking (number of transactions)

X_3 = M - Banking (Value of transactions)

ε = Probabilistic error term

3.7 Validity and Reliability

3.7.1 Validity

Data validity was obtained by making use of the construct validity approach. This seeks agreement between concepts expressed by the researcher and specific measuring devices or procedures adopted in a research. It involved an assessment of how well ideas are converted or initial thoughts into actual programs or research measures, and the extent to which the tests or scales sufficiently assess the theoretical construct as originally assumed.

3.7.2 Reliability

The data sources were tested for reliability of the instruments using the test-retest approach (Oppenheim 1992). The following methods were used to guarantee the internal consistency of the data generated. which include test and retest approach above, explaining in detail the instruments used, checking the test stability, means whether the individuals vary in their responses from the expected result.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction

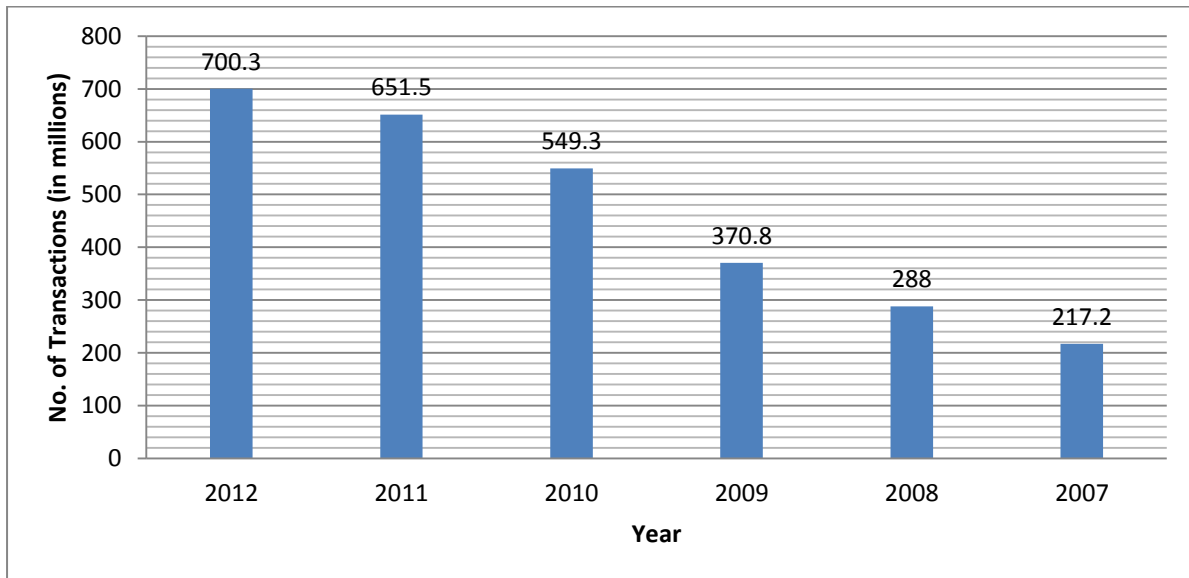
This chapter presents the results of the study. The chapter is organised as follows. First, diagnostic results of the data are presented followed by multivariate results on the relationship between financial innovations and financial deepening. To investigate the effect of financial innovations on financial deepening, an analysis financial services transactions carried out using various channels was carried out and a regression analysis carried out against data for formal users of financial users. The study uses time series data for the period 2007 to 2012. The choice of the period of study is based on data availability and the fact that the major financial innovations were introduced in the market during this period. The financial services data were collected from the Central Bank of Kenya publications and mobile networks operators' annual reports. Other sources included World Bank reports, International Financial Statistics Year Books and other government publications on public finance.

4.2 Data Presentation

4.2.1 Trends of Financial Users

Figure 1 shows the trend of financial inclusion (the number of users of formal financial services measured by depositors with commercial banks and other financial institutions (per 1000 adults). As shown, there had been a steady rise in the number of financial users since 2007 from 217.2 to 700.3 depositors with commercial banks and other financial institutions per 1000 adults in 2012.

Figure 1: Trend of Financial Users from 2007 – 2012



The results in Figure 2 show the trend of transactions from agency banking which was introduced in May 2010. Data was therefore only available for 2 years from the Central Bank of Kenya. As shown, the number of transactions was 5 million in 2011 and 20.4 in 2012. There has therefore been a remarkable upward uptake of agency banking in Kenya since its introduction in 2010.

Figure 2: Trend of Agency Banking Transactions 2007 – 2012

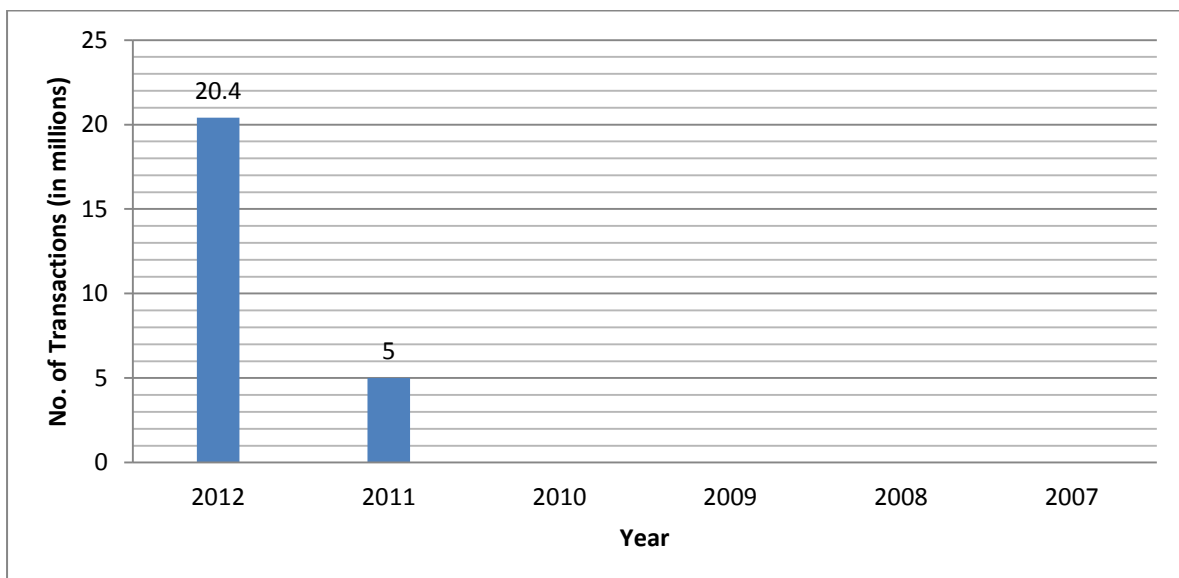


Figure 3 shows the results of the trend of mobile money payments from 2007 to 2012. These include mobile transactions from Safaricom’s MPESA, Airtel’s Airtel Money, Essar’s Yu Cash, Orange Telkom’s Orange Money, Mobile Pay’s Tangaza, and Mobikash’s Mobikash. The number of transactions have risen from 5.47 million in 2007 to 577.37 million in 2012, a rise of 104.6% over the 6 years.

Figure 3: Trend of Mobile Money Transactions 2007 – 2012

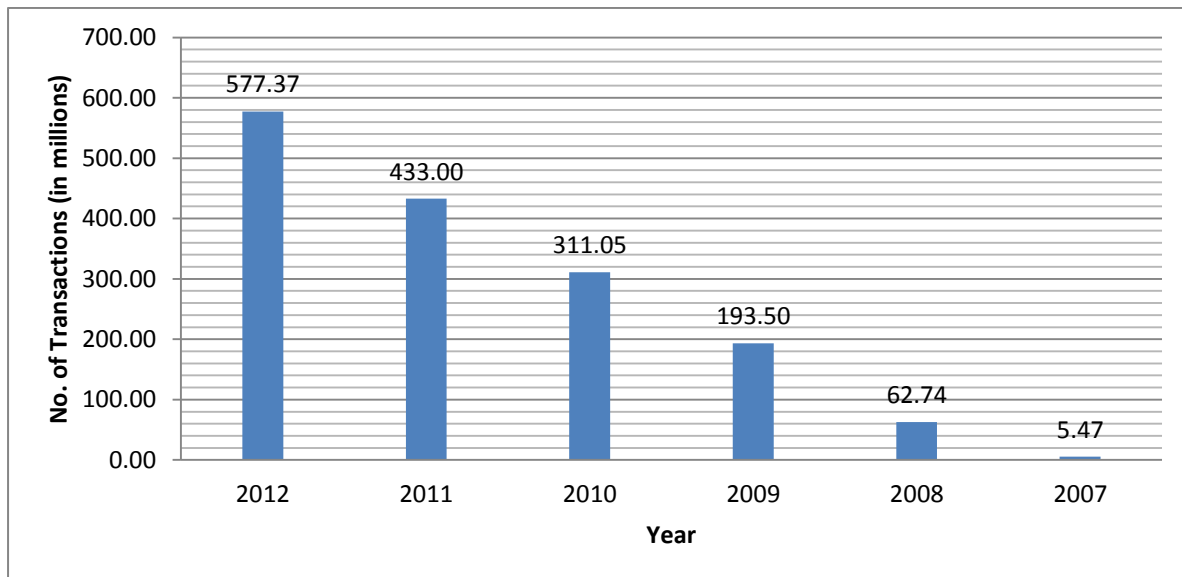


Figure 4 shows the trend of m-banking for the period 2007 – 2012. The value of transactions have been rising from 16.31 million in 2007 to 1,543.55 million in 2012. This is an increase of 93.6% over a 6 year period.

Figure 4: Trend of M-Banking Value of Transactions 2007 – 2012

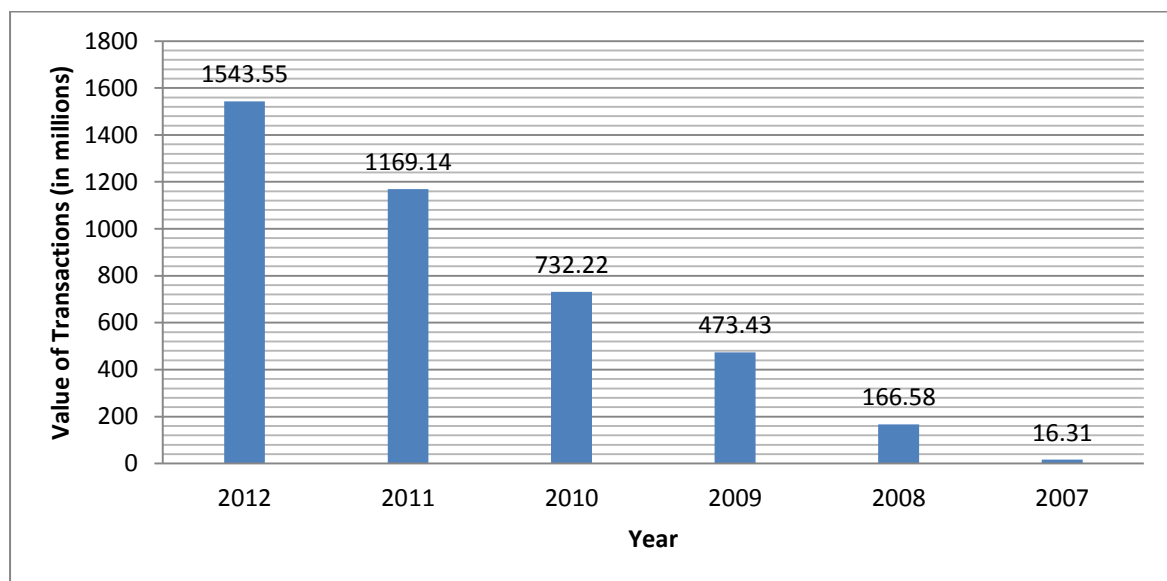


Table 1: Summary Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Agency	2	12.7	10.88944	5	20.4
Mobile	6	263.855	219.6771	5.470349	577.3742
M-banking	6	683.5383	588.9625	16.31	1543.55
Inclusion	5	415.36	181.0908	217.2	651.5

Table 1 shows the summary descriptive results on the variables used in the study. As shown, a 6 year data for financial inclusion was available with a mean of 415.36 million users and a standard deviation of 181.09 million. Agency banking users were an average of 12.7 million transactions for the 2 years banks have used this model with a standard deviation of 10.89 million transactions. Further, mobile banking innovations were an average of 263.86 million transactions for the 6 years with a standard deviation of 219.67 million transactions. M-banking values averaged 683.54 million with a standard deviation of 588.96 million.

4.2.2 Multivariate Analysis

Table 2 shows correlation results on all the four variables used in the study. From these results, financial inclusion had a perfect correlation with agency banking and a very high correlation with both mobile money innovations and m-banking. As shown, there were very high and significant correlations agency banking and mobile money innovations ($r = 1.000$). In fact, it was a perfect correlation. Further, m-banking also had a very high correlation with mobile money innovations ($r = 0.999$) as well as with agency banking ($r = 1.000$). The perfect correlations exhibited by agency banking against both mobile money innovations and m-banking shows a high serial correlation and therefore agency banking is dropped from the final regression model. Secondly, agency banking has only two data points (2011 and 2012) and therefore cannot be used in the final regression analysis due to unavailability of data. Therefore, these diagnostics lead to the use of only two independent variables in the model – mobile money innovations and m-banking.

Table 2: Correlation Results

	LnInclusion	LnAgency	LnMobile	Lnmbanking
LnInclusion	1		.922*	.928*
LnAgency	. ^a	1	1.000**	1.000**
LnMobile	.922*	1.000**	1	.999**
Lnmbanking	.928*	1.000**	.999**	1

Table 3 shows the summary regression model results. As the results reveal, there was a very high correlation between financial innovations and financial deepening ($r = 0.943$). Financial innovations accounted for 89.0% of the variance in financial deepening in Kenya (r -squared = 0.890). The model therefore accounted for most of the variance in financial deepening.

Table 3: Regression Model

R	R Square	Adjusted R Square	Std. Error of the Estimate
.943	.890	.780	.21210

Table 4 shows the joint effect of financial innovation variables on financial deepening in Kenya through the F-test. As shown, F-statistic was 8.073 but was not significant ($p > 0.05$). Therefore, the results suggest that the model used was not significant in jointly explaining the relationship between financial innovations and financial deepening as none of the variables in the model was significant.

Table 4: Joint Effect of Financial Innovation Variables

	Sum of Squares	df	Mean Square	F	Sig.
Regression	.726	2	.363	8.073	.110 ^b
Residual	.090	2	.045		
Total	.816	4			

Table 5 shows the results of individual effects of financial innovation variables on financial deepening in Kenya. The results show that mobile money innovations had a negative but insignificant effect on financial deepening ($t = -0.720$). Further, m-banking had a positive but insignificant effect on financial deepening ($t = 0.855$). These results therefore show that financial innovations used in this study do not have a significant impact on financial deepening in Kenya.

Table 5: Individual Effects of Financial Innovation Variables

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.090	2.104		1.468	.280
LnMobile	-1.255	1.745	-4.918	-.720	.547
Lnmbanking	1.553	1.817	5.844	.855	.483

4.3 Summary and Interpretation of Findings

The results collectively suggest consistent growth of formal financial services measured by depositors with commercial banks and other financial institutions. There has been a steady rise in the number of financial users since 2007 from 217.2 to 700.3 depositors with commercial banks and other financial institutions per 1000 adults in 2012. Data available also shows how the growth of transactions from agency banking over the two years it has been in existence. Data was available for 2 years from the Central Bank of Kenya. The number of transactions was 5 million in 2011 and 20.4 in 2012. There has therefore been a significant upward interest of agency banking in Kenya since its introduction in 2010.

As noted above, the results of mobile money payments over the years from 2007 to 2012 include mobile transactions from Safaricom's MPESA, Airtel's Airtel Money, Essar's Yu Cash, Orange Telkom's Orange Money, Mobile Pay's Tangaza, and Mobikash's Mobikash. The number of transactions have risen from 5.47 million in 2007 to 577.37 million in 2012, a rise of 104.6% over the 6 years. These trend suggests consistent growth in uptake and acceptance of this service since its introduction in 2007. The value of transactions have also been rising from 16.31 million in 2007 to 1,543.55 million in 2012. This is an increase of 93.6% over a 6 year period.

The summary descriptive results on the variables use a 6 year data for financial inclusion with a mean of 415.36 million users and a standard deviation of 181.09 million. Agency banking users were an average of 12.7 million transactions for the 2 years banks have used this model with a standard deviation of 10.89 million transactions. Further, mobile banking innovations were an average of 263.86 million transactions for the 6 years with a standard deviation of 219.67 million transactions. M-banking values averaged 683.54 million with a standard deviation of 588.96 million.

Correlation results indicate that financial inclusion had a perfect correlation with agency banking and a very high correlation with both mobile money innovations and m-banking. These results also show some other diagnostics especially serial correlations. There were very high and significant correlations agency banking and mobile money innovations ($r = 1.000$). In fact, it was a perfect correlation. Further, m-banking also had a very high correlation with mobile money innovations as well as with agency banking. The perfect correlations exhibited by agency banking against both mobile money innovations and m-banking shows a high

serial correlation and therefore agency banking is dropped from the final regression model. Secondly, agency banking has only two data points (2011 and 2012) and therefore cannot be used in the final regression analysis due to unavailability of data. Therefore, these diagnostics lead to the use of only two independent variables in the model – mobile money innovations and m-banking.

The summary regression model results reveal, there was a very high correlation between financial innovations and financial deepening ($r = 0.943$). Financial innovations accounted for 89.0% of the variance in financial deepening in Kenya ($r\text{-squared} = 0.890$). The model therefore accounted for most of the variance in financial deepening.

The joint effect of financial innovation variables on financial deepening is examined using the F-test. As shown, F-statistic was 8.073 but was not significant ($p > 0.05$). Therefore, the results suggest that the model used was not significant in jointly explaining the relationship between financial innovations and financial deepening as none of the variables in the model was significant.

The results of individual effects of financial innovation variables on financial deepening in Kenya show that mobile money innovations had a negative but insignificant effect on financial deepening ($t = -0.720$). Further, m-banking had a positive but insignificant effect on financial deepening ($t = 0.855$). These results therefore show that financial innovations used in this study do not have a significant impact on financial deepening in Kenya.

The findings above suggest that financial innovations have an insignificant effect on financial deepening in Kenya. A review of existing literature had suggested that further innovation will be necessary to generate a level of access and transactions costs that make services - especially savings - appropriate and affordable for poor people handling, at most, a few hundred shillings a day. Some literature emphasized this further by suggesting that there's no shred of neutral evidence that financial innovation has led to economic growth.

These findings contrast the studies of Cracknell (2012) on policy innovations and their impact on financial access in Kenya. He had noted that Equity Bank has demonstrated both in Kenya and beyond, the power of matching market responsive processes with technology, systems and word of mouth. Few have been able to recreate the Equity Bank's market responsive formula, but all banks are interested in learning more. In his studies, he had

argued that use of various electronic platforms had to increase the formally banked customers by increasing its customer numbers. However he provides conditions for the success of these innovations which have not been tested by this model.

The findings in this research corroborate with the findings of (Campbell, 1988; Tufano, 2003) who argued that with financial innovation the financial systems ability to fulfil following functions will improve: to determine the market price of financial instruments, to guarantee liquidity for instruments, to be a source of companies' capital, to encourage savings and investments through risk sharing and diversification and to offer risk management products. The findings of these research show that there has been a significant increase in liquidity especially through the use of mobile money payments.

The major finding of these study however is the insignificant relationship that exists between financial innovations and financial deepening measured by the number of formally banked adults with various variables indicating mobile money innovations had a negative but insignificant effect on financial deepening ($t = -0.720$) and m-banking had a positive but insignificant effect on financial deepening.

However the more literature indicated that there is some relationship between financial innovations and its impact on financial deepening and perhaps its implications on economic growth. These findings therefore agree with assertions that even though there have been key financial innovations that would change the landscape in the financial services, more work still needs to be done to take advantage of the new channels to provide services that will facilitate further deepening of financial services in Kenya as currently there exists some minimal relationship between the two variables.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The study intended to achieve two objectives: establish the nature of financial innovations in Kenya's financial sector; and determine the effect of financial innovations on financial deepening in Kenya. There are a number of financial innovations in Kenya. First, mobile money innovations were introduced in 2007 by Safaricom through MPESA where people could send and receive money through their mobile phones. Later, Airtel came up with Airtel Money. Essar Telecom came up with Yu Cash while Orange Telkom introduced Orange Money. Other mobile money innovations include Tangaza by Mobile Pay and Mobikash by Mobikash Ltd. Mobile banking innovations averaged 263.86 million transactions for the 6 years with a standard deviation of 219.67 million transactions. The regression results showed that mobile money had a negative but insignificant impact on financial deepening.

Another financial innovation that was discussed in this study is agency banking. This was introduced in May 2010 by the Central Bank of Kenya to allow banks to extend their services to more customers by using agents. As at June 30, 2012, 10 commercial banks had contracted 12,067 agents facilitating over 20.4 million transactions valued at Ksh. 104.4 billion. This represented an increase over the 6 banks that had contracted 6,513 agents facilitating over 5 million transactions valued at Ksh. 16.7 billion by June 2011. The study found that agency banking users averaged 12.7 million transactions for the 2 years banks have used this model with a standard deviation of 10.89 million transactions. The regression results for agency banking could not be established given insufficient data and high serial correlation between agency banking and other financial innovations used in the study.

Mobile banking (m-banking) is also one of the financial innovations that was a center of focus in this study. As such, most of the banks have adopted mobile platforms where customers can use to deposit cash into their accounts, withdraw cash from their accounts, check their balances, among other services. Customers can assess their banks through their mobile phones. However mobile banking is largely used to carry out transactions and there is still limited use of mobile banking for opening of new accounts and attracting new depositors. The study found that mobile banking transactions averaged 683.54 million with a

standard deviation of 588.96 million. The results also showed that m-banking had a positive but insignificant effect on financial deepening.

5.2 Conclusion

The study concludes that financial innovation has an insignificant impact on financial deepening. As was noted, both mobile money innovations and mobile banking have insignificant effects on financial deepening in Kenya. This means that the rise in mobile money transactions as well as in m-banking in Kenya do not significantly influence financial deepening.

From these results, financial inclusion had a perfect correlation with agency banking and a very high correlation with both mobile money innovations and m-banking. These results also show some other diagnostics especially serial correlations between agency banking and mobile money innovations. Further, m-banking also had a very high correlation with mobile money innovations as well as with agency banking. The perfect correlations exhibited by agency banking against both mobile money innovations and m-banking shows a high serial correlation although agency banking was dropped from the final regression model.

There was a very high correlation between financial innovations and financial deepening with a financial innovations accounting for 89.0% of the variance in financial deepening in Kenya while the joint effect of financial innovation variables on financial deepening in Kenya was not significant. Further the results of individual effects of financial innovation variables on financial deepening in Kenya show that mobile money innovations had a negative but insignificant effect on financial deepening, m-banking had a positive but insignificant effect on financial deepening. These results therefore show that financial innovations used in this study do not have a significant impact on financial deepening in Kenya.

Therefore, the results suggest that the model used was not significant in jointly explaining the relationship between financial innovations and financial deepening as none of the variables in the model was significant. Policies therefore need to take advantage of the opportunities presented by the financial innovations towards increasing financial deepening within the country.

5.3 Policy Recommendations

The study makes a number of recommendations. First, the study recommends that for financial deepening in Kenya to be enhanced, there is need for policy makers to relook at the role of mobile money penetration as this is seen to have an insignificant impact on financial deepening especially on drawing users to use of commercial banks and other formal financial services. Policy makers in therefore need to streamline policies that will enhance the uptake of mobile money in Kenya if significant impacts are to be observed.

Secondly, the study recommends that there is need for banks to focus more on offering mobile banking services to a larger population as this may deepen financial services in the country further. The Central Bank of Kenya should come up with measures that can enhance the uptake of mobile banking services by more customers and banks in Kenya.

There is a possibility that agency banking will have a huge impact on financial deepening in Kenya. Therefore, more banks need to take up the agency banking model and penetrate more regions in the country to enhance the usage of the same and therefore deepening financial services in the country.

Thirdly, The Central Bank of Kenya should consider maintaining a single database of users of all forms of financial services within the country to collect reliable data that can be used to assess usage of these services hence inform decisions in the area of new channels of financial services and policy decisions targeted at increasing financial inclusion.

Finally, the unprecedented growth in the number and value of transactions indicated the potential of these innovations to boost financial development and subsequently economic growth. Financial development/intermediation can be achieved through these innovations if policies towards maintaining competitiveness in product and service innovation, promoting structural reforms and facilitating these developments.

5.4 Limitations of the Study

The study only covered users of formal financial services which include depositors with commercial banks and other financial institutions. Although users of technology based solutions are now being considered formal channels of financial services, aggregate data including these users is still not available. Conclusions could have been different if usage of all financial services for the whole population was studied.

Use of agency banking was launched only two years ago, data was therefore only available for two years hence there is still limited data to help determine whether this innovation has an impact on financial deepening in Kenya.

Information available on users of financial services is based on the official reports submitted by commercial banks to the Central Bank. It is possible that there are other formal channels of financial services that are not included in this category of financial users. This indicator should be enhanced over time to include other financial institutions that do not report directly to the Central bank of Kenya.

Use of products resulting from financial innovations has a substitution effect on use of financial services since they may be seen as an alternative for formal financial services. An enhanced model can be used to determine if this has an effect on growth of access and use of financial services

5.5 Suggestions for Further Research

The study recommends that there is need for further studies on financial deepening in Kenya. A study similar needs to be carried out where both primary and secondary data can be used and triangulated in order to provide a clear picture on the determinants of financial deepening in Kenya.

Another area of recommendation suggested is further studies on the effect of financial innovations on more diverse forms of financial inclusion which do not use the conventional financial system of commercial banks and microfinance institutions in measuring financial deepening.

A further investigation is needed into how all these variables studied; contribute to deepening over a longer period of time since most of the innovations are still new in the market so as to compare findings.

Studies should also be carried where the independent variables in this research are used against other indicators of financial deepening such as adults with credit by regulated institutions, formally banked enterprises and points of service

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APPENDICES

Appendix 1 : Mobile Money Payments Data

Month, Year	Agents	Customer(KShs. Millions)	Transaction(KShs. Millions)	Value(KShs. Billions)
Jun, 2013	103,165	23.75	60.0300	152.5000
May, 2013	100,584	23.47	60.3400	158.7700
Apr, 2013	96,319	23.0185	55.9993	142.6090
Mar, 2013	93,211	22.3292	52.3949	134.4460
Feb, 2013	88,393	21.8024	53.4683	141.1260
Jan, 2013	85,548	21.4181	53.4068	142.6530
Dec, 2012	76,912	21.06	55.9600	150.1600
Nov, 2012	75,226	20.25	53.5600	138.9900
Oct, 2012	70,972	20.02	51.8900	137.6800
Sep, 2012	67,301	19.71	48.9400	130.6900
Aug, 2012	64,439	19.38	49.7000	131.3800
Jul, 2012	63,165	19.58	49.3500	129.2800
Jun, 2012	61,313	19.7956	47.8763	124.0200
May, 2012	59,057	19.6943	47.9655	128.4030
Apr, 2012	56,717	19.53	44.3500	117.3600
Mar, 2012	55,726	19.2393	45.7570	126.0930
Feb, 2012	53,685	18.7921	41.7805	116.6910
Jan, 2012	52,315	18.834	40.2449	114.0600
Dec, 2011	50,471	19.191	41.7075	118.0800
Nov, 2011	49,091	19.46	41.1769	112.3320
Oct, 2011	47,874	19.2097	40.5500	109.1190
Sep, 2011	46,234	18.8916	39.2139	108.6150
Aug, 2011	44,762	18.6128	39.2993	107.4240
Jul, 2011	43,577	18.3082	37.9763	99.7104
Jun, 2011	42,840	18.1469	35.8222	92.6437
May, 2011	38,485	17.9239	35.3457	94.3724
Apr, 2011	37,309	17.7573	32.4254	86.0877
Mar, 2011	36,198	17.4653	32.7301	88.9966
Feb, 2011	34,572	16.8928	28.5462	76.3366
Jan, 2011	33,968	16.6901	28.2047	75.4328
Dec, 2010	39,449	16.4463	29.1183	75.8654
Nov, 2010	38,201	16.075	30.0386	70.2727
Oct, 2010	37,009	15.7346	31.3186	71.7947
Sep, 2010	35,373	15.2239	29.4457	68.5062
Aug, 2010	33,864	14.5893	26.8233	61.5310
Jul, 2010	32,974	13.4701	26.9150	61.7728
Jun, 2010	31,902	10.9147	25.0338	58.0993
May, 2010	31,036	10.4928	24.6984	58.0795
Apr, 2010	29,570	10.2026	22.6933	51.8136

Month, Year	Agents	Customer(KShs. Millions)	Transaction(KShs. Millions)	Value(KShs. Billions)
Mar, 2010	27,622	9.97211	24.0758	56.1167
Feb, 2010	25,394	9.67495	20.8087	49.9055
Jan, 2010	24,850	9.4767	20.0767	48.4625
Dec, 2009	23,012	8.88258	21.6891	52.3417
Nov, 2009	22,476	8.61529	19.9750	47.4656
Oct, 2009	20,631	8.36803	19.9200	48.6365
Sep, 2009	19,803	8.01624	18.3703	45.3683
Aug, 2009	18,780	7.7141	17.0104	40.6787
Jul, 2009	18,504	7.42641	16.8986	40.3374
Jun, 2009	16,641	7.19062	15.9846	38.1756
May, 2009	16,029	6.8427	15.0488	36.8062
Apr, 2009	14,790	6.53192	13.7796	34.0201
Mar, 2009	13,358	6.28952	13.5541	33.8202
Feb, 2009	7,512	5.81602	11.0793	28.6863
Jan, 2009	7,304	5.47828	10.1906	27.0749
Dec, 2008	6,104	5.08247	10.2051	26.9900
Nov, 2008	5,399	4.75139	8.5668	21.7000
Oct, 2008	4,781	4.42028	8.3037	21.6007
Sep, 2008	4,230	4.14304	7.1519	19.2699
Aug, 2008	3,761	3.72618	6.3424	16.7563
Jul, 2008	3,378	3.36719	5.3911	14.0171
Jun, 2008	3,011	3.03852	4.2014	10.9172
May, 2008	2,770	2.71813	4.0213	10.9042
Apr, 2008	2,606	2.37346	3.0729	8.3896
Mar, 2008	2,329	2.07553	2.3975	6.7475
Feb, 2008	2,067	1.82153	1.7399	5.2198
Jan, 2008	1,812	1.5891	1.3468	4.0590
Dec, 2007	1,582	1.34527	1.2741	3.7703
Nov, 2007	1,379	1.1332	1.2217	3.5150
Oct, 2007	1,196	0.875962	0.9589	2.8296
Sep, 2007	960	0.635761	0.6697	2.0697
Aug, 2007	819	0.432555	0.5162	1.5799
Jul, 2007	681	0.268499	0.3543	1.0654
Jun, 2007	527	0.175652	0.2337	0.7201
May, 2007	447	0.107733	0.1500	0.4837
Apr, 2007	362	0.054944	0.0700	0.2209
Mar, 2007	307	0.020992	0.0217	0.0644
TOTAL	2,466,021	873.825258	1,918.7694	4,974.5828

Source: Central Bank of Kenya

Appendix 2 : Users of Financial Services

Indicator Name	Depositors with commercial banks & Other financial institutions(per 1,000 adults)
Indicator Code	FB.CBK.DPTR.P3
2004	103.3511
2005	115.3365
2006	139.9343
2007	217.2454
2008	287.9835
2009	370.7915
2010	549.32
2011	651.513

Source: World Bank Global Financial Inclusion (Global Findex) Database

Appendix 3: Mobile Banking Data

Year	M-Banking (Value of transactions)
2012	1,544.81
2011	1,169.15
2010	732.22
2009	473.41
2008	166.57
2007	16.32

Source: Central Bank of Kenya

Appendix 4 : Agency Banking Data

Year	Agency Banking Number of Transactions	Value of Transactions	No of Agents
2012	20.4 million	104.4 billion	12,067
2011	5 million	16.7 billion	6,513

Source: Central Bank of Kenya