

**THE EFFECT OF FINANCIAL INNOVATION ON FINANCIAL
INCLUSION IN KENYA**

**PAUL NZYOKA MUTUA
D61/85891/2016**

**A RESEARCH PROJECT SUBMITTED IN PARTIAL
FULFILLMENT FOR THE AWARD OF MASTER OF BUSINESS
ADMINISTRATION DEGREE, SCHOOL OF BUSINESS
UNIVERSITY OF NAIROBI**

DECEMBER 2018

DECLARATION

I hereby declare that this research project is my original work and has not been presented in any other university for a degree.

Signature: _____

Date: _____

Paul Nzyoka Mutua

D61/85891/2016

This project has been submitted for examination with our approval as the University Supervisors.

Name: Mr. Ronald Chogii

Supervisor

School of Business, University of Nairobi

Signature: ----- Date: -----

Name: Dr. Cyrus Iraya

Co-Supervisor

School of Business, University of Nairobi

Signature: ----- Date: -----

-

ACKNOWLEDGEMENTS

I owe my deepest gratitude to my supervisors, Mr Ronald Chogii and Dr. Cyrus Iraya for their guidance and advice during the entire project period. Their professional guidance, constructive criticism has been very useful in completing this project. They have been extremely patient and understanding given my tight work schedule. I am also indebted to the University of Nairobi whose conducive learning environment has enabled me pursue the MBA programme.

I wish to acknowledge institutions, which that have availed data and various reports on their websites especially the Central Bank of Kenya that has made it possible for me to complete the research.

In a special way I recognize my love Sheilah and my son Ryan for all the support accorded to me and understanding while I spent many hours away while undertaking this study.

I am also thankful to my family: parents, brothers and sisters and my friends who gave me the time needed to undertake this research.

DEDICATION

I dedicate this work to my parents: John Mutua and Esther Ngina for their commitment in ensuring that I went to school and teaching me the value of education.

TABLE OF CONTENT

DECLARATION	ii
ACKNOWLEDGEMENTS.....	iii
DEDICATION.....	iv
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
LIST OF ABBREVIATIONS	x
ABSTRACT	xi
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the Study	1
1.1.1 Financial Innovation	2
1.1.2 Financial Inclusion.....	4
1.1.3 Financial Innovation and Financial Inclusion	6
1.1.4 Kenyan Economy	8
1.2 Research Problem	9
1.3 Research Objectives	11
1.4 Value of the Study	11
CHAPTER TWO: LITERATURE REVIEW	13
2.1 Introduction	13
2.2 Theoretical Review	13
2.2.1 Life Cycle Theory	13
2.2.2 Economic Theory	14
2.2.3 Evolution Theory	15

2.2.4 Institutional Theory	17
2.3 Determinants of Financial Inclusion	18
2.3.1 Financial innovation	19
2.3.2 Financial Literacy	19
2.3.3 Accessibility of financial services.	20
2.4 Empirical Review	20
2.5 Conceptual Framework	25
2.6 Summary of Literature Review	27
CHAPTER THREE: RESEARCH METHODOLOGY	28
3.1 Introduction	28
3.2 Research Design	28
3.3 Data Collection.....	29
3.4 Data Analysis	29
CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND INTERPRETATION	31
4.1 Introduction	31
4.2 Data Presentation.....	31
4.3 Descriptive Statistics	34
4.4 Pearson’s Correlation Analysis	35
4.4.1 Multicollinearity Analysis	36
4.5 Regression Analysis.....	37
4.5.1 Analysis of Variance	37
4.5.2 Coefficients.....	38
4.6 Discussion of Study Findings.....	40

**CHAPTER FIVE: SUMMARY, CONCLUSIONS AND
RECOMMENDATIONS..... 43**

5.1 Introduction 43

5.2 Summary 43

5.3 Conclusion 44

5.4 Recommendations 45

5.5 Limitations of the study 46

5.6 Suggestions for further research 46

REFERENCES..... 48

LIST OF TABLES

Table 3.1: Operationalisation of Study Variables	30
Table 4.1: Summary of Descriptive Statistics	34
Table 4.2: Pearson Correlation Analysis	36
Table 4.3: Collinearity Diagnostics	36
Table 4.4: Regression Model Summary.....	37
Table 4.5: Analysis of Variance	38
Table 4.6 : Coefficients	39

LIST OF FIGURES

Figure 2.1: Conceptual Model	26
Figure 4.1: Trend of Number of Deposit Accounts from 2008 to 2017	31
Figure 4.2: Trend of Number of Mobile Money Transfer Services Transactions from 2008-2017	32
Figure 4.3: Trend of Number of Registered Bank Agents from 2008-2017	33
Figure 4.4: Trend of Number of Registered DTMFIs from 2008 to 2017	33
Figure 4.5: Trend of Number of ATMs from 2008 to 2017	34

LIST OF ABBREVIATIONS

ATISG	-Access Through Innovation Subgroup
ATMs	-Automated Teller Machines
CBK	-Central Bank of Kenya
DMFIs	-Deposit Taking Micro Finance Institutions
EAPS	-East African Payment System
GDP	-Gross Domestic Product
IT	-Information Technology
KEPSS	-Kenya Electronic Payment and Settlement System
KNBS	-Kenya National Bureau of Statistics
MFSs	-Mobile Financial Services
MNOs	-Mobile Network Operators
MVNO	-Mobile Virtual Network Operator
NSE	-Nairobi Securities Exchange
RTGS	-Real Time Gross Settlement
SACCOs	-Savings and Credit Cooperative Societies
SPSS	-Statistical Package for Social Sciences

ABSTRACT

Over 39% of the world population is excluded from formal financial system. In third world countries, more than half of the population do not have an account with a financial institution and the situation is particularly acute in Sub-Saharan Africa. Financial inclusion is a key component of an all-inclusive social, political and economic development in any country since exclusion from the formal financial system has been identified as one of the major bottleneck to a world without poverty. Consequently, the importance of an all-inclusive financial system is widely recognised in the policy circle and has become a key consideration in financial policy formulation in many countries including Kenya. The objective of this research was to establish the effect of financial innovation on financial inclusion in Kenya. The study adopted a descriptive statistics and used secondary data from the Central Bank of Kenya. The data on number of deposit accounts, number of automated teller machines, number of registered bank agents, number of mobile money transactions and number of licensed deposit taking micro finance institutions was collected for the period between 2008 to 2017 on quarterly basis. The data collected was analysed using descriptive and inferential statistics. Descriptive statistics included trend analysis of the variables over the period of the study. Inferential statistics used include Pearson correlation and regression analysis. The data was analysed by use of Statistical Package for Social Sciences version 25 to determine the correlation and regression analysis between financial inclusion and the various variables of financial innovation. The correlation results showed that the association between number of bank agents, number of mobile money transactions, number of automated teller machines, number of deposit taking micro finance institutions and the number of deposit accounts was strong and positive. Regression results showed that number of deposit taking micro finance institutions and number of mobile money transactions had a positive effect on financial inclusion while agency banking had a negative effect on financial inclusion. Overall, the regression model showed that financial innovation was a good predictor of financial inclusion. The study concluded that financial innovation has a significant effect on the level of financial inclusion. The researcher recommends that all player in the financial inclusion space need to have an understanding of the financial lives of the financially excluded population including how they acquire and utilise their finances. This way, they will be able to design relevant frameworks and financial product and services, which meet their needs. Another study including other forms of financial innovations such as Shariah compliant products and credit reference bureaus as independent variables can be done to assess if they have an effect on the level of financial inclusion in the country.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

According to Global Findex 2017 Survey, about 69 percent of adults in the world have bank accounts and about 1.7 billion adults do not have access to an account at financial institution or through a mobile financial services provider. According to Triki and Faye (2013), less than a quarter of adults in Africa own an account at a formal financial institution. According to Fin Access (2016) the number of adults who have direct access to formal financial services in Kenya increased from 31 percent to 40 percent in urban locations and from 15 percent to 17 percent in rural locations between the period 2006 and 2016.

Financial inclusion is a key component of an all-inclusive social, political and economic development in any country. In addition, an all-inclusive financial system helps to reduce proliferation of informal sources of credit which can not only be exploitative but undermine the stability of a country's financial system as a whole. The Kenya Vision 2030 identifies the role of financial sector development as a key stimulant towards achieving broad macroeconomic goals and objectives. Consequently, an all-inclusive financial system has been recognised as a key policy consideration for most countries including Kenya.

Over the last decade, Kenya has taken steps to increase the level of financial inclusion in the country and strengthen confidence in the country's financial sector. The Kenyan government is on a program of ensuring affordable financial services particularly to the lowest carders in the society.

Through lenses of Vision 2030, the country seeks to benchmark its economic performance against some of the fast growing economies such as Vietnam or middle-income countries like South Africa. Against such benchmarks, a conservative target for access to formal finance by 2030 would be doubling formal financial inclusion by fifty percent. It is no doubt the Kenyan government is committed to enhancing an all-inclusive financial system for all.

Financial service providers are finding innovative ways to expand mobile-enabled financial services through two different models: partnerships between mobile network operators (MNOs) and banks that run a mobile virtual network operator (MVNO), which allows them to offer all their financial services through mobile platform (Bill and Melinda Gates Foundation 2017). Other financial innovations which have been implemented in the country include but not limited to the following: agency banking, online banking, credit card payments and Automated Teller Machines (ATMs). These financial innovations have offered immense possibilities including sustainable development, poverty reduction and economic growth. Kenyans in remote areas can now access financial services through mobile money, ATMs and agency banking.

1.1.1 Financial Innovation

Financial innovation entails design, creation and the implementation of innovative financial instruments and processes and the development of feasible solutions to challenges in financial arena (Lawrence 2010). Financial innovation is the process of creating and then popularizing new financial products as well as new financial technological advancements, financial institutions and markets (Tufano 2003).

According to Tufano (2003), innovations are usually classified into product or process innovation, where product innovation is exemplified by new derivatives, new form investment products and process innovations exemplified by new means of channelling financial securities, processing transactions or pricing transactions. He further notes that chronology of financial innovation shows that development of new financial products and processes has been a gradual progression part of economies for the last four decades.

According to Nato (2011), there are various types of financial innovations. These include: financial innovations, product innovations and process innovations, technological innovations, and circumventive innovations. He notes that institutional innovations relate to changes in legal and supervisory frameworks while process innovations are aimed at increasing efficiency in operations. Product innovations are done in order to meet changes in the market demand, while technological innovations are those which take advantage of technological advancements either one or all of the foregoing types of innovations. Circumventive innovations are those innovations which arise as a result of bypassing certain monetary and regulatory controls imposed in pursuance of certain public policy goals

The major role of financial innovation is to facilitate financial intermediation. Financial innovation serves several other functions in an economy. These include the following: financial innovations complete inherently incomplete financial markets, to respond to agency concerns as well as information asymmetry, to reduce transaction, searching and marketing costs, to address taxes and regulations issues, to respond to the increasing globalisation and risks, to counter technological disruptions (Tufano, 2003).

According to Merton (1995), financial innovations are the forces driving the world financial system towards a greater economic efficiency. Financial innovation increases the efficiency of the financial system by supporting credit market development, facilitating monetary policy operations, and monetary policy transmission mechanism. It is no doubt that financial innovations are critical in the development of financial system.

Due to the significance of financial innovation there is increasing pressure on financial institutions to measure financial innovation and its impact. Victor Ekpou (2015) notes that there are two broad ways of measuring financial innovations. Firstly, financial innovation can be measured as inputs such as research and development costs incurred, IT investment made, human capital. Secondly, financial innovation can be measured as the output of innovations such as retail banking, ATMs, online payments methods, agent banking etc. This study measured financial innovation in terms of output of various financial innovation which was assessed in terms of either number of transactions processed through a product of financial innovation or the number of financial innovations.

1.1.2 Financial Inclusion

Triki and Faye (2013), defines financial inclusion as all initiatives which make formal financial services readily available, easily accessible and affordable to all subgroups of the population in a particular country. Financial inclusion is also defined as the process which ensures accessibility, availability, and utilisation of financial systems by members of an economy (Sarma 2008). Financial inclusion refers to the provision of affordable financial products and services by the formal financial system particularly to members of an economy who tend to be excluded (Usha Thorat, 2007). Financial exclusion is the exact opposite of financial inclusion.

Financial exclusion is defined as the processes which prevent particular sections of the society and individuals from accessing the formal financial system (Leyshon and Thrift 1995). The concept of sustainable and inclusive economic growth is a multifaceted concept which considers financial inclusion as one of the key component. In order to spur a sustainable and inclusive economic growth, it is paramount to rethink how avail relevant financial instruments and services for the benefit of the poor and other less fortunate groups in the society (Triki and Faye 2013). Consequently, the importance of an all-inclusive financial system is widely recognised in the policy circle and has become a key consideration in financial policy formulation in many countries.

Most countries are interested and are committed to promoting financial inclusion through various initiatives. Recently, most countries have shown commitment to global initiatives that promote financial inclusion such as the G-20 Financial Inclusion Action Plan and Maya Declaration. This is in addition to the strategies and targets set by individual countries. For example in 2005, United Kingdom constituted a “Financial Inclusion Task Force” to monitor and evaluate the progress on financial inclusion.

Financial inclusion is often measured by assessing how many people own and use formal financial products (Klapper, El-Zoghbi and Hess, 2016). Demircuc-Kunt et al (2018),on their contribution to Global Findex Database, measured financial inclusion as the number of adults who owned accounts with financial institutions in various countries around the globe. This study measured financial inclusion as the number of deposit accounts with financial institutions in the country over the period of the study.

1.1.3 Financial Innovation and Financial Inclusion

Financial innovation has been majorly viewed as the evolution of new financial services and instruments as well as new and more efficient methods of providing financial services (Misati et al, 2010). Financial inclusion on the other hand is the ability to access and use financial services in an affordable manner. The Access through Innovation Subgroup (ATISG) notes that financial innovation has emerged as an invaluable way to expand access to financial services. The group recognised innovations through technology as a long-term solution to expanding access to finance (ATISG Report, 2010).

Some of notable landmark financial innovations in the financial sector include but not limited to mobile banking, agency banking, credit and debit card payments and internet banking. Such digital financial innovations have risen the levels of financial inclusion in the recent decades. For instance, with use of mobile money, many people are able to access financial services through mobile banking and mobile money transfer services. Similarly, through agency banking, the financially excluded rural population is able to access financial services since most of the bank agents are located in the rural areas where it is not economical for banks to start a branch.

Ekmekcioglu and Barak (2012), observed that financial innovation and development aids to raise financial system which in turn facilitates monetary policy operation but complicates to a greater extend the inalienable environment in which the monetary policy operates in. In order to manage complexities brought by financial innovations financial industry regulators needs to respond by efficiently monitoring the financial landscape.

In his opening remarks during Global Symposium on Innovative Financial Inclusion on September 2016, the Governor of Central Bank of Malaysia noted that succession of technological breakthroughs coupled with ubiquity of mobile devices presented a significant opportunity to scale up financial inclusion to unprecedented levels. He further noted that financial innovations had permeated to almost every activity of financial sector propelled by faster computing and faster problem solving capabilities which led to increase in levels of financial inclusion.

Andrianaivo and Kpodar (2011), examined whether financial inclusion was one of the avenues through which mobile phone development impacts on economic growth among a sample of African countries for the period between 1988 to 2007. They found out that development of mobile phones consolidated the impact of financial inclusion on economic growth particularly in countries where mobile financial services had taken root.

Empirically, Kama and Adigun (2013) on financial inclusion in Nigeria observed that financial inclusion had assumed a critical development policy among many countries and particularly the developing ones. They noted that low levels of financial inclusion in Nigeria was caused by among other factors, inadequate infrastructure facilities and inefficient technology based facilities by financial institutions.

Empirical evidence from various field studies notes that people who have unrestricted access to savings bank accounts, or informal savings accounts are likely to improve productivity, consumption and income, and reduce exposure to illness and other unforeseen events (Dupas and Robisson, 2009)

1.1.4 Kenyan Economy

The financial sector in Kenya comprises of the Central Bank of Kenya, Commercial Banks, Non-banking Financial Institutions Capital Markets, NSE, Insurance companies, SACCOs among others. Financial sector plays an invaluable role in towards economic growth by providing intermediation between savers and borrowers in the economy; administering the country's national payment system as well as establishing an institutional framework within which fiscal policies can be implemented.

According to CBK Annual Report 2017, as at June 2017, the Kenya's banking sector was made up of forty-three commercial banks, thirteen micro-finance banks, one mortgage finance company, seven representatives of foreign banks, seventy-four foreign exchange bureaus, eighteen money remittance providers and three credit reference bureaus.

A lot of changes have taken place in the banking sector that have led to the rapid increase of financial products and services and organisational reforms which have improved and increased the efficiency of delivery of services in the financial sector. These changes, amplified by the rapid developments in the international financial arena and the increasing level of integration of both domestic and global financial markets have resulted to increase in financial innovations. Some of notable financial innovations which have been witnessed in the financial sector include advent of ATMs, Agency banking, Automated Clearing House, Magnetic Ink Recognition which ensures speedy and efficient clearing of cheques, leading mobile money transfer innovations such as Airtel Money, M-Pesa, MobiKash, Orange Money and Tangaza Pesa among others haven taken root and are fast growing in the country.

In July 2005, (KEPSS) and (EAPS) were introduced to facilitate secure and efficient method of payment for time critical and high value payments locally and within the East African Region through RTGS. This was an effort by the government to modernise payments methods to align to global trends. Recently, mobile banking products and services such as KCB M-pesa, Mshwari, Equitel, MCo-op Cash have taken root in the financial sector and have facilitated quick access to bank accounts to transact.

The increase in financial innovations has resulted to a considerable increase in the level of financial inclusion in the country. According to a survey by Fin Access in 2016, 75% of Kenyans are now formally included and as such financial exclusion stands at 17.4%. The level of exclusion is high in the rural areas compared to the urban areas. According to the survey, the increase in financial inclusion is partly explained by new financial innovations such as (MFSs)

1.2 Research Problem

In many advanced economies, financial innovation has become a key contributor to increased productivity, economic growth and development not only for manufacturing sector but for service industry and particularly financial services sector. Granting access to affordable financial services (financial inclusion) to the excluded population results to creation of large depository of savings, investable funds which facilitates boom in investment activities which in turn promotes economic growth and development.

Financial exclusion from the formal financial system has been identified as one of the major bottleneck to a world without poverty. In many third world countries, more than half of the population do not have an account with a financial institution.

In the recent years, Kenya has made substantial progress in achieving financial inclusion but a significant portion of the population remains financially excluded and exposed to the exploitative informal finance. Currently, 75.3% of Kenyans have access to formal finance, 7.2% have access to informal finance while 17.4% has been totally excluded from access to both formal and informal finance (Fin Access 2016). Empirical scrutiny of both global and local studies shows that there exists not only literature gaps but also mixed results and conclusions on the effect of financial innovation on financial inclusion.

In the global context, Ozili (2017) observed that digital finance had a positive effect on financial inclusion in emerging and advanced economies. According to Lumsden (2018), implementing mobile-based financial systems can increase financial inclusion and improve economic development particularly in emerging and developing economies.

Locally, study by Michele (2016) shows that there is insignificant relationship between financial innovations (agency banking, mobile banking and internet banking) on financial inclusion. The same sentiments were shared by Kenyoru (2013) who noted that financial innovation had insignificant effect on financial deepening in Kenya. Boro (2017), observed that there existed a strong positive relationship between mobile banking and financial inclusion in Kenya.

It is at the centre of such mixed results, conclusions and literature gaps that motivated and necessitated the need to carry out a study from Kenyan context to establish the effect of financial innovation on financial inclusion. The study sought to answer the question, what is the effect of financial innovation on financial inclusion in Kenya?

1.3 Research Objectives

The main objective of this study was to examine the linkage between financial innovation and financial inclusion in Kenya.

1.4 Value of the Study

The results of this research will be beneficial to various stakeholders such as the government, policy makers, management of financial institutions, researchers and other industry players.

This study will contribute to the ongoing debate on financial inclusion as well as financial innovations theory. Most of the studies focus on specific financial innovations and their effect on financial inclusion and little has been researched on the extent to which financial innovations as a whole affect financial inclusion and as such this research will fill the literature gap. Academicians and researchers in the financial sector will be able to access to the findings of this study once the results are published.

The results of the study will provide empirical evidence to policy makers on the extent to which financial innovations have impacted financial inclusion in the country and thereby develop policies which are geared towards supporting financial innovations. It will also provide a reference point for government policy makers to formulate robust, broad and effective policies that lays a strong foundation for financial innovation in bid to achieve financial inclusion in the country.

Managers of financial institutions will benefit from results of this study as it will provide a point of reference on which financial innovations have the greatest impact on financial inclusion as hence realign their organisational strategies and policies in supporting such innovations and even developing more innovative financial products and services for their consumers. This is expected to improve financial performance of financial institutions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on various theories of financial innovation, financial innovation and financial inclusion, review of empirical studies that focus on financial innovations and financial inclusion and lastly summary of the literature review.

2.2 Theoretical Review

This section examines key theories on which the study is underpinned based on the variables of the study. According to Khraisha and Arthur (2018), financial innovations are complex in nature which makes it impracticable to come up with a unifying theory to explain their growth and development. They identified a Meta theory which identifies, groups and links financial innovation theories in a way that explains the complex nature of financial innovation. They classified financial innovation theories as follows: Life cycle, evolution, economic and institutional theories.

2.2.1 Life Cycle Theory

This theory assumes that innovation is a sequential chain of events taking place within the system which has an ultimate goal towards which it tries to reach over time. Literature on financial innovation contents that financial innovation is a continuous uninterrupted process propelling the financial system towards a specific goal. The theory emphasises the need to view financial innovation process from a historical development perspective. For example, Goetzman and Rouwenhorst (2005), analysed financial innovations over the last four hundred years in what they called “financial archaeology”.

Poole and Van de Ven (1995), noted that life cycle theory is also premised on logical necessity. Logical necessity simply implies that one historical step forms a necessary logical condition for the next step.

Life cycle is a development theory when the chronology of financial innovations exhibits uninterrupted continuity as well as non-opportunistic behaviour. The theory is general in its nature as it depends on explaining the logical process of innovation and therefore where there is high complexity the theory has less explanatory ability. Poutanen et al (2016), contents with this observation noting that historically, innovation has been understood as a linear uninterrupted sequence of events but in the real sense, it is more complex and encompasses unforeseeable interplay between different time phases. This theory was relevant to this study as it shows the logical development of independent variables of the study over time. For example, mobile money transfer services was a logical step that supported emergence and development of mobile banking.

2.2.2 Economic Theory

Economic theory is based on the premise that demand and supply forces of financial innovations in the market are the outcomes of financial market participants trying to respond to market imperfections such as transaction costs, information asymmetries and other inefficiencies while at the same time pursuing the profit maximization motives of shareholders. The theory is premised on mainly two models ie supply and demand models. The two models aims to determine if financial innovations arise due to demand forces in the market or it is something which occurs without influence of market forces. Many studies content that financial innovation arise due to interactions of demand and supply forces (Duffie and Rahi, 1995, Harris and Raviv, 1989,).

Demand for financial innovation may emanate from the consumer in the form of households need to invest or borrow money, innovative methods to reduce risks and lower tax costs. Innovation may also come from the inventor side occasioned by external and (or) internal constraints. Some external constraints include but not limited to government regulations, inflation and exchange rate risks while internal organisational constraints may be risk limits. According to Silber (1983), such factors can lead to financial innovation. According to Awry (2013), the proponents of the supply side hold that conventional economic theory and industry regulators do not necessarily consider the motives of the financial system to provide financial innovations. As a model, economic theory explains financial innovation once there is a consensus on the ultimate goal for financial innovation.

This theory was pertinent to the study since one of major reason why financial institutions innovate is to reduce operating costs, compete effectively and hence maximize profits. A classic example of financial innovation which is explained by this theory is agency-banking model in Kenya.

2.2.3 Evolution Theory

According to Poutanen et al (2016), evolution theory holds that financial innovation involves the process of change, selection, self-organisation, and optimization. Poole and Van de Ven (1995) contents that this theory does not assume a predefined route of development or a pre-determined goal that the development has to meet. The evolution process has four distinct models. Firstly, there is optimisation model. According to Kauffman et al (2000), the model assumes that firms encounter challenges for which they look for solutions in a space of possibilities.

The optimization model assumes that financial innovations could be seen as a product of constrained optimization by financial institutions, which try to fully maximize their utility function, (Ben-Horim and Silber, 1977).

The second model of evolution theory is combinatorial evolution model. This model is based on premise that financial innovations are modelled by combining already existing elements in unique ways. Self-regulation is the third model. According to Holland (2014), self-regulation refers to emergence of order without necessarily the influence of controlling authority. The creation, extensive spread, and implementation of financial innovations can be analysed from self-regulating point of view.

The fourth model is based on principle of natural selection. A number of factors affect the whole process of natural selection in the growth and development of financial innovations. Buttzuge and Hens (2001), presents a model that explains that the survival of new financial services and products is wholly dependent on several factors, which include marketing activities and high trading volumes.

The evolution model indicates how financial innovations evolve overtime and their emergence, but does not explain why they are developed in the first place. It provides more details than life cycle and economic theories simply because different financial innovations have varied and complex evolution process.

This theory was relevant to the study as it captures evolution of financial innovation over time. For instance, financial innovation such as ATMs has evolved over time. ATMs were primarily to be used to reduce congestion of customers withdrawing cash in banking halls. This has evolved and customers now not only withdraw but also deposit cash in ATMs.

2.2.4 Institutional Theory

Institutional theory shows how growth and development of financial innovations is affected by institutional or organisational changes. In this theory, considerable impact is given to the type and nature of the innovating financial institutions as well as the role of financial architectural framework which provides information on which firms innovate in finance and the most relevant structural framework of financial markets to promote innovation. There exists scanty literature about the nature of institutions involved in financial innovation (Allen, 2001, Lerner, 2006). Boot & Thakor (1997) proposes a model which shows how varied institutional structures lead to varied patterns of innovations.

According to Schumpeter (1934), highly innovative activities require high levels of profit and intensive investments in research and development and as such markets are more conducive to innovation. According to him, the monopolistic firms are better positioned to be innovative since they encounter less market risks and have relatively stable cash flows to support innovations. Arrow (1962) observed that tough competition is necessary for innovation to happen and therefore monopolistic firms may not have the incentive to innovate.

Regulations partly explains institutional theory of financial innovations. Regulations interact with financial innovations in two ways. Firstly, regulations can be drivers of financial innovations in the sense that they prohibit financial firms to engage in particular financial activities. In order to circumvent around the rules and regulations, financial institutions innovate in order to maintain their profits. Secondly, regulations can be implemented to encourage financial market participants to invent responsible and beneficial financial innovations. Financial regulation remains to be an important driver in the growth and development of financial innovations.

According to Wall (2014), a classic example of how institutional variables can result to financial innovation is the development of money market funds. From the years 1933 to 1935, several banking Acts were passed in the US to cap interest rates by financial institutions mainly on savings and bank deposits. These Acts created institutional barriers for investors who were after interest payments on their bank deposits. In order to circumvent these regulations, Bruce Rent and Henry Brown developed an alternative financial instrument to the bank deposits in 1971, the money market fund.

Behavioural theory also contributes to the development of institutional theory of financial innovation. The behavioural theory explains how financial innovation and the behaviours of financial market participants interact. According to Shefrin and Statman (1993), combining elements of behavioural model with financial innovations can result to positive effect on the design and management of new financial innovations.

This theory was significant to this study as it shows how institutional dynamics have interacted to result to emergence and development some of the financial innovations. A classic example of financial innovation emanating from institutional dynamics is internet banking. CBK through its legislations it has supported internet banking through enactment of relevant legislations and guidelines, which supports internet banking.

2.3 Determinants of Financial Inclusion

This section examines various factors which influence level of financial inclusion. The key determinants of financial inclusion include; financial innovations, financial literacy and accessibility

2.3.1 Financial innovation

Financial innovation is seen as a process undertaken by any institution which involves development, promotion, as well as adoption of new products and services, processes, or technological improvements which brings new methods or changes the manner in which financial activities are done (Khraisha and Arthur 2018). Financial innovation increases the level of penetration of financial products and services to the financially excluded in a population.

With advancement in technology, financial services and products have been easily accessible to many who would otherwise be financially excluded. For example, seven out of ten Kenyans are financially included mainly driven by mobile money and approximately 97% of financially included population have mobile money accounts (Bill and Melinda Gates Foundation, 2017).

Financial innovations have greatly transformed banking services globally and their impact on economics globally is becoming increasingly noteworthy. A classic example is agency banking which has revolutionised banking industry and majority of rural population are able to access banking services through agency banking channels.

2.3.2 Financial Literacy

According to Atakora (2013), financial literacy can be defined as the possession of knowledge of how money works and how to manage, invest and spend it. Financial literacy focuses on individual's ability to make informed and prudent financial decisions. Financial literacy contributes to financial stability and economic growth.

Financial literacy is often seen as a precondition for financial access since one cannot access what they are not aware of. Therefore, increase in financial literacy is expected to increase level of financial inclusion. Wafula (2017), examined the effect of financial literacy on financial inclusion among small scale farmers in Trans Nzoia County and found out that there was a positive significant relationship between financial literacy (saving practices, debt management, investment practices, financial planning services) and financial inclusion.

2.3.3 Accessibility of financial services.

According to Camara and Tuesta (2015), access to financial products and services and is determined by the supply of the same and is a necessary condition for financial inclusion.

Reliable access to financial services and products is an integral component of financial inclusion and is often obstructed by lack of infrastructure such as means of transport to reach a financial institution, lack of network coverage to access mobile banking or even lack of internet access to access online banking, procedural rigidities such as lot of documentation to be able to access credit in financial institutions. Chithra and Selvam, (2013) conducted an empirical study on the determinants of financial inclusion in India and found out that physical infrastructure for connectivity and information was closely associated with levels of financial inclusion.

2.4 Empirical Review

The concept of financial inclusion is a relatively recent phenomenon being discussed across financial arena and as such, it is now that literature on this area has started picking up particularly in the Kenyan context.

Most of the existing literature focus on effects of financial innovations on economic growth and effect on financial performance of financial institutions. The empirical review here focused on studies in other parts of the world then Africa and zeroed in the Kenyan context.

Johnson and Kwak (2012), examined whether financial innovations were good for the economy. They observed that there has been a lot of debate on financial innovations but the social value was unclear. Innovation is one of powerful forces which define and shape human society and improvement in living standards for Americans was attributable to innovation. They noted that financial innovations stood accused for the recent global financial crisis in 2008. They noted that the conventional reasoning that financial innovation is often good needed to be reviewed more keenly. According to them financial innovation does not necessarily promote economic growth since it affects the concentration of risks in the financial system.

Ho (2006), examined the effect that financial innovation had on fiscal policy transmission mechanisms. He observed that emergence of electronic payments systems could substitute demand deposits and other liquid deposits and thereby weaken the proper operation of monetary policy transmission system mainly due to weakening of association between change in bank demand deposits as well as change in real sector activities. Bara and Mudzingiri (2016), studied the linkage between financial innovation and economic growth in Zimbabwe for the period between 1980 and 2013. The data was analysed using Autogressive Distributed Lag bound tests and Granger causality tests. The study found out that financial innovation had a positive relationship to economic growth which varied based on the parameters used to quantify and measure financial innovation.

Yawe and Prabhu (2015) carried a review of innovation and financial inclusion. The review covered several areas of financial innovations such as savings, payments, banking services for the excluded poor and financial literacy. The results of the research indicate that financial inclusion should go beyond the traditional banking sector. They noted that mobile operators have initiated mobile financial services, although it's not in their mandate. This has led to competition between them and financial institutions. The study recommends for partnerships between the two to enhance interoperability. They recommended the need to have an institutional framework composed of regulators of financial institutions and telecommunication companies in order to expand financial inclusion without necessarily compromising on policies towards combating contemporary global issues such as money laundering. This research focused on financial innovation and how it related to financial needs of the financially excluded under various categories; savings, payments, banking services for excluded poor, financial literacy and consumer protections.

Triki and Faye (2013), examined financial inclusion in Africa. They found a more comprehensive definition of financial inclusion which encompassed three aspects; access, affordability and availability of financial services. They studied financial services penetration and found out that African continent lagged behind other developing areas in terms of cost and access, and that distance and cost remained as key challenges for the growth and development of all-inclusive financial systems. They noted that economic and social and cultural barriers and inefficiencies in laws and regulations were denying women access financial products and services in Africa.

The study found out that twenty three percent of adults in Africa had an account with a formal financial institution. This level of inclusion varied between Southern (42%) and seven percent in Central Africa. For example, in Democratic Republic of Congo, more than 95% of adults are unbanked. Boro (2017), studied the effect of mobile banking on level financial inclusion in Kenya for the period between 2007 and 2016. Secondary data was used for the study and descriptive and inferential statistics was used to estimate link between mobile banking and level of financial inclusion.

Financial inclusion was measured by the number of deposit accounts over the period of study while mobile banking was measured by number and value of mobile transfers, number of mobile money subscribers and number of mobile money agents. The research established that there was a strong and positive correlation between mobile banking and financial inclusion in Kenya.

Nato (2011), studied the effect of financial innovations on financial inclusions in Kenya and specifically in Kibera. He zeroed in mobile money as financial innovation. The study covered the year 2005 and 2011 and the population was people living in Kibera within that time which was estimated to be between 0.5 million to 1.2 million. His study was divided into three phases; ie period before mobile money, 2005 and earlier, period when mobile money was introduced, 2008 and period after mobile money, between 2008 and 2011. He used primary data and used Logit Model, linear probability model and Probit Model to analyse the data. The study concluded that probability of access to financial services could not be ascertained between the period 2005 and 2008. However, probability of access to finance rose from 50.7% in 2008 to 60.14% in 2011 mainly explained by financial innovations of which mobile money was a significant contributor.

Waihenya (2012), reviewed the link between agency banking and level of financial inclusion in Kenya. The study covered mainly the year 2012. Financial inclusion was measured as performance index for banks which have rolled out agency banking between January to July 2012 while agency banking was measured in terms of number agents, number of transactions per agent and volume of money flowing through the agents. The population which was the same as the sample, covered all commercial banks which have rolled out agency banking. The data was analysed using inferential analysis and found out that agency banking increased financial inclusion in the country. Specifically, the volume of money flowing through agents had a positive impact on level of financial inclusion in Kenya.

Kenyoru (2013), examined the relationship between financial innovations and financial deepening in Kenya for the period between 2007 and 2012. Financial inclusion was measured as the number of deposit accounts in commercial banks and other financial institutions for the period under review. Financial innovations studied were agency banking, mobile money and M-banking. Agency banking was measured number of transactions in agency banking, mobile money was measured as number of transactions in mobile money while mobile banking was measured as value of transactions processed through mobile banking. Regression analysis was applied in analysis of the research data and the results were that financial innovations had insignificant effect on financial deepening in Kenya.

Michelle (2016), examined the relationship between digital finance and level of financial inclusion in the banking sector in Kenya. Digital finance was measured in terms of agency banking, mobile banking and internet banking while financial inclusion was measured using credit penetration. The study covered 44 commercial banks in the county and data was collected from 13 commercial banks as a

representative sample. The data was analysed using regression and correlation analysis. The study found an insignificant negative relationship between agency banking, mobile banking and internet banking and financial inclusion. It was concluded that digital financial does not have any correlation with financial inclusion since banks use digital finance to lower operating costs and not to foster financial inclusion.

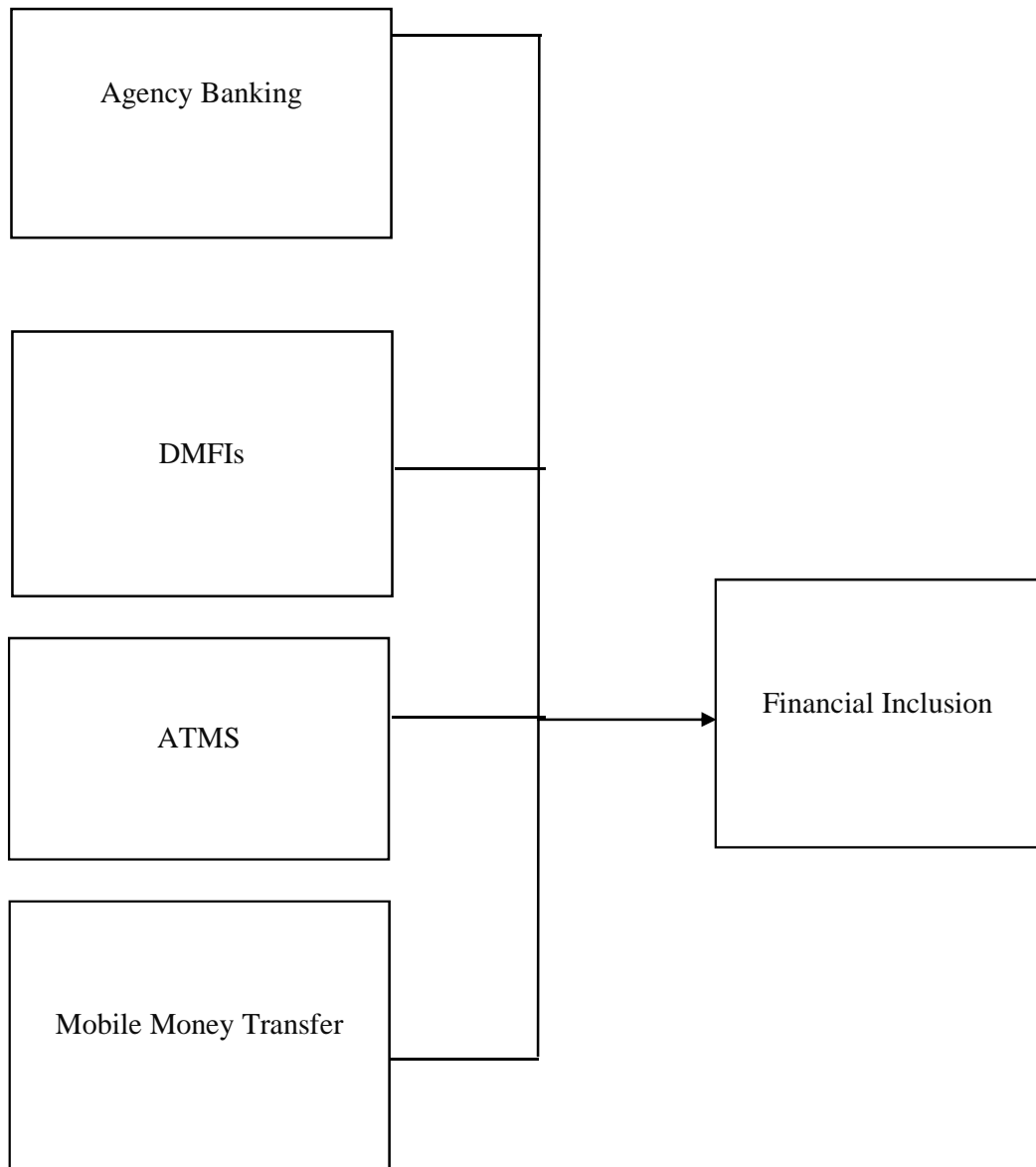
2.5 Conceptual Framework

A Conceptual framework is a diagrammatic representation that shows the link between the independent and dependent variables. For this research, financial innovations were represented by agency banking, mobile money transfer, ATMs and DTMFIs. Financial inclusion represents the number of deposit accounts in financial institutions owned by adult Kenyans. Theoretically, financial innovations are expected to increase the level of financial inclusion. Several empirical studies indicate that relationship hold while others hold that financial innovations are mainly focused on reducing operational costs by the innovating institutions and not fostering of financial inclusion. Below is the conceptual framework for the study.

Figure 2.1 Conceptual Model

Independent Variables

Dependent Variables



2.6 Summary of Literature Review

After 2008 financial crisis, of which financial innovations has been blamed to cause, the area of financial innovations has received considerable attention from both theoretical and empirical literature. The evaluated empirical studies show mixed results on the effect of financial innovation on level of financial inclusion and economic development. While some studies content that financial innovation has a positive relationship with financial inclusion, some argue that there exists no relationship between financial innovation and financial inclusion mainly to due to simple reason that financial institutions do not innovate to increase access to financial services but rather to reduce operating costs and maximise their profits. It is worth noting that majority of studies on financial innovations have focused on the effect financial innovation has on the economic development as well as financial performance of financial institutions.

The relationship between financial innovation and financial inclusion has not been exhaustively explored despite the fact that financial inclusion remains a policy priority for many countries including Kenya. The scanty literature on the relationship between the two aspects, motivated conduct of this research in order to contribute to the ongoing debate on financial inclusion and financial innovation. Due to these literature gaps, this study examined the effect of various financial innovations in the country's financial system on the level of financial inclusion.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter highlights the details of the approaches used in preparation for the study. It gives the overall framework conceived that helped in answering the specific research question and identifies the research procedures and methods that were used in collecting, processing and analysing the data. The chapter is organised as follows; research design, data collection and data analysis.

3.2 Research Design

Burns and Groove (2009), defines research design is a road map for conducting a research with total control over the factors that may affect the validity of the findings. Research design is the overall strategy for collecting and analysing data while including the specifics for improving both the internal and external validity of the research (Polit, Hungler, & Beck, 2001). The fundamental role of research design is to ensure that research evidence obtained helps a researcher in answering initial research question(s) as unambiguously as possible.

This study adopted a descriptive research design. Cooper and Schindler (2003), contents that descriptive research is focused on finding out the what, where, and how of a phenomenon. This research design was chosen as it enabled the researcher to generalise the findings of the study to the larger target population.

3.3 Data Collection

The study used secondary data mainly from CBK. Secondary data was used since it was cheaper, more accurate and easily accessible. Data on agency banking, DMFIs, mobile money transfer, ATMs and deposit accounts was collected from CBK for the period between 2008 to 2017.

3.4 Data Analysis

The data was analysed using regression and correlation analysis with the help of SPSS version 25. Pearson's correlation analysis was used to assess the nature of and degree of relationship between the variables while regression analysis was deployed to determine the existing link between the variables.

After determining financial inclusion and various financial innovations the link between the two variables was determined. This involved regressing financial inclusion as the dependent variable in the regression equation and while independent variables were measures of various aspects of financial innovations. The regression equation that was used in this research is as follows:

$$Y = S_A + S_B X_1 + S_C X_2 + S_D X_3 + S_E X_4 + v \quad \text{where:}$$

Y = Financial inclusion

S_A = Constant - Other factors which affect financial inclusion such as income level, age, financial literacy level among others

S_B, S_C, S_D, S_E = Regression coefficients

X_1 = Agency banking

X_2 = DMFIs

X_3 = ATMs

X_4 = Mobile money transfer services

v = Probabilistic error term

Table 3.1 Operationalization of Study Variables

The table below describes the various study variables and how they were measured.

Variable	Description	Measurement
Y	Financial inclusion	Financial inclusion was measured as natural logarithm of the number of deposit accounts in financial institutions.
X₁	Agency Banking	Agency banking was measured as natural logarithm of total number of registered bank agents.
X₂	DTMFIs	DTMFIs were measured as a natural logarithm of total number of licensed DTMFIs.
X₃	ATMs	ATMs were measured as natural logarithm of the total number of ATMs in the country.
X₄	Mobile Money Transfer Services	This was measured as the natural logarithm of total number of mobile money transactions in the country

Test of Significance

The study used t and F-test to determine statistical significance. F-test was used to assess the statistical significance of the whole model while t-test was used to assess the statistical significance of the regression coefficients at 5% level of significance

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND INTERPRETATION

4.1 Introduction

This chapter presents the results of the research. The chapter is organised as follows; data presentation, descriptive statistics, correlation analysis, regression analysis and finally discussion of the study findings.

4.2 Data Presentation

Figure 4.1 below shows the trend of financial inclusion measured as the number of deposit accounts with financial institutions in the country. There has been a steady increase in level of financial inclusion in the country as evidenced by the steady increase in number of deposit accounts from 6.43 million in 2008 to 49.88 million in 2017.

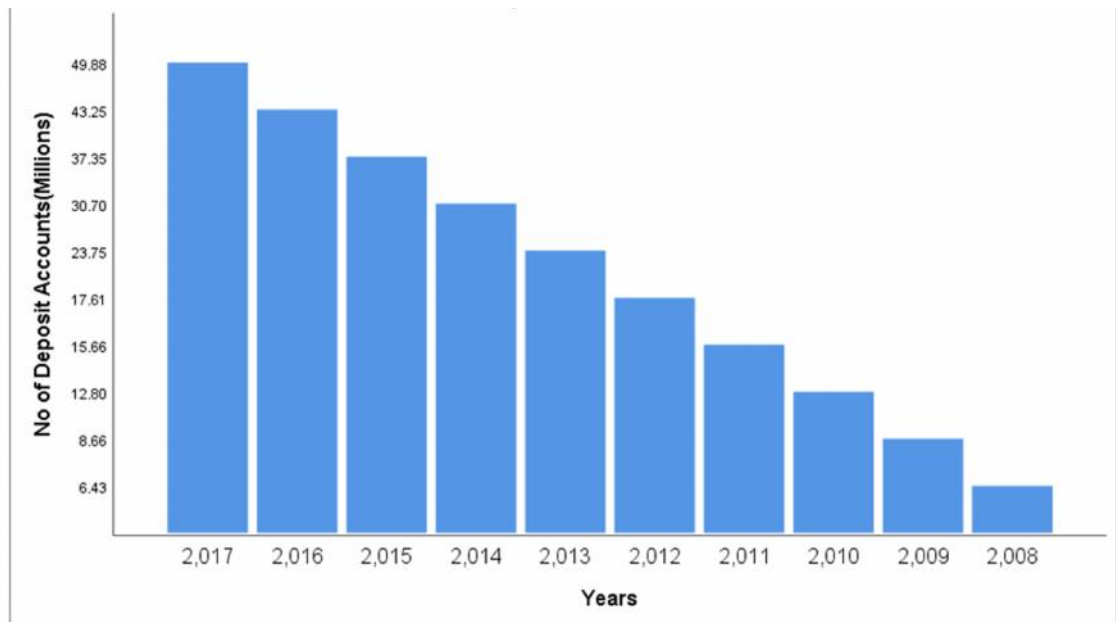


Figure 4.1: Trend of Number of Deposit Accounts from 2008 to 2017

Figure 4.2 shows the trend of number of mobile money transfer services transactions from 2008 to 2017. Mobile money was first introduced in the country in 2007 through M-Pesa. The number of transactions has increased steadily from 21.77 million transactions in 2008 to 1.699 billion transactions in 2017.

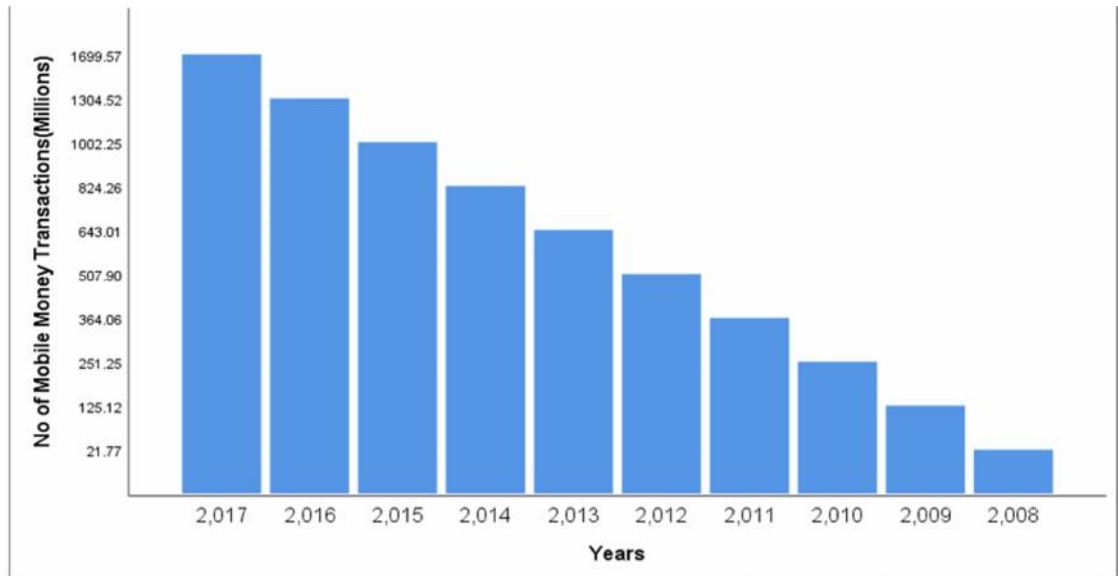


Figure 4.2: Trend of Number of Mobile Money Transfer Services Transactions from 2008-2017

The results in figure 4.3 shows the trend of number of registered bank agents, which was introduced in 2010. As shown, the number of transactions increased from 9,748 agents in 2011 to 61,290 agents in 2017.

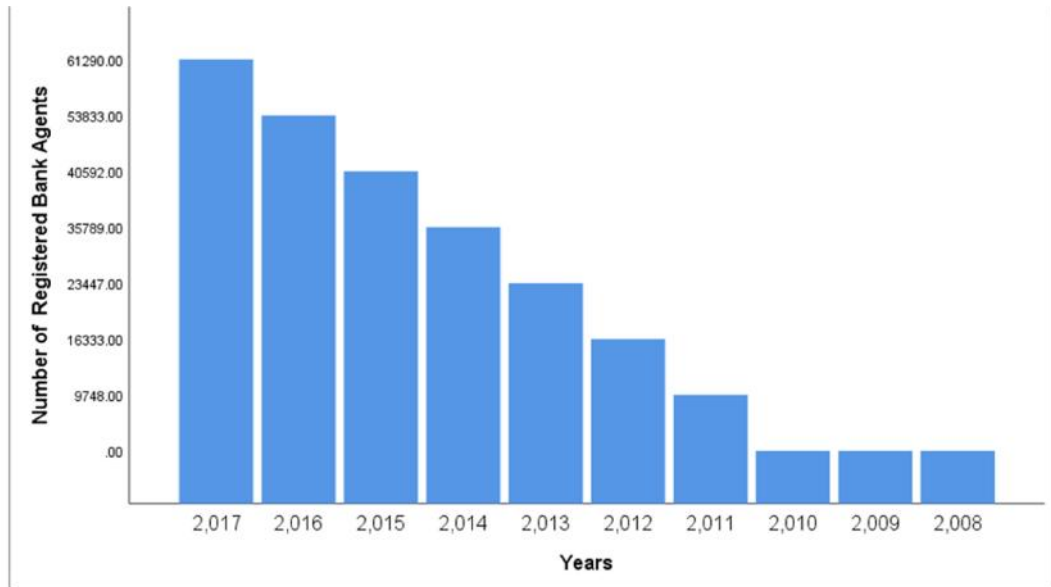


Figure 4.3: Trend of Number of Registered Bank Agents from 2008-2017

Figure 4.4 shows the trend of the number of registered deposit taking micro-finance institutions in the country. This was introduced in 2008 through Central Bank legislations. The number of DTMFIs increased from one in 2009 to 13 in 2017.

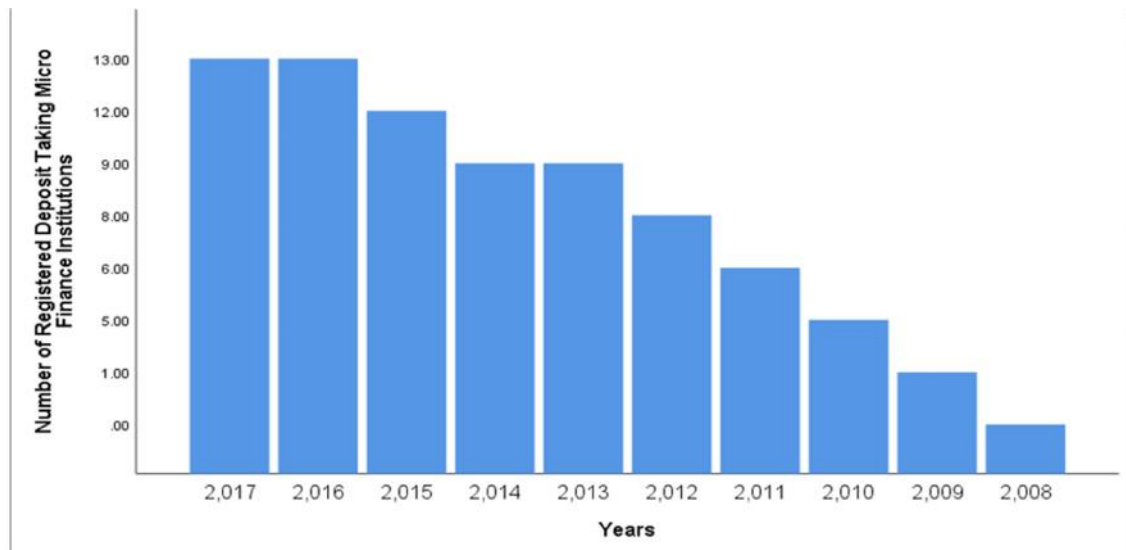


Figure 4.4: Trend of Number of Registered DTMFIs from 2008 to 2017

Figure 4.5 shows results of trend of number of ATMs in the country from 2008 to 2017. The number of ATMs rose from 1325 in 2008 to 2825 in the year 2017.

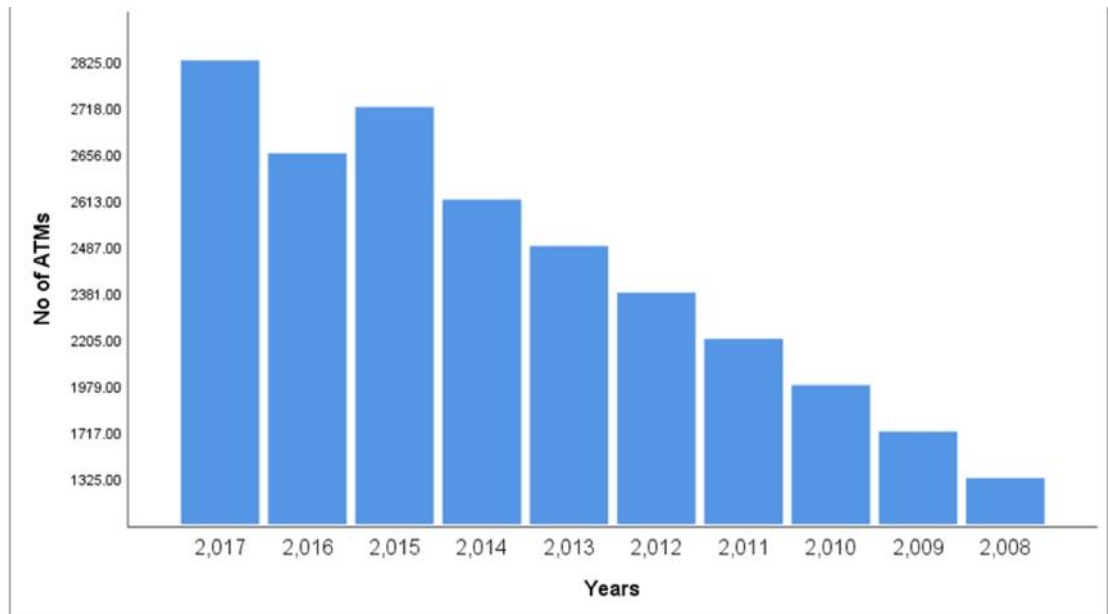


Figure 4.5: Trend of Number of ATMs from 2008 to 2017

4.3 Descriptive Statistics

Table 4.1 presents the summary of descriptive statistics of the study variables.

Table 4.1 Summary of Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
No of deposit accounts	40	15.44	17.73	16.7358	.68675
No of registered banking agents	40	.00	11.02	7.7223	4.27768
Number of Mobile Money Transactions	40	14.69	18.76	17.6090	.97333
No of Deposit Taking Micro Finance Institutions	40	.00	2.56	1.6260	.98587
No of ATMs	40	6.97	7.95	7.6893	.25993
Valid N (listwise)	40				

Table 4.1 shows that financial inclusion had a mean of 16.73 and minimum and maximum of 15.44 and 17.73 respectively in terms of natural log of the number of deposit accounts. The average number of bank agents in terms of natural log was 7.72 whereas the minimum and maximum number of transactions were zero and 11.02 respectively. The mean of number of ATMs in terms of natural log was 7.68 while minimum and maximum were 6.97 and 7.95 respectively. The average number of mobile money transactions in terms of natural log was 17.6 while the minimum and maximum number of transactions were 14.69 and 18.76 respectively. The table also shows that the average number of deposit taking micro finance institutions in terms of natural log was 1.62 while the minimum and maximum numbers were 0 and 2.56 respectively.

4.4 Pearson's Correlation Analysis

The table below shows the degree of association among the five variables used in the study. Correlation ranges between -1 and 1, where -1 shows a strong negative association and 1 shows a strong positive association while zero shows lack of association between the variables. The correlation between the number of deposit accounts and number of registered bank agents, number of ATMs, number of mobile money transactions and number of registered DTMFIs was strong, positive, and statistically significant as shown in the table below.

Table 4.2 Pearson Correlation Analysis

	Financial Inclusion	Agency Banking	Mobile Money	DTMFIs	ATMs
Financial Inclusion	1				
Agency Banking	.871*	1			
Mobile Money	.957*	.875*	1		
DTMFIs	.941*	.954*	.911*	1	
ATMs	.939*	.910*	.987*	.931*	1

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

4.4.1 Multicollinearity Analysis

Table 4.3 below shows test for multicollinearity among the predictor variables. Variance Inflation Factor (VIF) shows the correlation between independent variables and strength of that correlation. The rule of thumb is that VIF of 1 indicates no correlation among the variables. If VIF is more than 4, this requires further investigation and if more than 10, it shows serious multicollinearity requiring correction. As shown below, except DTMFIs, VIFs were more than 10 and this was corrected by dropping ATMs from the model since it had the highest VIF. As shown in table 4.3, the resultant VIF were less than 10 and hence the model used the three remaining variables.

Table 4.3 Collinearity Diagnostics

	Collinearity	Statistics VIF
No of bank agents	0.097	10.350
No of Mobile money	0.020	48.791
No of DTMFIs	1.08	9.238
No of ATMs	0.14	73.444

4.5 Regression Analysis

Table 4.4 shows the summary of the regression model results. The coefficient of determination (R-Squared) was 0.951. The results show that the independent variables explained 95.1% of change in dependent variable while 4.9% change in the dependent variable was explained by other factors not included in the regression model. Autocorrelation between the variables was measured using Durbin Watson Test. Autocorrelations are model errors which determine whether autocorrelations exist among the variables. Durbin Watson suggested a value of 1 to 4 is considered appropriate while a value of more than 4 shows that the model has significant autocorrelation to results to errors in the model. The Durbin Watson value in this model is 0.33, which is within the acceptable limits for autocorrelations.

Table 4.4 Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin Watson
.975 ^a	.951	.947	.15765	0.330

4.5.1 Analysis of Variance

Analysis of variance (ANOVA) results are presented in table 4.5 below. The table shows the joint effect of various financial innovation variables in explaining financial inclusion in Kenya through F-test. The regression was undertaken at 5% significance level and hence alpha value was 0.05. The alpha value was compared to p value to determine the significance of the model. If the alpha is greater than p value, it is concluded that the model is significant and vice versa. In the table below, p value is 0.000, which is less than the alpha value of 0.05, and therefore it is concluded that the model is significant.

The null hypothesis states that financial innovation has no effect on financial inclusion. In order to reject or fail to reject the null hypothesis, the F critical value from F distribution table at 5% significance level and degrees of freedom of 3 and 36 should be less than or more than F calculated respectively.

The F critical value at 5% significance level and 3 and 36 degrees of freedom is 2.87 which is less than F calculated of 234.673 as shown in the table below. The study therefore rejects the null hypothesis and concludes that financial innovation has an effect on financial inclusion.

Table 4.5 Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.499	3	5.833	234.675	.000 ^b
	Residual	.895	36	.025		
	Total	18.393	39			

4.5.2 Coefficients

Table 4.6 below shows the results of the effect of individual independent variables on the dependent variable. The results indicate that mobile money and number of deposit taking micro finance institutions had a positive and statistically significant effect on the level of financial inclusion. The results show that number of bank agents had a negative and significant effect on financial inclusion.

Table 4.6 Coefficients

	Unstandardized Coefficients		Standardized coefficients	t	Sig	Statistics VIF
	B	Standard error	Beta			
Constant	8.313	1.055		7.878	.000	
No of bank agents	-.039	.016	-.232	-2.360	.024	7.138
No of Mobile Money Transactions	.460	.066	.652	6.991	.000	6.430
No of DTMFIs	.390	.077	.560	5.060	.000	9.078

These coefficients therefore help to explain the relationship between the dependent and the predictor variables and was modelled as follows:

$Y=8.313-0.039X_1+0.390X_2+0.460X_3$ where X_1 =Agency Banking, X_2 =DMFIs, X_3 =Mobile Money Transactions.

The model shows that a unit increase in number of bank agents, reduces the number of deposit accounts by 0.039 units, a unit increase in number of mobile money transactions increases number of deposit accounts by 0.46 units and a unit change in number of deposit taking micro finance institutions increases number of deposit accounts by 0.39 units. Further, holding all factors constant, the level of financial inclusion would be 8.313.

4.6 Discussion of Study Findings

The results of the research showed that the number of deposit accounts with financial institutions grew by 87% from 6.43 million in 2008 to 49.88 million accounts in 2017.

The number of bank agents grew by 84% from 9748 agents in 2011 to 61,290 agents in 2017. The results suggest that a unit increase in number of bank agents decreases financial inclusion by 0.39 units. These findings are contrary to findings by Waihenya (2012) who found that agency banking had a positive effect on financial inclusion. However, the findings were consistent with those of Michele (2016) who found out that agency banking had a negative effect on financial inclusion.

The number of mobile money transactions processed grew by 96% from 21.77 million in 2008 to 1.66 billion in 2017. These transactions included transactions from Mpesa, Airtel Money, Yu cash, Orange Money, Tangaza and Mobikash. The results suggest that a unit increase in number of mobile money transactions increased the level of financial inclusion by 0.460 units. The results of this study are consistent with those of Nato (2010) who found out that mobile money highly contributed to the probability of access to financial services in Kibera Slums.

The number of registered deposit taking micro finance institutions increased by 92% from 1 in 2009 to 13 in 2017. The steady increase in number of these institutions indicates the government's commitment to ensuring the marginalized population has access to formal financial services.

The results indicate that a unit increase in number of registered deposit taking micro finance institutions led to increase in number of deposit accounts by 0.390 units. This was consistent with results of study by Pamela (2016) who found that micro banking enhanced financial inclusion in Kenya.

The number of ATMs increased by 53% from 1325 in 2008 to 2825 in 2017. This was a sluggish growth compared to the other financial innovations partly explained by competition offered by the other financial innovations such as agency banking and mobile banking.

Summary of descriptive statistics of the five variables for the 10-year period shows that number of deposit accounts had a mean of 16.7358 and standard deviation of 0.68675. The number of registered bank agents had a mean of 7.72 and a standard deviation of 4.27768. Number of mobile money transactions had mean of 17.6090 with a standard deviation of 0.97333. Further, number of licensed DTMFIs had a mean of 1.6260 and a standard deviation of 0.98587. The number of ATMs in the country had a mean of 7.6893 and a standard deviation of 0.25993

Regression analysis showed that the independent variables were statistically significant determinants of financial inclusion as evidenced by the strong relationship with the independent variables. The four independent variables explained 95.1% of financial inclusion while 4.9% of financial inclusion was explained by other variables not included in the study. Therefore, financial innovations are very significant and should be considered in effort to increase levels of financial inclusion in the country.

Correlation results indicated that financial inclusion had a strong and positive correlation with agency banking (0.871), mobile money (0.957), DTMFIs (0.941) and AMTs (0.939) Collinearity diagnostics test showed that VIF of variables was above tolerable limit of 10, which required corrections. Since AMTs showed high level multicollinearity with other variables, it was dropped from the model and VIFs values for remaining variables was below 10 which was assessed not to have significant impact on the model. These diagnostics lead to use of only three variables in the model-agency banking, mobile money and DTMFIs.

The joint effect of the financial innovation variables was tested using F-test. As shown in analysis of variance, the F statistic was 234.675 and was statistically significant since p value was 0.000, which was less than alpha value of 0.05. Further, the F calculated was 234.673 while the F critical was 2.87. The overall conclusion was that the model as a whole was statistically significant in jointly explaining the relationship between financial innovation and financial inclusion.

The results of individual effect of financial innovation variables on financial inclusion at 5% level of significance, showed that agency banking had 0.024 level of significance, mobile money had 0.000 level of significance and number of deposit taking micro finance institutions had 0.000 level of significance and thus the two most significant factors in enhancing financial inclusion.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives an overview of the study and includes summary of study findings, conclusions, policy recommendations and suggestions for further research.

5.2 Summary

This section highlights the key findings of the study. The main focus of the study was to establish the effect of financial innovation on financial inclusion in Kenya.

Agency banking was one of the variables in this study. Agency banking was introduced in May 2010 by the Central Bank of Kenya. Commercial banks and Micro Finance Banks have adopted agency banking model as a way of distributing banking services by partnering with existing businesses such as pharmacies, supermarkets etc. The findings indicated that agency banking had a negative and statistically significant impact on the level of financial inclusion in the country. The number of bank agent increased by 84% from 9748 agents in 2011 to 61,290 agents in 2017.

Mobile money transfer services were first introduced in Kenya through Safaricom's M-pesa platform in the year 2007. Thereafter, other platforms joined the market such as Airtel Money, Yu cash among others. The number of mobile money transactions increased by 96% from 21.77 million in 2008 to 1.66 billion in 2017. The results of the study showed that mobile money had a significant and positive effect on the level of financial inclusion.

Micro finance entities existed in Kenya but were not regulated until enactment of Microfinance Act in 2006 which was operationalized in 2008 and subsequent

registration of the first Micro finance bank in 2009. The number of licensed DTMFIs increased by 92% from 1 in 2009 to 13 in 2017. The results of the study showed that number of DTMFIs had a positive and significant effect on the level of financial inclusion.

5.3 Conclusion

The study makes various conclusions based on the results of the study. The finding that there exists a significant negative relationship between agency banking and financial inclusion leads to the conclusion that agency banking model has been adopted by financial institutions as a way of reducing operating costs by providing banking services to areas where it would have been difficult to reach due to high costs of establishing branches or lack of infrastructure. Therefore, the motive by financial institutions is to maximise their profits and not necessarily enhance the level of financial inclusion using the agency banking model of doing business.

The study showed that increase in number of licensed deposit taking micro finance institutions increased the level of financial inclusion. Licensing of micro finance banks by CBK helped to ensure the majority of the population is able to access financial services from the micro finance banks which have mainly set up branches in the rural areas where commercial banks have not been able to reach.

The study also concludes that continued use of mobile money services has significantly enhanced financial inclusion in the country. Most Kenyans are now able to access financial services by use of their mobile phones with help of mobile money platforms. Mobile money has also supported mobile banking which has further enhanced financial inclusion in the country.

5.4 Recommendations

Based on the research findings and conclusions made, several recommendations can be made. Financial institutions should consider using agency-banking model to enhance financial inclusion by promoting opening of deposit accounts through the established agents rather than using the agents mainly for deposits and withdrawal transactions. This way, the financial institutions will increase the number of depositors, which ultimately increases the number of deposit and withdrawal transactions. This will give the financial institutions a sustainable competitive advantage over financial institutions which do not have agency banking model or whose focus is mainly income from transaction fees for deposits and withdrawals.

The study further recommends that the government should consider licensing more micro finance institutions with the directive of operating in areas which are financially excluded from formal financial system. This way, the level of financial inclusion in the country will be significantly enhanced.

The study recommends that financial institutions should focus more on offering banking services through mobile money platforms. The services should not be limited to linking existing accounts to the mobile money but should also include opening bank accounts using mobile money platform. To achieve this, the study recommends that mobile money service providers, financial institutions and the government work closely in ensuring security of the mobile money platforms through enacting the relevant legislations.

The study recommends that the government should develop and support initiatives which enhance responsible financial innovations. This will help break away from the traditional banking system as the only way of accessing financial services.

Finally, the study recommends that all player in the financial inclusion space need to have an understanding of the financial lives of the financially excluded population including how they acquire and utilise their finances. This way, they will be able to design relevant frameworks and financial product and services which meet their needs.

5.5 Limitations of the study

The study relied on secondary data from reports published by CBK as well as data on CBK website. Due diligence was followed in capturing the data, however the accuracy of the data could not be guaranteed that it was free from bias and errors since CBK compiles this data from returns made by financial institutions on quarterly basis.

Agency banking was launched mid-2010, data on number of registered bank agents carrying out agency banking was available for 7 years from 2011 to 2017, and as such, there was limited data to determine if this financial innovation had an effect on financial inclusion.

5.6 Suggestions for further research

This study was not exhaustive in nature and a similar research can be undertaken using different financial innovations such as Shariah Compliant banking and emergency of Credit Reference Bureaus and assess whether the findings will be consistent with or contrary to the findings of this study.

The study was conducted from the Kenyan context as a country. Similar study can be conducted at a broader scope such regional level or on a smaller scope such as county level to ascertain if the findings will be consistent.

A further investigation can be done on these variables over a longer period of study since most the financial innovations are still new in the market so as to compare the research results.

Finally, a similar study can be carried out by triangulation both primary and secondary data to provide a clear picture of what influences financial inclusion in Kenya.

REFERENCES

- Allen, F. (2001). Presidential Address: Do Financial Institutions Matter? *Journal of Finance* 56(4): 1165-1175.
- Andrianaivo, M. & Kpodar, K. (2011). ICT, Financial Inclusion, and Growth: Evidence from African Countries. *IMF Working paper WP/11/73*. International Monetary Fund.
- Arrow, K. (1962). Economic welfare and allocation of resources for invention. In *The rate and direction of inventive activity: economic and social factors*. Princeton University Press.
- Atakora, A. (2013). Measuring the effectiveness of financial literacy programs in Ghana. *International Journal of Management and Business Research* 3(2): 135-148.
- ATISG Report 2010, Innovative Financial Inclusion: Principles and Report on Innovative Financial Inclusion from Access through Innovation. Sub-Group of the G-20 Financial Inclusion Experts
- Awry, D. (2013). Toward a supply-side theory of financial innovation. *Journal of Comparative Economics* 41(2): 401-409.
- Bara, A & Mudzigiri, C. (2016). Financial Innovation and Economic Growth: Evidence from Zimbabwe. *Investment Management and Financial Innovations, Vol 13 (2)*.
- Ben-Horim, M. & Silber, W.L (1977). Financial Innovation: a linear programming approach. *Journal of Banking and Finance* 1(3): 277-296
- Bill and Melinda Gates Foundation (2017). *Financial Inclusion Insights: Applied Research for Digital Financial Inclusion*. Nairobi, Intermedia.
- Boot, A.W & Thakor A.V (1997). Banking scope and financial innovation. *Revised Finance Study*: 10(4): 1099-1131.
- Boro, M. (2017). Effect of Mobile Banking on Financial Inclusion in Kenya. *Unpublished MBA Project*, University of Nairobi.
- Burns, N. & Grove, S. (2009). *The Practice of Nursing Research: Appraisal, Synthesis, and Generation of Evidence*. 6th Edition, Saunders, St. Louis.
- Buttzuge, M.O & Hens. T (2001). An evolutionary approach to financial innovation. *Rev Economic Study* 68(3) 493-522.
- Central bank of Kenya (*Various issues*), Annual Reports, Central Bank of Kenya, Kenya.

- Central Bank of Kenya, Kenya National Bureau of Statistics & FSD Kenya. (2016). *The 2016 Fin Access Household Survey on financial inclusion*. Nairobi, Kenya: FSD Kenya.
- Chithra, N & Selvam, M., Determinants of Financial Inclusion: An Empirical Study on the Inter-State Variations in India (July 19, 2013). Available at SSRN: <https://ssrn.com/abstract=2296096> or <http://dx.doi.org/10.2139/ssrn.2296096>
- Cooper, D. R., & Schindler, P. S. (2003). *Business Research Methods* 8th ed. Boston McGrawHill Irwin.
- Demirguic-Kunt, Asli, Leora Klapper, Dorothe Singer, Saniya Ansar and Jakes Hass. (2018). *The Global Findex Database 2017: Measuring Financial Inclusion and Fintech Revolution*. Washington, DC: World Bank.
- Duffie, D. & Rahi, R. (1995). Financial market innovation and security design.an introduction. *Journal of Economic Theory* 65(1): 1-42.
- Dupas, P. & Robinson, J. (2009). Savings Constraint and Microenterprise Development: Evidence from a field experiment in Kenya. NBER Working Paper 14693, National Bureau of Economic Research, Cambridge, MA.
- Ekmekcioglu, E. & Barak, O (2012). The Effects of Financial Innovation and Development on Monetary Policy. *International Journal of Economics and Finance Studies* 4(2):111-117.
- Goetzmann, W.N & Rouwenhorst, K.G (2005). *The origins of value: the financial innovations that created modern capital markets*. Oxford University Press.
- Harris, M & Raviv, A. (1989). The design of securities. *Journal of Financial Economics* 24(2): 255-287.
- Ho, N. W (2006). *Financial Innovation and its impact on Central Bank Policies*, Monetary Authority of Macao, Macao.
- Holland, J.H (2014). *Complexity: A very short introduction*. Oxford University Press.
- Ignazio, V (2007). Financial Deepening and Monetary Policy Transmission Mechanism, *BIS Review* 124/2007.
- Johnson, S. & Kwak, J. (2012). *Is Financial Innovation Good for the Economy? Innovation Policy and the Economy Vol 12*, University of Chicago Press.
- Johnston, E.T & Mc Connell, J.J (1989). Requiem for a market: analysis of rise and fall of financial futures contract. *Revised Finance Study* 2(1) 1-23
- Kama. U & Adigun. M (2013). *Financial Inclusion in Nigeria: Issues and Challenges*. Central Bank of Nigeria, Abuja Nigeria.

- Kauffman, S., Lobo, J. & Macready, W.G (2000). Optimal search on a technology landscape. *Journal of Economics and Behavioural Organisation* 43(2): 141-166.
- Kenyoru, J. O. (2013). Effect of Financial Innovation on Financial Deepening in Kenya. *Unpublished MBA Project*, University of Nairobi.
- Klapper, L., El-Zoghbi, M & Hess, J. (2016). Achieving the Sustainable Development Goals: The Role of Financial Inclusion. CGAP, Washington DC.
- Khraisha. T. & Arthur, K. (2018). Can we have a general theory of financial innovation process? A Conceptual Review. Available at <https://jfin-swufe.springeropen.com/articles/10.1186/s40854-018-0088-y>
- Lawrence, J.W. (2010). Technological Change Financial innovation and Financial Regulation in the US, the Challenges for Public policy, cited from citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.155.1655.
- Lerner, J. (2006). The New Financial Thing: The Origins of Financial Innovations. *Journal of Finance and Economics* 79(2): 223-255.
- Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of Economic Literature* 79(2): 688-726.
- Leyshon, A. & N. Thrift, (1995). Geographies of Financial Exclusion: Financial Abandonment in Britain and the United States, *Transactions of the Institute of British Geographers, New Series*, Vol. 20, No. 3, pp. 312-41.
- Lumsden, E. (2018). The Future is Mobile: Financial Inclusion and Technological Innovation in the Emerging World. *Stanford Journal of Law, Business and Finance* 23(1).
- Merton, C. (1995). A functional perspective of financial intermediation. *Finance Management* 24(2): 23-41..
- Michelle, A. M. (2016). The Effect of Digital Finance on Financial Inclusion in the Banking Industry in Kenya. *Unpublished MBA Project*, University of Nairobi.
- Misati, R et a.(2010). Financial Innovation and Monetary Transmission in Kenya, *International Research Journal of Finance and Economics*, vol 50, pp.123-136
- Mugenda, O.M & Mugenda, A.G (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.
- Nato, J.W (2011). Financial Innovation and Inclusion: The Case of Mobile Money Transfer among the Urban Poor in Kenya. *Unpublished Master of Arts in Economic Policy and Analysis*, University of Nairobi.

- Ngechu. M. (2004). Understanding the research process and methods. An introduction to research methods. Nairobi: Acts Press
- Ozili, P.K (2018). Impact of digital finance on financial inclusion and stability, *Borsa Istanbul Review*.
- Pamela K. (2016). The effect of Microfinance Banking on Financial inclusion in Kenya. *Unpublished MBA Thesis*, University of Nairobi.
- Poole, M.S & Van de Ven, A.H (1995). Explaining development and change in organisations *Academy of Management Review* 20(3): 510-540.
- Poole, M. S, Van de Ven, A.H, Dooley, K. & Holmes, M.E (2000). Organizational change and innovation process: theory and methods for research. Oxford University Press.
- Polit, D.F, Hungler, B. P & Beck, C. (2001). Essentials of Nursing Research: Methods, Appraisal and Utilisation 5th ed. Philadelphia: Lippincott Company.
- Polit, D. and Hungler, B. (1999). Nursing Research: Principle and Method, 6th ed.; Philadelphia: Lippincott Company, P.P. 416-417.
- Poutanen, P., Soliman, W., & Stahle, P. (2016). The complexity of innovation: an assessment and review of complexity perspective. *The European Journal of Innovation Management* 14(4): 475-495.
- Republic of Kenya (2007). The Vision 2030, Government Printer, Nairobi.
- Sarma, M. (2008). Financial Inclusion and Development: A Cross Country Analysis. Indian Council for Research on International Economic Relations, New Delhi, India.
- Schumpeter, J.A (1934). The Theory of Economic Development. Cambridge: Harvard University Press.
- Shaw, E.S. (1973). Financial Deepening in Economic Development. Oxford University Press, London.
- Shefrin, H. & Statman, M (1993). Behavioural aspects of the design and marketing of financial products. *Finance Management*: 123-134.
- Silber, W.L (1983). The process of financial innovation. *American Economic Review* 73(2): 89-95.
- Thorat, U. (2006). Financial Inclusion and Sustainable Development: Role of IT and Intermediaries, Address to Annual Bankers Conference at Hyderabad on November 4.

- Triki & Faye. (2013). Financial Inclusion in Africa. Ghana: African Development Bank.
- Tufano P (2003).“Financial Innovation” In: Constantinides G, Harris M, Stultz R,(eds) Handbook of the economics of finance. Elviesier, Amsterdam.
- Tuesta, D., Sorensen, G., Haring, A., & Camara, N. (2015). Financial Inclusion and its Determinants: The Case of Argentina. *Working Paper No. 15/03*. Madrid.
- Victor. E (2015). Measuring and Reporting Financial Innovation Performance and its Impact: A Review of Methodologies. Dubai, UAE.
- Wafula, I. M (2017). The Effect of Financial Literacy on Financial Inclusion among Small Scale Farmers in Trans Nzoia County. *Unpublished MBA Thesis*, University of Nairobi.
- Waihenya, M. H (2012). The effect of agent banking on financial inclusion in Kenya. *Unpublished MBA Project*. University of Nairobi.
- Wall, L (2014). Two drivers of financial innovation, notes from the vault. Available on <https://www.frbatlanta.org/cenfis/publications/notesfromthevault.aspx>.
- Yawe, B. L& Prabhu, J. (2015). Innovation and Financial Inclusion: A review of literature. *Journal of Payments Strategy & Systems Vol 9(3)*.