RELATIONSHIP BETWEEN BANK INNOVATIONS AND FINANCIAL INCLUSION AMONG COMMERCIAL BANKS IN KENYA

BY

GRACE MUKAMI NJERU

D63/80653/2012

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN FINANCE, SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI.

NOVEMBER, 2018

DECLARATION

This research project is my original work and has not been submitted to any other University or institution of higher learning for any academic award.

Signed………………………………….Date …………………………………..

GRACE MUKAMI NJERU

D63/80653//2012.

This research project has been submitted for examination with my approval as the appointed University supervisor.

Signed……………………………………….Date ……………………

DR. JOSEPHAT LISHENGA

Senior Lecturer, Department of Finance and Accounting, University of Nairobi

DEDICATION

I dedicate this project to my parents, Mr. & Mrs. Njeru Ithiga for their support both financial and moral throughout my education. I also dedicate it to my husband Julius Kimathi who has been my source of strength and motivation as I undertook this degree program.

God bless you abundantly.

ACKNOWLEDGMENT

I would like to express my gratitude to Dr. Josephat Lishenga for his valuable and constructive guidance as I undertook this research project. My gratitude as well goes to Dr. Mirie Mwangi, Chairman Department of Finance and Accounting, for the assistance in moderating my research proposal.

In general I would like to acknowledge the role played by members of the Department of Finance and Accounting, and all lecturers for their help during the time I undertook this Master's Degree program.

I also wish to thank my parents Mr. & Mrs. Njeru Ithiga, for their support throughout my studies as well as Julius Kimathi, my husband, for his constant encouragement and motivation.

God Bless you.

ABSTRACT

Over a half of the populations in many countries are unbanked despite the benefits associated with financial inclusions (CGAP, 2010).The banking sector in Kenya has continued to embrace financial innovations especially in technology. Automated teller machines have grown a hundred fold between 2001 and 2010 while mobile phone banking transactions increased from 48,000 per annum in 2007 to over 14 million millions of transactions per annum in 2014. During this period there were massive investments by banks in technology based banking. The Central Bank of Kenya has in the recent years introduced several regulatory interventions aimed at increasing financial inclusion in Kenya. The mobile operators and financial institutions have successfully launched numerous technological innovations either to increase the convenience for existing customers or to reach out to new customers. There is evidence of more un-banked people moving into the formal financial grid and money initially circulating in informal systems can now be accounted for. Mobile money has made it much easier to receive and transfer money as well as make payments. The financial inclusion in Kenya has increased 40.5 percent in 2014 from 26.3 percent in 2003. The objective of this study therefore was to establish the relationship between bank innovations and financial inclusion among commercial banks in Kenya. Descriptive research was undertaken and a census was done on all 43 banks of Kenya as listed by the Central Bank of Kenya as at 31st December 2017. A regression model was used to test the relationship between the independent and the dependent variable. The study concluded that mobile banking and automated teller machines do have a positive correlation to financial inclusion with mobile banking innovations having a very strong and significant correlation. Therefore commercial banks need to design strategies that encourages their client to uptake mobile banking. Also, there is need for government to increase and strengthen internet connectivity across all the remote regions in Kenya. The government should also reduce tax on mobile banking as this would encourage mobile banking.

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

According to Ddumba-Sentamu, (2009) financial inclusion provides consumers with diverse products and services and therefore developing economies have adopted policies aimed at providing encouraging financial inclusion in the financial sector. Financial inclusion forms a key pillar in development priorities of both developed and developing economies. This is grounded on the multiple benefits associated with financial inclusion. Financial inclusion takes into the accessibility of financial products by the vulnerable groups in the society and not only at affordable cost but also access to multiple products at a seamless process. Therefore financial inclusion is an integrated process in the society that needs to be encouraged by the state to safeguard the interest of the weak. Bank innovations form the key ingredient of financial inclusion in the financial sector that spans from providing the financial needs of the consumers to offering divers products at a relatively lower cost.

Goetzmann (2009) observed that financial innovation forms an integral component of financial sector. Kenyan financial sector has transformed in its ways of operations spanning many years. This is manifested in the adoption of technologies in transactions. Financial innovations are associated with a number of economic benefits which include lower bankruptcy costs, tax advantages, reduced moral hazard, reduction in regulatory costs, transparency and customer satisfaction (Gorton and Metrick, 2010)

Ahmad (2006) argues that adoption of technology has transformed the financial sector around the globe. Through technology, a number of financial products have evolved ranging from Automated Teller Machines, mobile banking, internet banking and agency banking which provides financial accessibility to a bigger proportion of consumers in the economy. These financial innovations not only reach a big number of consumers but also provide financial services at a lower cost to the people. In Kenya for example, financial liberation has seen emergence of many financial service providers like banks, SME, SACCOS, agency banking which has created stiff completion. To gain a competitive edge, banks have embraced financial innovations to provide affordable financial services and also to reach as many remote areas as possible. Therefore this study will examine the relationship between bank innovations and financial inclusion among commercial banks in Kenya.

1.1.1 Bank Innovations

Financial innovation involves adopting new financial instruments that embrace the modern technology and creating a seamless transaction that provides solutions to consumers (Tufano, 2002). Bank innovation therefore is associated with enhanced services delivery, competitive advantage, and seamless access to financial products, productivity, cost cutting and reduction in moral hazards.

Mobile banking Kenya has revolutionized the financial sector in Kenya to an extent that one can access financial services in the remotes areas in any part of the country. Mobile banking provides a wide range of services that ranges from bank transaction, financial information and stock market, mobile loan, payment of bills, fee payment

etc. Mobile service providers in Kenya boast of wide network distribution in almost all parts of the country hence facilitating remittance of money among the customers. World Bank (2014) noted that developing economies are inadequately supplied with physical infrastructure which excludes consumers from bank's services. Kenya is synonymous with M-Pesa which provides financial service to the people.

Automated Teller Machine (ATM banking) provides a platform for electronic banking outlet which offers a faceless transaction for the consumers. ATM provides a number of services ranging from cash withdrawal, bank statements, and balance inquiry to cash deposits. And this is achieved without an aid of bank employees. This process is cost effective, reliable, saves time and cost effective. Soludo (2008) postulates that automated machines in the banking sector has provided business persons and general public with many business opportunities and financial inclusion.

Online banking also entails use of internet and telecommunication networks to deliver to offer financial services to consumers (Steven, 2002) by using their mobile phones at the comfort of their homes or offices. Like ATM, mobile banking provides customers with a wide range of services that include cash transfers to other account, M-Pesa transaction, bill settlement, balance inquiry and even bulk payment.

1.1.2 Financial Inclusion

Joshi, (2010) defines financial inclusion as the provision of a wide range of financial products at affordable cost and to all segment of the society especially the lower income earners. Ndebbio (2004) further states that financial inclusion should be a transparent and cost effective to include the vulnerable groups in the society. Access

to affordable financial services could spur economic development thereby improving the standard of living of people in the society. Electronic financial Inclusion is the innovative applications of ICT for delivery of financial and payment services and adequate credit where needed, at an affordable cost to the vast section of disadvantaged and low-income groups, who currently are unbanked (Atieno, 2001).

1.1.3 Bank Innovations and Financial Inclusion

Both developing and developed economies aim to provide sound environment for financial inclusion for its citizens. Financial inclusion plays a pivotal role in expanding financial sector and enhancing financial service delivery to all segment of the economy. Bank's innovation that provides access to affordable financial services has influence financial inclusion particularly in Kenya. Agent banking for instance has increased the level of financial inclusion and should be supported by all stake holders (World Bank, 2008).

Kenya has experienced rapid growth in financial services over the years. However, some regions especially with low income earners have been excluded from the financial services. Ndebbio (2004) asserts that a wide range of financial services should be available for all individuals to solve the problem of financial exclusion.

Flaming (2011) observed that cost impedes financial inclusion in the economy. These costs includes cost associated with physical infrastructure in the remote areas to put a bank's branches. In the last decade, there has been an explosion of different forms of remote access financial services, i.e., beyond branches technology in the banking sector. Different channels have been used to provide these services such as mobile

4

phones, automatic teller machines (ATMs), point-of-sale (POS) devices and banking correspondents (agency banking). The branchless channels have made an important contribution to enhancing financial inclusion by reaching people that traditional, branch-based structures would have been unable to reach (Levine, 1997).

1.1.4 Commercial Banks in Kenya

There exists 45 institutions banking institutions in Kenya which are further categorized into 41 commercial banks, 3 mortgage finance companies, one non-bank financial institutions and one building society as at December 2006(CBK, 2014).34 of the commercial banks are locally owned while the foreign banks comprised of 6 locally incorporated and 5 branches of foreign incorporate institutes. Out of the 45 institutions, 34 were locally owned. Local banks dominates the Kenyan banking sector in terms of numbers, but only account for 48.2% of the sector's total assets, closely followed by the foreign owned banks with 43% of the sectors assets. The Kenyan banking sector has continued to record impressive growth in the last few years (CBK, 2014).

According to CBK (2009) the banking sector in Kenya embraced the use of information and communication technologies in service provision. The banks have invested a lot of resources in implementing the self and virtual banking services with the objective of improving the quality of customer service and increasing financial inclusion. These includes mobile banking, core banking solutions, ATMs, and among others. In mid-2005, Kenya's banking Industry moved a milestone by introducing Real Time Gross and Settlement system (RTGS) which was renamed Kenya

Electronic Payment and Settlement system (KEPSS). This will facilitate the inter-bank financial data transfer. The adoption of technology and development of e-banking services is expected to decongest banking halls and reduce the incidences of long queues in banking halls as well as reach the un–banked population (Kenya Bankers Association, 2014).

1.2 Research Problem

Over a half of the populations in many countries are unbanked despite the benefits associated with financial inclusions (CGAP, 2010).Mabrouk and Mamoghli (2010) argue that the influence of bank innovations on financial inclusion has not been given attention because of inadequate understanding about the drivers of adoption of bank innovations and secondly bank innovations 'effect on financial inclusion remains lowly untested by Governments. Over 90 developing countries, representing more than 75% of the world's unbanked population, have signed the Maya declaration (2011). The Maya Declaration is a set of measurable commitments that aim through financial inclusion to improve social and economic conditions of the poorest in society (Maya, 2011).

The banking sector in Kenya has continued to embrace financial innovations especially in technology. Automated teller machines have grown a hundred fold between 2001 and 2010 while mobile phone banking transactions increased from 48,000 per annum in 2007 to over 14 million transactions per annum in 2014. During this period there were massive investments by banks in technology based banking. The Central Bank of Kenya has in the recent years introduced several regulatory

interventions aimed at increasing financial inclusion in Kenya. The mobile operators and financial institutions have successfully launched numerous technological innovations either to increase the convenience for existing customers or to reach out to new customers. There is evidence of more un-banked people moving into the formal financial grid and money initially circulating in informal systems can now be accounted for. Mobile money has made it much easier to receive and transfer money as well as make payments. The financial inclusion in Kenya has increased 40.5 percent in 2014 from 26.3 percent in 2003. The ten percent growth in financial inclusion is as a result of financial innovation (CBK, 2014).

Many local studies on relationship between technological innovations and financial inclusion in Kenya have been done, but the studies are not exhaustive because bank innovations are still at their formative stages and a lot of new developments and new changes are coming up on day to day. Ndome (2011) in a study of agent banking and its adoption in Nairobi only focused on one of the bank innovations and also never focused on its role towards financial inclusion. Nyangosi, *et.al*, (2009) and Barako and Gatere, (2008) studied use of technology in Kenyan Banks but did not find the link between these technologies and financial inclusion.A study by Mwangi (2013) on the influence of bank innovation on financial performance of commercial banks in Kenya did not show the relationship between bank innovations and financial inclusion. Nyangosi and Arora (2011) examined the adoption of information technology in Kenyan banks focusing on services provided through internet and mobile phone banking. No link was sought between IT and financial inclusion in this study.

However, these studies did not discuss the effect of bank innovations on financial inclusion among commercial banks in Kenya. Informed by this knowledge gap, this study sought to establish the relationship between bank innovations and financial inclusion among commercial banks in Kenya. The Project therefore sought to answer the following research question: what is the relationship between bank innovations and financial inclusion among commercial banks in Kenya?

1.3 Research Objective

To establish the relationship between bank innovations and financial inclusion among commercial banks in Kenya.

1.4 Value of the Study

The study may be crucial to the management of commercial banks in Kenya as it will provide answers to the nature relationship between bank innovations they have adopted and financial inclusion in Kenya. This will inform their future investment decisions in choosing the bank innovations to invest more in to increase their competitive advantage as well as contribute to economic development.

The study will provide valuable information to bank executives and policy makers on the need for financial institutions with a view to making strategic decisions.

The study may also be expected to give an insight on the state of bank innovations as a competition between the commercial banks in Kenya towards achieving competitive edge via financial inclusion. Players in the banking sector and telecommunications

industry will find the study useful as they may use the findings to strategize on how they can mutually benefit from this development of bank innovations.

Finally, this study adds to the existing literature on relationship between bank innovations and financial inclusion, and may be a valuable literature for students, academicians, and scholar interested in bank innovations and financial inclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents literature related to the study theoretical and conceptual framework. The chapter is therefore structured into the following subtopics, theoretical review where the Silber's Constraint Theory of Innovation and finance-growth theories are discussed. Thereafter the determinants of financial inclusion and conceptual framework are presented. Later the summary of literature review is presented.

2.2 Theoretical Review

The study will be anchored on the following theories; Silber's constraint theory of innovation and finance-growth theories.

2.2.1 Silber's Constraint Theory of Innovation

Firms undertake financial innovations to reduce constraints that negatively impacts on profitability (Silber, 1975). The theory is anchored on the premise that financial innovations are the primary objective of the profit maximizing financial institutions. Internal and external handicaps have been identified as restrictions to profit maximization. Restrictions are known to reduce efficiency of the financial institutions. Firms that register less profit are associated with little innovations.

Coupled with government regulations and competition, these firms strive to innovate to increase their profitability.

2.3 Determinants of Financial Inclusion

Financial inclusion is a multifaceted concept which involves various economic agents use financial services like money transfer, borrowing, savings. Various parameters are used to determine the nature and level of financial inclusions. These include use of ATMs, mobile banking, debt and credit cards. Electronic payments and mobile banking have transformed financial innovation over time. The debate on financial inclusion has alluded that mere holding of bank account does not constitute financial inclusion. However, the broad sense of financial inclusion should incorporate the aspect of credit access or not. The inability to access credit constitutes exclusion

2.4 Empirical Review

Klapper and Demirguc-Kunt (2012) postulates that innovative process increases the chance of financial or credit access. Countries with a large population who are unbanked has the potential to increase financial inclusion (Federal Reserve System, 2012). The increase in mobile use especially in Kenya has seen the growth of M-PESA since 2007. M-PESA provides user with the ability to pay bills, send money, buy airtime and mobile banking (CCK, 2006). Mobile banking has played a positive role in alleviating poverty and also providing ease of accessing bank services (Fernández-Ardèvol, 2011). Mobile banking is associated reduced cost, increased access to information and transparency in transactions (Fernández-Ardèvol, 2011).

Innovation in technology provides more accurate targeting of sections of the market that has led to restricted access to financial services for some groups. There is a growing dwindle, with an increased range of personal finance options for a segment of high and upper middle income population and a significantly large section of the population who lack access to even the most basic banking services. This is termed "financial exclusion". These people, particularly, those living on low incomes, cannot access mainstream financial products such as bank accounts, credit, remittances and payment services, financial advisory services, insurance facilities, etc. (Soludo, 2008).

According Friedman (1999) internet banking excludes active involvement of Central Bank. Financial inclusion plays redistribution role in the economy by providing avenues for the lower segment earners in the economy. According to Olugbenga and Olankunle (1998), financial inclusion is geared towards providing access to credit for all in the economy. Research Centre (2010) note that, when an agent can both open accounts and facilitate transactions, it not only offers greater incentive for the agent to provide the service to customers, but it encourages customers to use the service as well. If customers cannot transact immediately upon opening an account, they lose the instant gratification of being able to use the account.

Agents enhance financial inclusion by provide platforms for customers to transact their businesses (Tarazi, 2010). An agent should have enough cash and e-money float balances to meet customer cash-in/cash-out requests. When too much cash is taken in, the agent may run out of e-float and not be able to accept more deposits. If there are

too many withdrawals, the agent will accumulate e-float but run out of cash. In either case, customers will get discouraged if the agent cannot provide the services they need when they need them. In addition, a secure mechanism needs to be in place to transport cash needs to and from an agent. It is therefore important to have the agents trained in the field of banking to create an enabling environment for the bank to realize its objectives in the financial world.

Financial agents do provide banks with avenue channel for distributing payments to remote areas. Banks have therefore been keen to use agents as a means of cost-cutting (agents have become the cheapest way to reduce congestion in branches and avoid the fines that are imposed when customers are left waiting in line for more than a certain amount of time) and to increase their client base through geographic expansion (CGAP, 2010).According to CGAP (2010), Brazilian agents handle around 3 billion transactions per year. This comprises just 7% of transactions flowing through the Brazilian banking system but it includes large flows of transactions which are particularly interesting for financial inclusion. Therefore, Brazil has managed to utilize the opportunities which accrue from agency banking.

According to CGAP (2007) banking agents increase convenience of existing customers since very poor, remote clients often do not trust banks, improves indirect branch productivity and efficiency by offering additional points of sale, expanding customer base outside the existing branch network and reducing upfront cost by leveraging existing infrastructure. The study also observed that the cost of

establishing and operating one branch is equal to 40 banking agents. The survey also observed that the benefits of using a bank agent to the client included; access since seemingly no problem of illiterates and the bank agents operate shops and kiosks within the vicinity of the villages or estates, in Brazil, access to finance was increased from 2,623 to 4,444municipalities (89%). Convenience, since less transaction cost to reach point of service, the opening hours of the agent bank are flexible and more than the bank branches.

Wambugu (2011) studied factors influencing the adoption of agency banking by commercial banks in Kenya. The study indicated that increasing customer coverage, enhancing revenue, expanding customer base outside the existing branch network high penetration to the unbanked and diverting customers from the crowded banking halls influence agency banking. This was inferred by the researcher to mean that, the major driving forces of commercial banks while adopting agency banking is increasing the banks operational capacity, while increasing revenues but at the same time reducing the operation cost. Another study in Western Province of Kenya by Dupas, Green, Keats and Robinson(2012) revealed that simply expanding banking services is not likely to massively increase formal banking use among the majority of the poor unless quality can be ensured, fees can be made affordable, and trust issues are addressed.
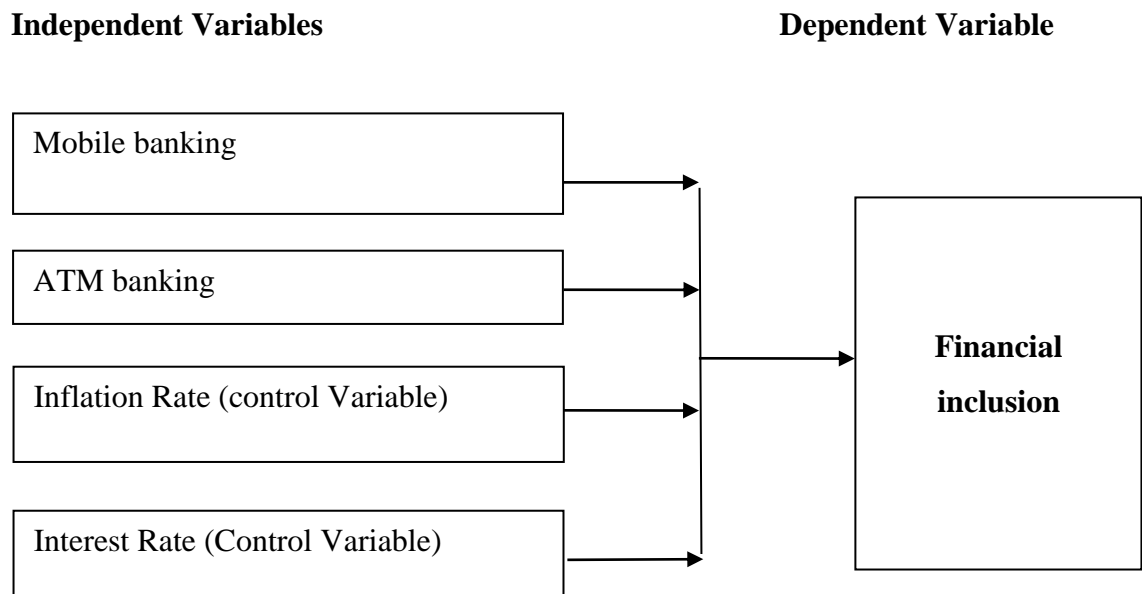
2.5 conceptual framework

Independent Variables   **Dependent Variable**

```
┌─────────────────────────────────┐
│ Mobile banking                  │ ──────┐
└─────────────────────────────────┘       │
                                           │
┌─────────────────────────────────┐       │      ┌──────────────────┐
│ ATM banking                     │ ──────┤      │                  │
└─────────────────────────────────┘       │      │    Financial     │
                                           ├───▶  │                  │
┌─────────────────────────────────┐       │      │    inclusion     │
│ Inflation Rate (control Variable)│ ─────┤      │                  │
└─────────────────────────────────┘       │      └──────────────────┘
                                           │
┌─────────────────────────────────┐       │
│ Interest Rate (Control Variable)│ ──────┘
└─────────────────────────────────┘
```

Figure 2.1 Conceptual Framework

2.6 Summary of Literature Review

Since, most of the previous studies both local (Wambugu, 2011, Nyangosi, 2009 and Mwangi, 2013) and international (World Bank, 2014, Mabrouk and Mamoghli, 2010 and CGAP, 2010) on bank innovations and financial inclusion are theoretical, the study therefore sought to fill the gap in the literature by focusing on the relationship between bank innovations and financial inclusion among commercial banks in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section presents research design, population of the study, data collection and data analysis.

3.2 Research Design

Descriptive research design was used to form the basis of analysis for this study. Descriptive statistics is important in providing more information on the characteristics of the targeted group. The design is important since it allows the researcher to know in details the state of affairs of the variables used in the study (Kothari, 2004).

3.3 Study Population

According to Mugenda and Mugenda, (2003) target population is that population to which a researcher wants to generalize the results of the study. (2004) defined population as the object of interest e.g. households, elements etc. The target population of this study was all the 43 commercial banks in Kenya as provided CBK database as at 31st December 2017.This was a census survey since the whole population was investigated, therefore, no sampling was required.

3.4 Data Collection

Secondary data was used for the purposes of this study. The secondary data was extracted from The World Bank Data Indicators and The Central Bank of Kenya. The study will span 18 years from (2000-2017).

3.5 Data Analysis

Data collected was organized in excel, imported in SPSS and the analysis was done using SPSS. Bank innovations were analyzed using its various components namely; mobile banking and ATM banking. Control variables that might affect the overall outcome of the dependent variable were also included. These Control Variables were Inflation rate and Interest Rate. Descriptive statistics was used where the mean, standard deviation, maximum and minimum values of the variables used were considered. Multiple regression analysis was used to estimate the coefficients of the variables used in the model.

3.5.1 Data Analysis Model

The multiple regression model specification is as follows;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon.$$

+Where; Table 3.1 Study Variables

	Variables	Measure
Y	Financial inclusion	Total number of depositors with Commercial Banks in Kenya measured per 1000 adults
X_1	mobile banking	Total value of transaction through mobile devices in the Kenyan Economy
X_2	Automated Teller Machine (ATM) banking	Total number of Automated Teller Machine transactions (ATM) per 100,000 adults in the Kenyan economy
X_3	Inflation Rate(Control Variable)	This is a control variable that indicates the general Increase in price of goods and services measured by consumer price index
X4	Real Interest Rate(Control Variable)	This is a control variable that will facilitate adjustment for changes in interest rates in the Kenyan economy

Multiple regression models was used to examine the significance of each study's independent variable (bank innovations) in affecting the financial inclusion among

commercial banks (Kothari, 2004). Student-t statistics was used to test if the coefficients were significant at 95% confidence level or not.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents descriptive statistics, correlation analysis, model summary, regression result and interpretation of the findings.

4.2 Descriptive Statistics

The descriptive statics captures the mean and standard deviation of the variables used in the study (Financial inclusion, mobile banking, automated teller machine, inflation rate and interest rate). Table 1 below shows the descriptive statistics for the data used in the study. On average, depositors with commercial banks per 1000 persons was recorded 513.92617 with a standard deviation of 518.538216. Automated teller machine had a mean of 5.82928 per 100, 0000 adults during the study period with maximum value recorded at 9.810. Inflation rate on the average was reported at 26.240% with a standard deviation of 5.2840. During the study period, inflation went as high as 26.240% with a minimum value at 1.961%. Real interest rate had a mean value of 17.813% with a standard deviation of 6.350%. The average value of mobile banking stood at Ksh, 92.4335 billion during the study period with a maximum value at Ksh. 332.622 billion.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Deposits(Per 1ooo persons)	18	39.803	1578.190	513.92617	518.538216
Automated teller machines ATMs (per 100,000 adults)	18	1.123	9.810	5.82928	3.685014
Inflation	18	1.961	26.240	9.44228	5.284092
Real Interest rate	18	-8.010	17.813	7.87156	6.350786
Mobile banking(Ksh billions)	18	.484	332.622	92.43350	113.836178
Valid N (listwise)	18				

Source: Own analysis from SPSS

4.3 Trend Analysis

Trend analysis helps to capture the behavior of the variables used in the study over time. Figure 1 below illustrates that depositors with commercial banks per every 1000 persons has been steadily increasing over time. This can be attributed to financial deepening in Kenya where the financial sector has been liberated by the Kenyan government. Also, financial information is readily available to consumers in the market

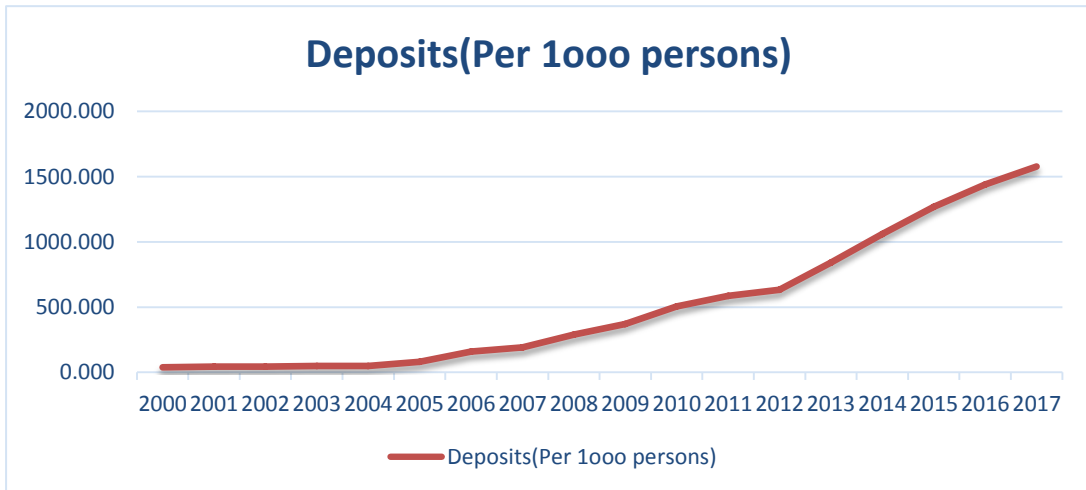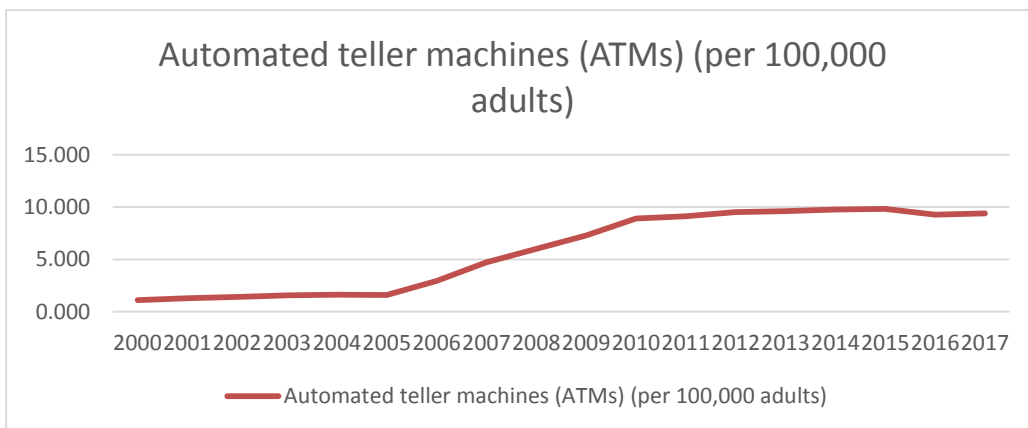**Figure 1: Trend for Deposits**

Figure 2 below indicates that automated teller machines per every 100,000 adults has been on the rise over time.
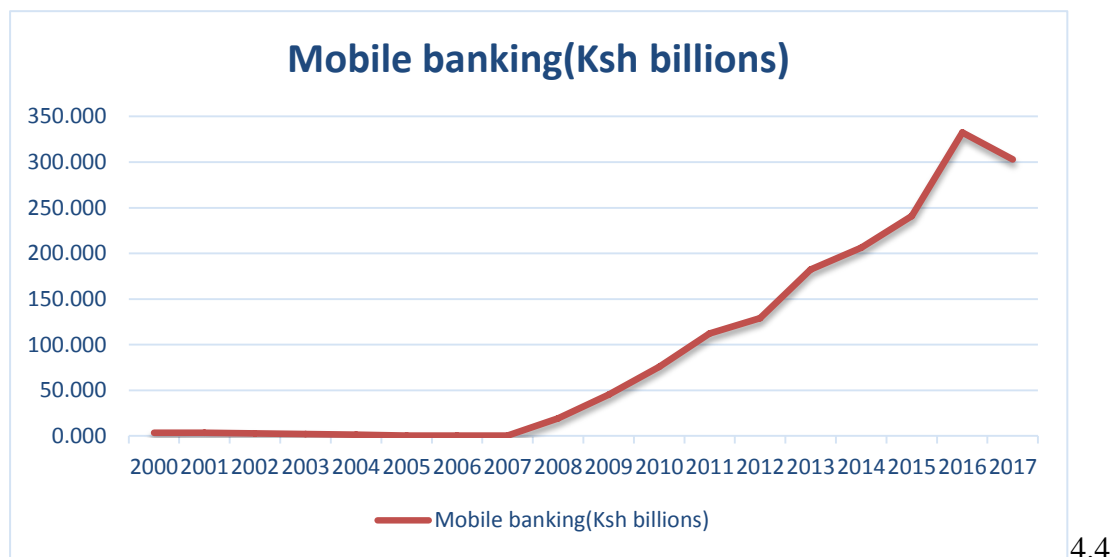
Figure 2: Trend for ATMs

The figure below shows that there is steady increase in mobile banking during the study period. The increase in mobile banking is occasioned by the demand for

convenient and ease in access to fund, improvement in technology and desire by financial institutions to cut on cost.

Figure 3: Trend for Mobile banking

Mobile banking(Ksh billions)

4.4

4.4 Correlation Analysis

Correlation analysis captures the nature and the strength of the relationship between the variables used in the study. Correlation analysis also helps in detecting the presence of serial correlation among the variables. The result presented in table 3 below indicates that relationship between depositors to commercial banks and automated teller machines is strong and positive (R=0.841), the relationship between inflation and deposits to commercial banks is weak and negative (R=-0.237), the association between mobile banking and commercial bank deposits is very strong and positive (R=0.988). Positive relationship implies as commercial banks depositor increases, automated teller machines and mobile banking also increases. However,

23

relationship indicates that as depositors with commercial banks increase, inflation rate will decrease.

Table 2: Correlation Analysis

		Deposits(Per 1ooo persons)	Automated teller machines (ATMs) (per 100,000 adults)	Inflation	Real Interest rate	Mobile banking(Ksh billions)
Deposits(Per 1ooo persons)	Pearson Correlation	1.000				
	Sig. (2-tailed)					
Automated teller machines (ATMs) (per 100,000 adults)	Pearson Correlation	.841[**]	1.000			
	Sig. (2-tailed)	.000				
Inflation	Pearson Correlation	-.237	-.100	1.000		
	Sig. (2-tailed)	.344	.693			
Real Interest rate	Pearson Correlation	.012	-.131	-.690[**]	1.000	
	Sig. (2-tailed)	.963	.603	.002		
Mobile banking(Ksh billions)	Pearson Correlation	.988[**]	.807[**]	-.293	.092	1.000
	Sig. (2-tailed)	.000	.000	.238	.717	

4.5 Regression result

Regression estimation technique was used to estimate the coefficient of the variables used in the model. Ordinary least square estimation was employed and the output comprised of model summary, analysis of variance and coefficient estimates.

4.5.1 Model Summary

Model summary provides coefficient of determination. The coefficient of determination indicates the proportion of dependent variable that is explained by the explanatory variable used in the model. Table 4 indicate R-square of 0.985 implying that 98.5 percent of the total variation in financial inclusion (depositors with commercial banks) is attributed to the changes in the explanatory variables (mobile banking, automated teller machines, inflation rate, interest rate and mobile banking).

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.993[a]	.985	.981	72.360098

a. Predictors: (Constant), Mobile banking(Ksh billions), Real Interest rate, Inflation, Automated teller machines (ATMs) (per 100,000 adults)

4.5.2 Analysis of Variance

Analysis of variable was applied to ascertain whether the model used is appropriate or not. The decision as to whether model fits is based on the F-statistics. F-statistics from table 5 below is statistically significant (Significance < 0.05) therefore we conclude that the model used was good to answer the research objectives.

Table 4: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4502924.204	4	1125731.051	214.999	.000[b]
	Residual	68067.789	13	5235.984		
	Total	4570991.993	17			

a. Dependent Variable: Deposits(Per 1ooo persons)

b. Predictors: (Constant), Mobile banking(Ksh billions), Real Interest rate, Inflation, Automated teller machines (ATMs) (per 100,000 adults)

4.5.3 Regression coefficients

The estimates for the regression coefficient is presented in table 5 below.

Table 5: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	91.692	86.270		1.063	.307
Automated teller machines (ATMs) (per 100,000 adults)	12.458	8.606	.089	1.448	.171
Inflation	.045	4.841	.000	.009	.993
Real Interest rate	-4.980	4.005	-.061	-1.244	.236
Mobile banking(Ksh billions)	4.202	.282	.922	14.894	.000

a. Dependent Variable: Deposits(Per 1ooo persons)

The output indicates that automated teller machines has positive but insignificant effect on depositors with commercial banks. Inflation rate positively impacts on depositors with commercial banks though the effect is insignificant. Real interest rate has a negative effect on depositors with commercial banks but the effect is insignificant. Mobile banking has significant and positive effect on depositors with commercial banks. This implies that a unit increase in mobile banking will lead to 4.202 unit increase in depositors with commercial banks.

4.6 Summary and Interpretation of Findings

The study objective is to examine the relationship between bank innovation and financial inclusion among commercial banks in Kenya. From the findings, there has been a constant rise in the value of mobile banking transactions. Automated teller machines have increased in number but have stabilized from the year 2011.

Descriptive statistics for the model show that, on average, depositors with commercial banks per 1000 persons was recorded 513.92617 with a standard deviation of 518.538216. This implies in concurrence to empirical research, that over the study period, may people moved from being unbanked to being banked and hence the increase in the number of depositors in all commercial banks of Kenya,

Automated teller machine had a mean of 5.82928 per 100, 0000 adults during the study period with maximum value recorded at 9.810. The implication of this is that there was an increase in number of automatic teller machines in Kenya also has shown by the trend on figure 3. This shows that banks are investing in making automated teller machine available in all areas in the country.

Inflation rate on the average was reported at 26.240% with a standard deviation of 5.2840. During the study period, inflation went as high as 26.240% with a minimum value at 1.961%. Real interest rate had a mean value of 17.813% with a standard deviation of 6.350%.

The average value of mobile banking stood at Ksh, 92.4335 billion during the study period with a maximum value at Ksh. 332.622 billion. This implies that many people have embraced mobile banking in Kenya and hence the increased value of transactions as recorder by the commercial banks of Kenya,

From the regression model, the relationship between depositors to commercial banks and automated teller machines is strong and positive (R=0.841), the relationship between inflation and deposits to commercial banks is weak and negative (R=-0.237), the association between mobile banking and commercial bank deposits is very strong and positive (R=0.988). Positive relationship implies as commercial banks depositor increases, automated teller machines and mobile banking also increases. However, relationship indicates that as depositors with commercial banks increase, inflation rate will decrease.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

This chapter entails, summary of the results, conclusion and recommendation based on the results in chapter four.

5.2 Summary

During the study period (2000-2017), on average, deposits per 1000 persons was recorded 513.92617 with a standard deviation of 518.538216. Automated teller machine had a mean of 5.82928 per 100, 0000 adults with maximum value recorded at 9.810. Inflation rate on the average was reported at 26.240% with a standard deviation of 5.2840. Real interest rate had a mean value of 17.813% with a standard deviation of 6.350%. The average value of mobile had a mean of Ksh, 92.4335 billion with a maximum value at Ksh. 332.622 billion. The relationship between banks deposits to commercial banks and automated teller machines was found to be strong and positive (R=0.841), the relationship between inflation and deposits to commercial banks was found to be weak and negative (R=-0.237), the association between mobile banking and commercial bank deposits was very strong and positive (R=0.988).

R-square of 0.985 was recorded and this indicated that 98.5 percent of the total variation in financial inclusion (depositors with commercial banks) was attributed to the changes in the explanatory variables. The regression result showed automated

teller machines, inflation, and real interest rate had insignificant effect on depositors with commercial banks. However, mobile banking had significant and positive effect on depositors with commercial banks. This implies that a unit increase in mobile banking will lead to 4.202 unit increase in depositors with commercial banks.

5.3 Conclusion

The main objective of the study was to establish the relationship between bank innovations and financial inclusion among commercial banks in Kenya.

From the study findings, it was established that mobile banking has a positive and significant effect on financial inclusion in Kenya. This implies that more innovations and regulation needs to be developed around mobile banking so as to achieve higher financial inclusivity in Kenya

For automatic teller machines, they have positive but insignificant effect on financial inclusion in Kenya, therefore, increased innovations will not significantly lead to financial inclusion in Kenya.

Inflation has a negative but insignificant effect on financial inclusion in Kenya. This implies that every time inflation rate increases then the number of depositors decreases. This is because inflation affects the average spending of the common citizen hence leaving them with very little surplus to take to bank. However, the effect of inflation rate on financial inclusion is insignificant.

On the other hand, interest rates have a positive impact on financial inclusion and this implies that whenever interest rates increase then depositors will increase with

Commercial banks of Kenya. This can be attributed to speculation of more interest income with increased savings. However, the effect of interest rates on financial inclusion is insignificant.

5.4 Policy Recommendation

Commercial Banks of Kenya need to design strategies that encourages their client to uptake mobile phone banking. As per the research results show, the innovation that is impacting many Kenyans is mobile banking whereby more innovation in this area leads to bringing more people from being unbanked to being banked.

There is also need for government to increase and strengthen internet connectivity across all the remote regions in Kenya. Mobile banking largely relies on internet connectivity and therefore the government needs to prioritize internet connectivity project throughout Kenya so as to reach as many people as possible.

The government should also introduce legislation that entices Kenyans to consciously undertake mobile banking. This can be by reducing taxes on mobile banking transactions so as to ensure affordability for all and encourage as many Kenyans as possible to undertake mobile banking and in turn promote financial inclusion.

5.5 Limitation of the Study

The use of control variables is done to check whether any other factors other than the ones forming the basis of the study, had an influence on the dependent variable. In this study, the control variables used were not significant. It is thus possible that more relevant control variables could have been used and lack of significance as depicted by T-statistics could have caused alterations in interpretation of the results gotten. Also, more control variables can be included so as to get precision.

Also, time limitation on this study could not allow for more in-depth analysis on the relationship between bank innovation and financial Inclusion among commercial banks in Kenya. At the time, the findings were based on a relatively small sample that may have influenced the nature of the results obtained.

5.6 Recommendations for Further Research.

The banking sector innovations are still at the formative stage and there are new developments coming up every now and then. There is therefore need to conduct a research on how these new developments are promoting financial inclusion. This will assist the banks in coming up with strategies that allow them to focus on innovations that will directly lead to financial inclusion among Kenyans.

The time limitation on this study could not allow for more in-depth analysis on the relationship between bank innovation and financial Inclusion among commercial banks in Kenya. At the time, the findings were based on a relatively small sample that may have influenced the nature of the results obtained. There is therefore a need to

expand on the sample size and carry out similar research in order to draw conclusions and provide information that will aid in policy development

Also, there are many other variables, control variables, other than those used in this study that would impact financial inclusion. A study needs to be done that includes more variables so as to provide banks with information that will allow them attain precision in their strategies.

REFERENCES

Amedu, U. M. (2005). Domestic electronic payment in Nigeria: The challenges. Central Bank of Nigeria Bullion, 29(1), January/March.

Atieno R. (2001), Formal and Informal institutions' Lending policies and Access to *Credit by Small Scale Enterprises in Kenya*. An Empirical Assessment AERC Research Paper

Atieno R. (2001), Formal and Informal institutions' Lending policies and Access to Credit by Small Scale Enterprises in Kenya. An Empirical Assessment AERC Research Paper.

Atman, E. (1993), Corporate Financial distress & Bankruptcy', Malasya, Asia. JohnWiley & Sons.

Beck, T., Demirguc-Kunt, A., and Martinez Peria, M. S. (2007) reaching out: *Access to and use of banking services across countries.* Journal of Financial Economics 85: 234-266.

Berger A. N. & Humprey B. D. (1998), Journal of Banking and Finance, *Federal Reserve Bank of Cleveland, Cleveland Ohio, USA.* CGAP, (2003), *Annual Report'*, CGAP Microfinance publication.

Berger A. N. & Humprey B. D. (1998), Journal of Banking and Finance, *Federal Reserve Bank of Cleveland, Cleveland Ohio, USA.* CGAP, (2003), *Annual Report'*, CGAP Microfinance publication.

Bhattacharya, S. and A. Thakor (1993), ''Contemporary Banking Theory,'' *Journal of Financial Intermediation 3, 2-50.*

Board of Governors of the Federal Reserve System. (2012). *Consumers and Mobile Financial Services.* Washington: Board of Governors of the Federal Reserve System.

Bringham, E. and Gapenski, L. (1993). Intermediate Financial management 4th Edition Orlando; The Dryden press

CBK. (2013). *Bank Supervision Annual Report*, Kenya, Government Press

Central Bank of Kenya (2009), Annual report

Consultative Group to Assist the Poor (CGAP), (2009). Notes on regulation of branchless banking in Washington D.C

Consultative Group to Assist the Poorest [CGAP] (2009). Financial Access 2009: *Measuring Access to Financial Services around the World*

Cooper, D.R., & Schindler, P.S. (2011). *Business Research Methods,* 11th, edition. McGraw-Hill Publishing, Co. Ltd. New Delhi-India.

Denscombe, M. (2008). Communities of Practice: A Research paradigm for the Mixed Methods Approach. *Journal of Mixed Methods Research*. 2(3) 270-283.

Diamond D. and P. Dybvig, (1983). Bank runs, deposit insurance, and liquidity. Journal of Political Economy 91 (June): 401–19

Dillon, A., & Morris, M. (1996). User acceptance of new information technology: theories and models. *Annual Review of Information Science and Technology, Medford (NJ), 31*, 3-32.

Fernández-Ardèvol, M. (2011). *Mobile Communication and Socio-Economic Development: A Latin American Perspective*.

Flaming, Mark, Claudia McKay, and Mark Pickens. 2011. "*Agent Management Toolkit*: *Building a Viable Network of Branchless Banking Agents*." Technical Guide. Washington, D.C.: CGAP, February.

Freixas, X. and J.C. Rochet (1998), Microeconomics of banking, MIT Press.

Ibeachu, E. H (2010). Comparative analysis of financial inclusion: A study of Nigeria and the UK, .Master Degree Thesis in International Business Leeds Metropolitan University Faculty of Business & Law

Klapper, L., & Demirguc-Kunt, A. (2012). *Measuring Financial Inclusion: The Global Findex Database.* World Bank Policy Research Paper 6025. Washington: World Bank.

Kleijnen, M., de Ruyter, K., Wetzels, M. (2007), "An assessment of value creation in mobileservice delivery and the moderating role of time consciousness", Journal of Retailing, Vol. 83 No.1, pp.33-46.

Kothari, C.R. (2004). *Research methodology: methods and techniques*, (2[nd]ed.). New Delhi. New Age International (P) Limited.

Levine R. (1997) *financial development and economic growth*: views and agenda Journal of economic Literature

Levine R. (1997) *financial development and economic growth*: views and agenda Journal of economic Literature

McAteer, M. (2008). Tackling financial exclusion: Ethical solutions. The Financial Inclusion Centre. Glasgow Caledonian University. Pp.12-14.

McKay, C., & Pickens, M. (2010). *Branchless Banking 2010: Who's served? At What Price? What's Next?* Washington: Consultative Group to Assist the Poor.

Mugenda, O. &Mugenda, A. (2008). *Research methods quantitative and qualitative approaches*. Nairobi: Acts Press.

Ndebbio J, 2004, Financial deepening, economic growth and development: Evidence from selected sub- Saharan African countries, African Economic Research Consortium (AERC) Research Paper 142, Nairobi, Kenya.

Nwachukwu, T.E and Odigie, P. (2009) What Drives Private Saving in Nigeria. A Paper Presented at the Centre for the Study of African Economies (CSAE) Conference, University of Oxford held on 23rd March, 2009.

Olugbenga S, and. Olankunle A.P, (1998) *Bank Performance and Supervision in Nigeria*: Analysing the Transition to a Deregulated Economy, African Economic Research Consortium

Porteous, D. (2006). *The Enabling Environment for Mobile Banking in Africa.* Boston: Department for International Development.

Rogers, E.M. (2003). *Diffusion Innovation* (5th Ed.) New York: the Free Press.

Sanusi, L.S. (2010). Developments in the banking system in Nigeria. Central Bank of Nigeria. An Address to Member of the Press. pp. 1-4. Retrieved August 2, 2011from: http://www.bis.org/review/r090922b.pdf

Serrao M, A.H. Sequeira and B.V. Hans (2012). Designing a Methodology to Investigate Accessibility and Impact of Financial Inclusion (March 18, 2012).

Soludo, C.C. (2008). Making finance work for the poor. A lecture delivered at the Federal University of Technology, Owerri, and Imo State. Retrieved August 6 2011, from http://www.cenbank.org/out/Speeches/2008/Govadd25-2-08.pdf

World Bank (2008) *banking the poor*: Measuring banking Access in 54 economies: Washington D.C, Worldbank

World Bank. (2014). *Information and Communication for Development 2012: Maximizing Mobile.* Washington: World Bank.

APPENDICES

APPENDIX I: LIST OF COMMERCIAL BANKS IN KENYA

1. African Banking Corporation Limited
2. Bank of Africa Kenya Limited
3. Bank of Baroda (K) Limited
4. Bank of India
5. Barclays Bank of Kenya Limited
6. CfC Stanbic Bank Limited
7. Charterhouse Bank Limited
8. Chase Bank (K) Limited
9. Citibank N.A Kenya
10. Commercial Bank of Africa Limited
11. Consolidated Bank of Kenya Limited
12. Co-operative Bank of Kenya Limited
13. Credit Bank Limited
14. Development Bank of Kenya Limited
15. Diamond Trust Bank Kenya Limited
16. Ecobank Kenya Limited
17. Equatorial Commercial Bank Limited
18. Equity Bank Limited
19. Family Bank Limited
20. Fidelity Commercial Bank Limited
21. Guaranty Trust Bank (K) Ltd
22. First Community Bank Limited
23. Giro Commercial Bank Limited
24. Guardian Bank Limited
25. Gulf African Bank Limited
26. Habib Bank A.G Zurich
27. Habib Bank Limited
28. Imperial Bank Limited

29. I & M Bank Limited

30. Jamii Bora Bank Limited

31. Kenya Commercial Bank Limited

32. Sidian Bank Limited (Formerly K-Rep Bank)

33. Middle East Bank (K) Limited

34. National Bank of Kenya Limited

35. NIC Bank Limited

36. Oriental Commercial Bank Limited.

37. Paramount Universal Bank Limited

38. Prime Bank Limited

39. Standard Chartered Bank Kenya Limited

40. Transnational Bank Limited

41. UBA Kenya Bank Limited.

42. Victoria Commercial Bank Limited

43. HFC Limited

APPENDIX 2: SUMMARY OF DATA USED FOR REGRESSION

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_{3} + \beta_4 X_{4} + \varepsilon.$					
Year	No. of Deposits(Per 1ooo persons) Source:The World Bank Data Indicators(Y)	No. of Automated teller machines (ATMs) (per 100,000 adults) Source:The World Bank Data Indicators(X2)	Inflation Rate Source:The Central Bank of Kenya(X3)	Real Interest rate Source:The World Bank Data Indicators(X4)	Mobile banking(Ksh billions) Source:The World Bank Data Indicators(X1)
2000	39.80	1.12	9.98	15.33	3.77
2001	44.67	1.31	5.74	17.81	3.51
2002	45.98	1.43	1.96	17.36	2.83
2003	49.89	1.58	9.82	9.77	2.07
2004	50.94	1.63	11.62	5.05	1.58
2005	83.12	1.60	10.31	7.61	1.07
2006	159.52	2.96	14.45	(8.01)	0.72
2007	191.92	4.71	9.76	4.82	0.48
2008	290.85	5.99	26.24	(0.98)	19.27
2009	372.66	7.27	9.23	2.84	45.37
2010	506.22	8.91	3.96	12.03	75.87
2011	588.39	9.10	14.02	3.83	112.33
2012	633.54	9.51	9.38	9.63	129.28
2013	841.55	9.60	5.72	11.38	182.50
2014	1,061.12	9.75	6.88	7.82	206.34
2015	1,270.26	9.81	6.58	5.51	240.99
2016	1,442.03	9.27	6.30	9.23	332.62
2017	1,578.19	9.38	8.01	10.68	303.21
N-18Years					