

**Strathmore**  
UNIVERSITY

**IMPACT OF MOBILE BANKING ON THE BANK PROFITABILITY  
OF KENYAN COMMERCIAL BANKS.**

**REMULO KRISTEN IJEOMA.**

**082306**

**Submitted in partial fulfillment of the requirements for the Degree of  
Bachelor of Business Science in Finance at Strathmore University**

*School of Finance and Applied Economics*

**Strathmore University**

**Nairobi, Kenya**

**January, 2018**

## DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Proposal itself.

© No part of this Research Project may be reproduced without the permission of the author and Strathmore University

Remulo Kristen Ijeoma ..... [Name of Candidate]  
KRulo ..... [Signature]  
26/2/2018 ..... [Date]

This Research Project has been submitted for examination with my approval as the Supervisor.

..... [Name of Supervisor]  
..... [Signature]  
..... [Date]

Strathmore Institute of Mathematical Sciences  
Strathmore University.

## DEDICATION.

I dedicate this research project to the Higher Being that watches over us for the gift of life and the determination and will to accomplish this research. It is also to my family and friends for all their love and encouragement.



## ACKNOWLEDGEMENT.

This research project would not have been possible without the support, help and cooperation of a number of people who in more than one way steered me in the path towards my ultimate goal. I would like to express my gratitude to them and especially to the following;

First and foremost, many thanks to Ms. Muthoni Ng'ang'a, my project supervisor for her constant guidance, advice and encouragement throughout the research period. As much as finance was not a cup of tea for her, she kindly read the paper and offered detailed advice on grammar, organization, and the theme of the paper.

Secondly, I wish to acknowledge the contribution of some of my classmates who offered insights on how to carry out the data collection, data analysis and the likes in order to make this project a reality. Not forgetting, many thanks to all the other professors who through their lectures impacted knowledge that made this research report possible

Last but not least, I would like to express utmost gratitude to family for their encouragement during trying times and the Almighty for granting me the needed strength, knowledge that enabled this project outcome.

To all, I remain forever grateful.

## **ABSTRACT.**

This study sought to determine the impact of mobile banking on the financial performance of commercial banks in Kenya during a period of seven years. The need for convenient and out-of-bank banking seems to be the force behind mobile banking. This is the reason for the heavy investment in technological adaptation. This is because, mobile banking offers millions of people with access to a cellphone, the ability to carry out banking transactions without having to physically be in the bank.

This was a causal study. It analyzed a sample of 7 out of the 43 commercial Banks in Kenya for a period of six years between 2010 through 2016. This was because most banks introduced the mobile banking service by around 2012. The secondary data was drawn from the annual reports of the Central bank of Kenya, the financial statements of the commercial banks and the investor annual reports. Data analysis involved multiple regressions of variables under study. That is, the financial performance represented by return on assets, the number of registered mobile banking customers by the banks, the number of mobile banking transactions by the banks and the loan amounts disbursed through mobile banking.

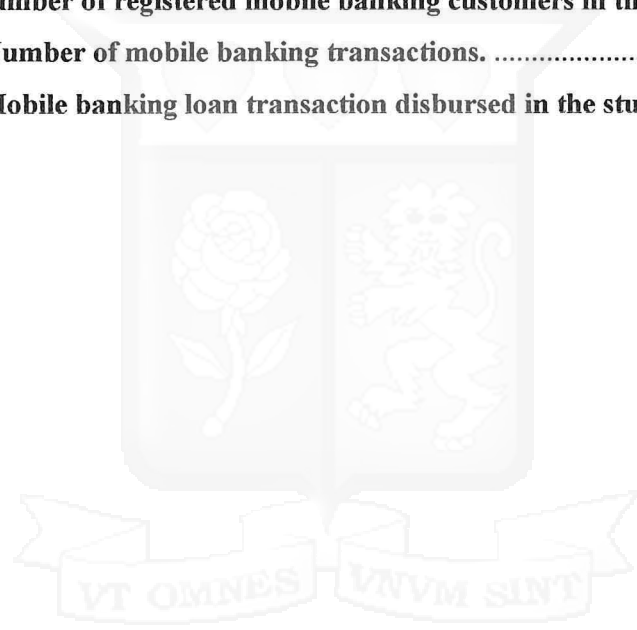
From the regression model of 6 years, the study found evidence of a positive relationship between mobile banking and bank performance. It can be concluded that mobile banking does lead to increased revenues based on the summary of findings. The mobile banking transactions as well as total mobile banking loans disbursed measured by the banks have a positive relation to the return on asset (ROA). This means that, a unit increase in each or all would result in an increase in the profitability performance indicator ROA. The results show that mobile banking has a moderate influence on profitability.

The study recommends that policy makers, such as the monetary policy committee (MPC), take mobile banking adoption into consideration when drafting policies on the operations of banks in Kenya. This is because of the direct relationship between mobile banking and financial performance as the banking sector moves into a technologically competitive environment. Policy makers should keep a keen eye on the developments of mobile banking as it is a new platform for competition among commercial banks so as to not lose its regulatory role.

## **Table of Contents.**

<b>DECLARATION</b> .....	1
<b>DEDICATION</b> .....	2
<b>ACKNOWLEDGEMENT</b> .....	3
<b>ABSTRACT</b> .....	4
<b>LIST OF ABBREVIATIONS</b> .....	7
<b>LIST OF TABLES</b> .....	8
<b>LIST OF FIGURES</b> .....	9
<b>CHAPTER 1: INTRODUCTION</b> .....	10
<b>1.1. BACKGROUND TO THE STUDY</b> .....	10
<b>1.1.1. Mobile Banking</b> .....	11
<b>1.1.2. Financial Performance of Commercial Banks</b> .....	14
<b>1.1.3. Total registered mobile banking customers</b> .....	16
<b>1.1.4. Number of mobile banking loans and transactions</b> .....	17
<b>1.1.5. Financial performance of commercial banks</b> .....	18
<b>1.2. PROBLEM STATEMENT</b> .....	19
<b>1.3. RESEARCH OBJECTIVES</b> .....	20
<b>1.4. RESEARCH QUESTIONS</b> .....	20
<b>1.5. SIGNIFICANCE OF THE STUDY</b> .....	20
<b>CHAPTER 2: LITERATURE REVIEW</b> .....	21
<b>2.1. THEORETICAL FRAMEWORK</b> .....	21
<b>2.1.1. Financial Intermediation Theory</b> .....	21
<b>2.1.2. The Market Power Theory</b> .....	22
<b>2.1.3. Innovation Diffusion Theory</b> .....	23
<b>2.2. EMPIRICAL FRAMEWORK</b> .....	24
<b>2.2.1. Summary of Literature Review</b> .....	27
<b>CHAPTER 3: RESEARCH METHODOLOGY</b> .....	28
<b>3.1. Research Design</b> .....	28
<b>3.2. Measurement of the study</b> .....	29
<b>3.2.1. The independent variables;</b> .....	29
<b>3.2.2. The dependent variables;</b> .....	29
<b>3.3. Population and Sampling Techniques</b> .....	30
<b>3.4 Data Collection Techniques</b> .....	30

3.5. Data Analysis .....	31
<b>CHAPTER 4: RESULTS, FINDINGS AND DISCUSSION. ....</b>	<b>33</b>
4.1. ANALYSIS.....	33
4.2. FINDINGS AND DISCUSSIONS.....	34
<b>CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS. ....</b>	<b>37</b>
5.1 SUMMARY AND CONCLUSION.....	37
5.2 POLICY RECOMMENDATIONS. ....	38
5.3. LIMITATIONS TO THE STUDY. ....	39
5.4. AREAS FOR FURTHER RESEARCH. ....	40
<b>APPENDICES. ....</b>	<b>41</b>
Appendix I: List of Commercial Banks in Kenya. ....	41
Appendix II: Number of registered mobile banking customers in the study. ....	43
Appendix III: Number of mobile banking transactions. ....	43
Appendix IV: Mobile banking loan transaction disbursed in the study. ....	44



## **LIST OF ABBREVIATIONS.**

ATMs	- Automated Teller Machines
CBA	- Commercial Bank of Africa Limited
CBK	- Central Bank of Kenya
DTB	- Diamond Trust Bank Limited
ICT	- Information Communication and Technology
KCB	- Kenya Commercial Bank Limited
Ksh	- Kenya Shilling
M-banking	- Mobile banking
MPC	- Monetary Policy Committee
NIM	- Net Interest Margin
ROA	- Return on Assets
ROE	- Return on Equity
SMS	- Short message services



## LIST OF TABLES.

Table 4.1: Model regression summary.....34



## LIST OF FIGURES.

Figure 4.1: Total registered mobile banking customers.....	16
Figure 4.2: Total mobile banking loans and transactions.....	17
Figure 4.3: Total return on assets (ROA).....	18



## **CHAPTER 1: INTRODUCTION.**

### **1.1.BACKGROUND TO THE STUDY.**

Integration of the financial sector with the technological sector has brought about applications that ease the banking industry. Mobile banking is one of the results of the evolution of these sectors. The banking industry in itself is a main sector of every robust economy and if it were to collapse, amongst other factors, so would the economy as seen from the previous financial crises (Abubakar and Tasmin, 2012).

Mobile banking platforms, more often referred to as m-banking is the provision of banking services using a mobile phone (Porteous 2007). Tiwari, Buse, and Herstatt (2006) point out that mobile banking is most often performed via short message services (SMS) or mobile internet, but can also be accessed through applications that are downloaded and installed onto the phone.

The last few years have witnessed a great success in the banking sector (Khrawish and Al-Sa'di, 2011). With the passing years, increasing globalization, competition and innovation in the banking industry is as a result of the banks trying to offer their services in line with the Information Technology way. This has proven to be the major enabler that has helped these commercial banks to integrate their regional or worldwide operations (Anandarajan et al., 2000).

### **1.1.1. Mobile Banking.**

Mobile banking platforms work in such a way that the currently unbanked people are indirectly targeted through the convenience that is offered by them. M-banking facilitates quicker and economical money transfer. To add on, it leads to increasing the volume of trade and access to finance for a large portion of the unbanked in developing countries (Kiprop et al., 2016).

Mobile Banking provides a number of advantages for both banks and customers. It reduces the geographical limitation to customers and therefore bringing convenience. There is also no time limitation as some transactions can even be carried out at night. It also provides efficient cash management and security of an individual's cash.

Apart from the convenience offered, another factor to consider with the integration of mobile banking platforms would be market concentration and their diffusion. According to Hannan and McDowell (1984), market concentration is found to have a positive effect on both the rate of diffusion of a new technology and the proportion of firms having that innovation. Market concentration is as a result of the ease of downloading these mobile banking applications. To add on, it is enhanced by the accessibility of banking services to those users without smartphones and the quick sign-up of a new user. This would then give the bank an idea of success or failure rate from the introduction of the mobile banking service.

The Kenyan Banking industry has witnessed many changes since the introduction of mobile banking. Customers now have efficient, fast and convenient banking services delivered through the mobile-banking platform innovations. Quite a number of banks have innovated and adopted various M-banking products to suit their banks. Some of the examples include; the Equitel application by Equity bank, KCB Mobi, Co-operative Bank, Standard Chartered, Diamond Trust Bank, Commercial Bank of Africa and African Banking Corporation mobile banking application which are the main areas of study on this research paper rather than the total 43 commercial banks in Kenya.

These samples of 7 Kenyan commercial banks have implemented the use of the mobile banking platform applications within the country. The m-banking services were introduced by the respective banks in order to rival Safaricom's M-Pesa application's longstanding dominance with the changing times. Each of the chosen banks

lies within each of the three tiers of bank categories. Also noting that, there was an increase in the Kenyan economy money supply. In the nine months to September 2016, Sh2.46 trillion was transacted via mobile money (Muthoki, 2017).

KCB unveiled KCB M-Benki in 2012. It was advantageous at that time in the banking sector in that the application, was able to send money to any Kenyan mobile number as well as purchase airtime amongst other advantages(KCB Bank, 2017) later on, in 2014, it introduced KCB Mobi.

African Banking Corporation has not yet started offering the mobile banking service. They have, however, improved on their internet banking. This bank is placed in the research as an observation of the effect of not having mobile banking.

Commercial Bank of Africa rolled out the mobile banking application on 27<sup>th</sup> of November 2012 through the product M-Shwari. This was a collaboration between the bank and Safaricom Ltd. In order to provide banking services and especially loan services to the unbanked population in Kenya. In 2017, the bank also introduced CBA Loop to target the youth and encourage mobile banking.

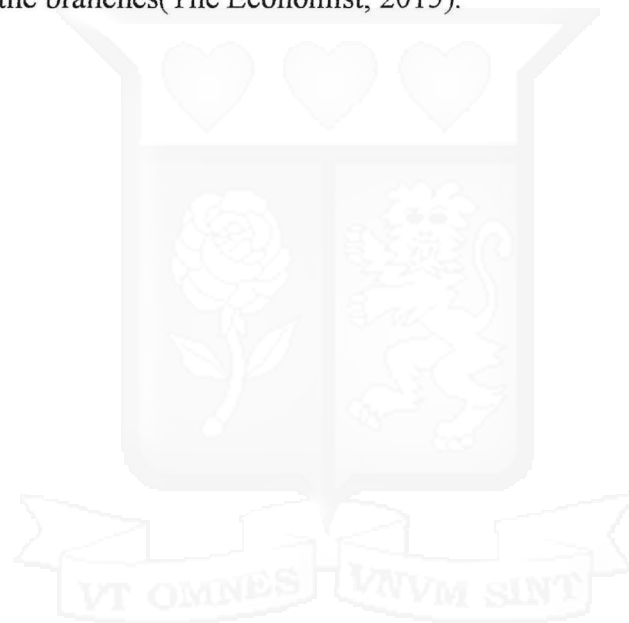
Diamond Trust Bank unveiled its mobile banking application DTB-Mobile on 2016. It is among the late introducers of the service. Information on the results of their application has not yet been published.

Equity bank also saw the importance of technology within the banking industry. The Equitel application was unveiled in 2014. To add on, the bank loaned their Equitel subscribers money to purchase dual-sim smartphones. This was in order to carry out their transactions faster without necessarily forcing them to abandon their previous telecommunication service provider. The bank's person-to-person money transfer value was at about 15% valued at approximately \$630 million. It was also reported that Equitel's 1.7 million customers had transacted over Sh115 billion in 2015 compared to Sh4.7 billion in 2014. This was as a result of the use of the mobile banking application(Equity Bank GroupBlog, 2015).

Standard Chartered Bank introduced the mobile banking application on December 2015/ January 2016 as most of the commercial banks had adopted this technology.

Co-operative Bank introduced its mobile banking application MCo-op Cash on August 2014.

Mobile money has become an integral part of commerce in Kenya over the last decade. It has been an attempt to generate market share of unbanked customers and to add on, it has improved the operations of the banks. As a result, m-banking has brought about various advantages such as; increase in loan transactions for these commercial banks. This is because, loan transactions are carried out more times through the applications than physically within the branches (The Economist, 2015).



### **1.1.2. Financial Performance of Commercial Banks.**

According to Greenwood and Jovanovic (1990), financial performance is a subjective measure of how well an organization can use assets or the capital employed from its primary mode of business and thereafter generate revenue. Profit is always the ultimate goal. The term financial performance can also be used to describe the measure of a firm's overall financial health over a period of time and can thus be a basis of how the firm would be performing against others within the same industry.

There are various ways of measuring profitability or rather the financial performance. Items such as revenue from operations, operating income or cash flow from operations can be used, as well as total unit sales (Jayawardhena & Foley, 2000). To measure the profitability, there is a number of performance ratios used. Return on Asset (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) are the major ratios that are used (Popovici, Turliuc et al, 2015).

Return on Assets is the main ratio used to indicate the profitability of a bank. It is a ratio of Income or rather pre-tax profits to the total assets (Khrawish, 2011). It measures the ability of an organization to generate income by utilizing the company assets at their disposal.

Return on Equity is another financial performance ratio that indicates how much net profit or after-tax profit a company earned compared to the total amount of shareholder equity invested as per the balance sheet. This is what the shareholders look for in return for their investment (Popovici, Turliuc et al, 2015).

Net Interest Margin is the measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders, relative to the amount of their assets. It is usually expressed as a percentage of what the financial institution earns on loans in a specific time period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which it earned income in that time period (the average earning assets) (Khrawish, 2011).

Mobile banking has truly changed the way the banking sector works within the recent decades. The use of m-banking has contributed to improved bank performance, in terms of increased market share, customer satisfaction, expanded product range, customized

products and better response to client demand. It has minimized time spent in bank waiting lines as well as reducing the distance to the nearest bank branches Simpson (2002).

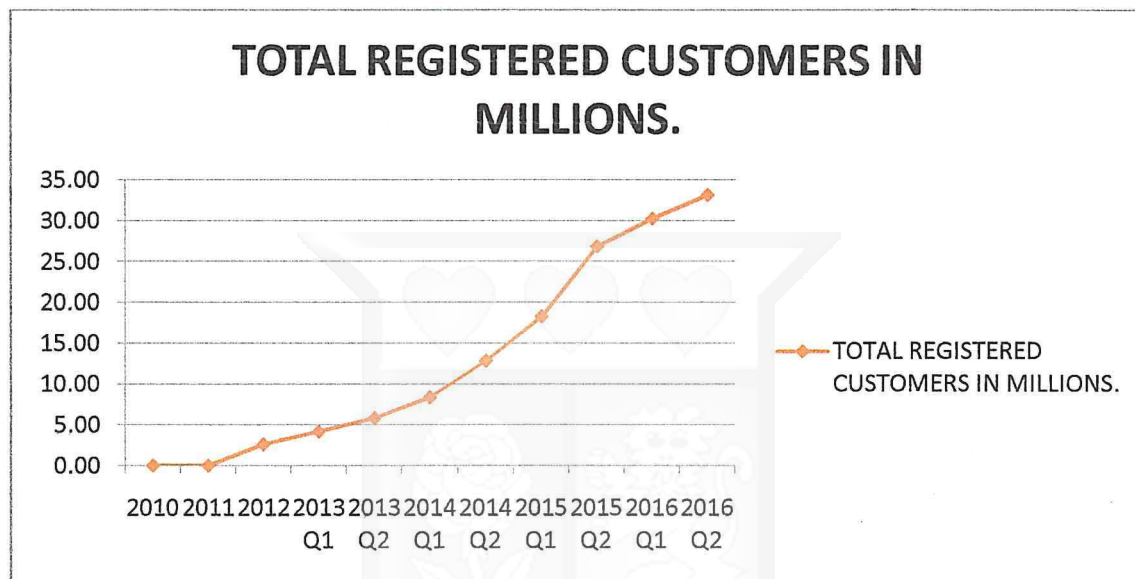
As a successful strategic tool in terms of customer retention, ultimately it leads to the profitability of the bank. Simpson (2002) also suggests that mobile banking is driven largely by the prospects of minimization of operating costs and maximization of operating revenues. A comparison of mobile banking in developed and emerging markets reveal that in developed markets it has brought about lower costs and higher revenues which are more noticeable.



### 1.1.3. Total registered mobile banking customers.

The study sought to find out developments in the number of registered mobile banking users among the sample 7 commercial banks since its inception. The findings were as shown in the figure 1.1 below;

**Figure 1.1: Total registered mobile banking customers.**



**Source: Own computation results, 2017.**

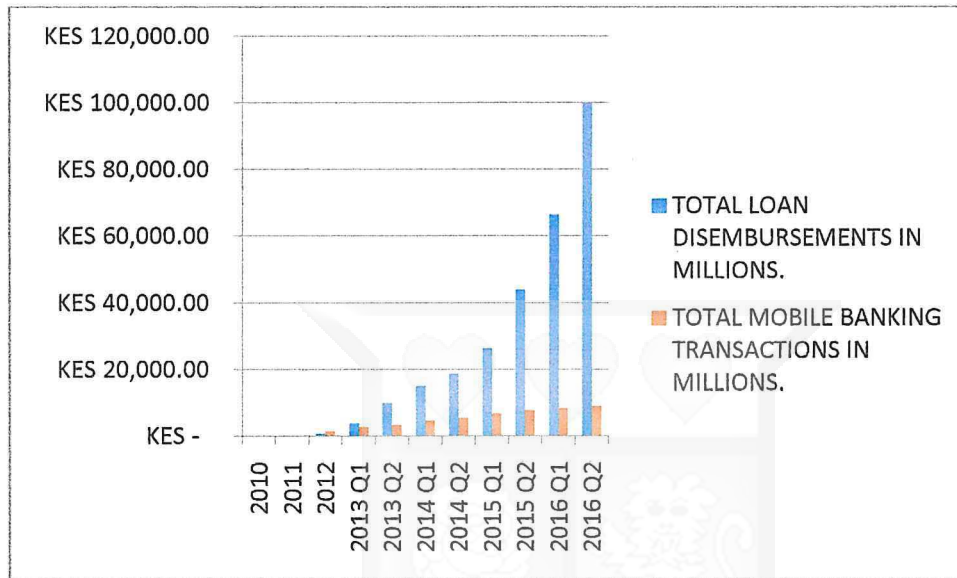
From the findings presented, in the inception year 2010 shown as observation 1, there was no registered number of mobile banking customers. Soon after, in 2012, the number of registered customers increased to 2.6 million. The positive trend in the number of customers grew steadily from year to year to close at 33.15 million customers as per the period ended 2016 quarter 2.

These findings show that as time lapsed, the number of mobile banking users increased. Commercial banks now start enjoying economies of scale as more and more customers adopt mobile banking. This affects banking operations especially in minimizing costs as the number of customers visiting the banks to transact may have tremendously reduced. The adoption of mobile banking also contributes positively to improved customer service and satisfaction.

#### 1.1.4. Number of mobile banking loans and transactions.

The study sought to find out developments in the number of mobile banking transactions and mobile banking loans disbursed among the sample 7 commercial banks since its inception. The findings were as shown in the figure 1.2 below;

**Figure 1.2: Total mobile banking loans and transactions.**



**Source: Own computation results, 2017.**

From the findings illustrated in the figure 1.2 above, the research project determined that at the start of the study, in 2010, the total loan disbursed as well as transactions carried out through mobile banking was Ksh. 0.

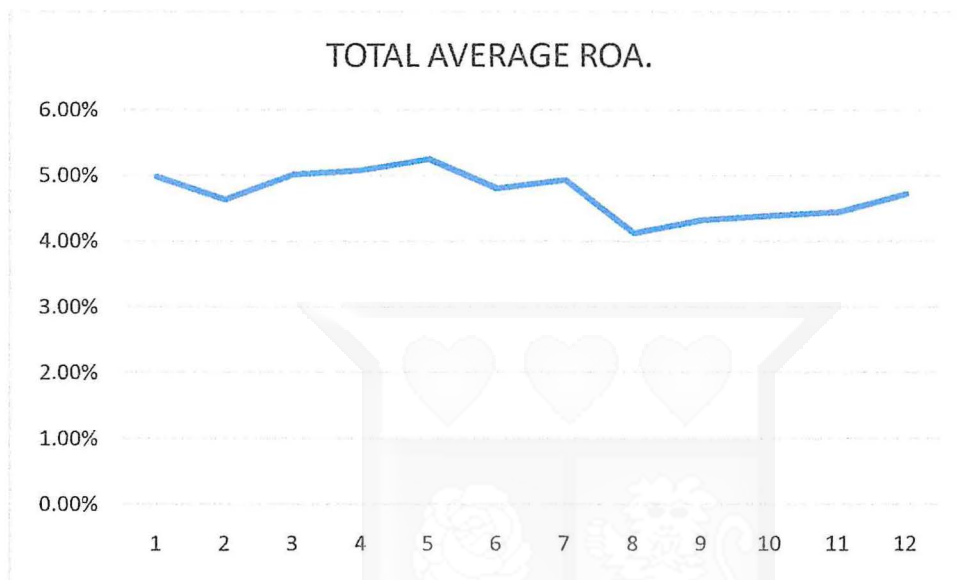
This figure then grew, in 2013, to a total of 1 Billion Ksh in loan disbursement and 1.5 Billion transactions carried out through mobile banking. This outcome was mainly from CBA Bank.

These numbers then steadily grew up to a total of 99.8 Billion Ksh in loan disbursements by the sampled commercial banks with a total of 9.1 Billion transactions carried out.

### 1.1.5. Financial performance of commercial banks.

The study analyzed the consolidated financial performance of the 7 sampled Kenyan commercial banks during the study period 2010 – 2016 with the periods 2013 – 2016 being analyzed semi-annually. The findings were as shown in the figure 4.3 below:

**Figure 1.3: Total return on assets (R.O.A).**



**Source: Own computation results, 2017.**

From the study findings in figure 1.3 above, the research project established that the Kenyan commercial banks had an average return on assets of 4.99% at the beginning of the study in 2010. The ROA dropped slightly in the following year 2011 to 4.64%. It then greatly increased to 5.26% in 2013. This was during the inception of mobile banking by most of the commercial banks under study.

The performance of the banking industry then seems to have reached its lowest point in the study period at 4.13% in the year 2015. This could have been attributed to many other variables such as inflation, interest rates, and others beyond this study. This is because; the performance of commercial banks is a function of more variables including the macroeconomic variables besides the mobile banking effects being studied in this research project. The ROA picked an upward trend in the year 2016, to end at 4.45%.

## **1.2.PROBLEM STATEMENT.**

Majority of the 43 commercial banks in Kenya have adopted the use of mobile banking technology. There have been numerous improvements to this technology that have not been fully implemented. To add on, not many studies have been carried out to determine to what extent these improvements on the mobile banking applications are on the financial performance of commercial banks. Most of the existing studies that have been carried out are either prior to proper implementation and claim a weakly positive relationship between mobile banking and financial performance or have been carried out in other countries with different economies with a different operating environment from that in Kenya.

Jayawardhena and Foley (2000) show that mobile banking results in cost and efficiency gains for banks. Kigen (2011) studied the impact of mobile banking on transaction costs of microfinance institutions. The study concluded that, mobile banking had reduced transaction costs considerably though they were not directly felt by the banks. This may have been because of the then small mobile banking customer base.

This study therefore seeks to fill this research gap by testing out the methodologies employed by previous researchers and will aim to show that based on the improvements to mobile banking, there should exist a relationship between mobile banking and financial performance. This is as a result of an improvement in the mobile banking applications and the numbers of banks which have adopted mobile banking have increased.

### **1.3. RESEARCH OBJECTIVES.**

1. To investigate the effect of mobile banking applications on the profitability of Kenyan commercial banks in Kenya.

### **1.4 RESEARCH QUESTIONS.**

1. How have the mobile banking platforms affected the profitability of Kenyan commercial banks in Kenya?

### **1.5 SIGNIFICANCE OF THE STUDY.**

This study may act as a key reference to ways in which different Kenyan commercial banks can take up current time technological innovation to improve their service delivery. Most importantly, the financial performance of the banks would be affected through cost reduction in line with the revenue increase. To add on, it would act as a key source of information for banking managers who would decide on innovations to adopt into their banks.

This study would also help in minimizing doubts of corporate customers who do not trust internet banking and mainly the mobile banking platform applications. Lastly, according to Wachira, E. W. (2013), this study may have implications in policy development in that the findings may assist regulators in making guidelines for other commercial banks sort of similar in running as the commercial banks under study with an intention of adopting technological innovations.

## **CHAPTER 2: LITERATURE REVIEW.**

### **2.1. THEORETICAL FRAMEWORK.**

Studies carried out on the performance of banks started as early as the 1980's. As a result, several theories were advanced; the financial intermediation theory, the market power theory and innovation diffusion theory (IDT).

#### **2.1.1. Financial Intermediation Theory.**

Financial intermediation is the process in which surplus units (savers), deposit funds with financial institutions who then lends to deficit units (borrowers). Bisignano et,al, (1998)clearly brought out thatfinancial intermediaries can be distinguished by four criteria.

These criteria include; their main categoriesof liabilities or deposits are specified for a fixed sum which is not related to theperformance of a portfolio. Secondly, the deposits are typically short-term and of a muchshorter term than their assets. To add on, a high proportion of their liabilities are chequeablewhich can be withdrawn on demand. Finally, their liabilities and assets are largelyst not transferable, (Bisignano et,al, 1998).

The financial intermediation theory highlights the role of financial intermediaries in the economy. It greatly ignores the perfect market assumption since if it were to hold, there would be no need for financial intermediaries.The existence of the financial intermediaries is explained by the existence of; high cost of transaction and lack of complete information in useful time(Allen & Santomero, 1997).

Gurley, Gurley, and Shaw (1960)established the financial intermediation theory which they based on the theory of informational asymmetry and the agency theory. The majority of markets are characterized by informational differences between buyers and sellers. In the financial markets, information asymmetries are particularly pronounced. For starters, entrepreneurs possess inside information about their ownprojects for whichthey seek financing.Brealey, Leland, and Pyle (1977) claim that, borrowers typically know their

background information as well as collateral, industriousness, and moral integrity better than the lenders. Moral hazard and adverse selection are thus a result of the asymmetrical information when considering projects of good quality to be financed.

### **2.1.2. The Market Power Theory.**

The Market Power Theory states that increased external market forces result into market power. Market Power on the other hand is defined as the capacity of an organization to increase its prices without losing any of or all its clients. According to Tregenna (2009), when applied in banking, the market power hypothesis states that the performance of banks is influenced by the market structure of the industry. This can thus bring out two forms of market power: differentiation of products and services, or ease of search.

There are two major approaches within the market power theory; the StructureConduct Performance (SCP) and Relative Market Power (RMP) hypothesis. According to the Structure Conduct Performance approach, the level of concentration in the banking sector's market gives rise to potential market power by banks; this may then raise their profitability. This would be due to them being able to lower their deposits rates and charge higher loan rates as a result of a sort of monopolistic tendency than the banks that operate in less concentrated markets (Tregenna, 2009).

The Relative Market Power hypothesis on the other hand states that bank profitability is influenced by market share. There is the assumption that only large banks with differentiated products can influence prices and increase profits. This theory sheds light on Information and Communication Technology investments as being market-power initiatives that generate profit for banks. With the increasing use of technology as well as smart phonedevices, the use of Mobile Banking platforms would enable enhanced customer relationships much better than before.

Among most digital channels, mobile banking is a clear IT investment priority in 2013 as retail banks attempt to capitalize on increasing their market share by attracting deposits from the unbanked (Tiwari, Buse, and Herstatt, 2006).

### **2.1.3. Innovation Diffusion Theory.**

Originally, Rogers (1995) coined this theory to explain user adoption or non-adoption of new technologies particularly those of the Information Technology sector. Diffusion is defined as ‘the process by which an innovation is communicated through certain channels over time among the members of a social society’. To add on, it is also defined as being, an idea or object that is perceived to be new.

The rate of diffusion is affected by an innovation’s; relative advantage, complexity, compatibility, trialability and observability. Rogers (1995) defines relative advantage as the degree to which an innovation is seen as being superior to its predecessor. Complexity is the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand. Compatibility refers to the degree to which an innovation is seen to be compatible with existing values, beliefs and experiences. Trialability is the degree to which an idea can be experimented with on a limited basis. Finally, observability is the degree to which the results of an innovation are visible.

The adoption and use of mobile banking has the potential to extend the limited nature and reach of the formal financial sector to the poor and rural population in Africa. Most of the existing literature is from the developmental arena with a few scholarly studies emerging (Mas and Morawczynski, 2009).

The relevance of the diffusion theory is that it explains the reason why banks adopt technical innovations. One of the reasons why banks adopt technical innovations is relevant advantage. This means that banks that adopt technical innovations have a relatively better financial advantage than those who do not. This theory was used to study how various new mobile banking products affects financial performance of commercial banks.

The relevance of the diffusion theory is that it explains the reason why banks adopt technical innovations. One of the reasons why banks adopt technical innovations is relevant advantage. This means that banks that adopt technical innovations have a relatively better financial advantage than those who do not. This theory was used to study how various new mobile banking products affects financial performance of commercial banks.

## 2.2. EMPIRICAL FRAMEWORK.

This section reviews different studies that have been conducted on the effects of mobile banking on the financial performance; bank profitability, of commercial banks. Majority of the studies show that mobile banking has positive effects on bank productivity, transactions and service delivery (Ukai, 2005) and (Francesca and Claeys, 2010), and have positive effects on the growth of banking.

Al-Jabri and Sohail (2012) studied mobile banking adoption in Saudi Arabia. This was done by looking at the application of the innovation diffusion theory. This was to investigate the probable factors that may influence mobile banking adoption and use. The study sought to investigate a set of technical attributes such as current users' requirements, past experiences, lifestyles, and beliefs and how they would influence mobile banking adoption in a developing nation, like Saudi Arabia. The research methods employed were a combination of surveys carried out as well as the multiple regression analysis models. The findings suggested that banks, in Saudi Arabia, should offer mobile banking services that are compatible with these attributes in order to fulfill customer expectations. This study helped in understanding and analyzing the effect of the volume of mobile transactions on the financial performance of commercial banks.

Nader (2011) carried out a study on the profit efficiency of the Saudi Arabia Commercial Banks. There was a sample of 6 Saudi commercial banks, out of the 11 working in the Saudi banking market. Data collected covered the period 1998 to 2007 for each bank. The study indicated that availability of mobile banking had a positive effect on profit efficiency of Saudi banks. The research method employed was a multiple regression model linking the profit efficiency being as a result of availability of mobile banking. The results showed that the most important determinant of profit efficiency is availability of mobile banking. Thus, the conclusion was consistent with the idea that availability of mobile banking is what determines profit efficiency rather than any other determinant in the study.

Uppal (2010) studied the extent of mobile banking in the Indian banking industry during the years 2000-2007. There was the use of correlation analysis, regression analysis as well as a pooled ordinary least squares (OLS) regression model. The study concluded that

among all e-channels, ATM is the most effective. Mobile banking did not hold a strong position in public and old private sector. However, in the new private sector banks and foreign banks, m-banking had been good enough with nearly 50% average branches providing the m-banking services. M-banking customers were also the highest in e-banks which have positive impact on net profits and business per employee of these banks. In providing m-banking services, foreign banks were at the top position, followed by new private sector banks with high efficiency.

Tiwari et al., (2006) studied mobile banking as a business strategy; impact of mobile banking applications on customer behavior and its implications on commercial banks. The study aimed to examine the opportunities for banks to generate revenues by offering value added, innovative mobile banking services while retaining and even extending their market share with technology-savvy customers.

Donner & Tellez (2008) carried out a study on mobile banking and economic development whereby the research sought to link the adoption, impact, and use of these technological innovations. The study concluded that through offering a way to lower the costs of moving money from one place to another and offering a way to bring more users into contact with formal financial systems; m-banking systems could prove to be an important innovation for the developing world.

Closer to home, with studies carried out in Kenya, Kingoo et.al, (2012) studied the relationship between electronic banking and financial performance of commercial banks in Kenya. The research methodology employed was that of the multiple regression analysis models. The main focus was on the microfinance Institutions in Nairobi. The study looked at the wider electronic banking but this research paper will only concentrate on mobile banking. The conclusion was that, indeed there exists a positive relationship between the two but a weakly positive relationship.

Gakure & Ngumi(2013) carried out a study on whether bank innovations influence the profitability of Kenyan commercial banks. The study carried out a descriptive survey research design. The target population comprised all commercial banks in Kenya. The research employed the use of a standard regression model, panel data regression model and Spearman and Pearson correlation matrix to analyze the data. The analysis produced a coefficient of determination of 47.8%. This shows the percentage of variations in

profitability which is explained by bank innovations. The significance test showed that influence of mobile banking applications on bank profitability was statistically significant. The correlation coefficients between bank profitability and bank innovations were also recorded. The highest correlation between profitability and bank innovations was with electronic funds transfer of 0.222 and the lowest was with debit and credit cards of 0.000. Mobile banking had a high collinearity with internet banking (0.761) and electronic funds transfer (0.721). It was concluded that bank innovations have a moderate influence on profitability of commercial banks in Kenya.

Zimmerman (2010) pointed out that the idea of mobile banking in a developing economy was one that has not readily been accepted especially among financial insiders while others argued that cell phones could revolutionize personal finance in poorer countries, regulators warned of the great risks involved such as money laundering and most bankers worried that low customer balances wouldn't be worth transaction costs.

Maina & Muturi (2013) carried out a study on the contribution of mobile banking to financial performance of commercial banks in Kenya. There was the investigation of the relativity between mobile banking and financial performance. Here, the research employed the use of multiple regression analysis to determine this relationship. The study also aimed at finding the financial strategies that had been adopted by the institutions to enhance growth and efficiency of mobile banking. From the results of the study, 70% of financial institutions in Kenya had adopted technological innovation or mobile banking which enabled them to serve more clients within a shorter time hence boosting the financial performance over time. The study concludes that adoption of mobile banking by financial institutions is important in improvement of financial adequacy of commercial banks as well as improving operations and reducing costs in the long run hence finally increasing earnings.

Results presented on the influence of mobile banking on the profitability of commercial banks in Kenya proved that incomes from mobile banking have high margin and that the maintenance costs of mobile banking are low.

### **2.2.1. Summary of Literature Review.**

In the research conducted in different economies, Al-Jabri and Sohail (2012) and Nader (2011) carried out a research on whether mobile banking is a determinant of bank profitability and the conclusion was consistent with the idea that amongst other behavioral attributes of customers, availability of mobile banking is what determines profit efficiency rather than any other determinant in the study.

Uppal (2010) carried out research on different factors that influence the financial performance of banks and concluded that, among all e-channels, ATM is the most effective. Mobile banking did not hold a strong position in public and old private sector. However, in the new private sector banks and foreign banks, m-banking had been good enough.

Donner & Tellez (2008) carried out a study on mobile banking and economic development whereby the research sought to link the adoption, impact, and use of these technological innovations. The study concluded that through offering a way to lower the moving costs of finances, m-banking systems could prove to be an important innovation for the developing world.

Kingoo et.al, (2012), Gakure & Ngumi (2013), Zimmerman (2010) and Maina & Muturi (2013) all studied the relationship between electronic banking and financial performance of commercial banks in Kenya. Their conclusion was that, bank innovations have a moderate influence on profitability of commercial banks in Kenya. It was also pointed out, that the idea of mobile banking in a developing economy was one that has not readily been accepted especially among financial insiders

However, most of the studies carried out in Kenyawere carried out prior to actual adaptation of improved mobile banking. Thus the results in this research may differ in the results from past researchers.

## **CHAPTER 3: RESEARCH METHODOLOGY.**

### **3.1. Research Design.**

The impact of mobile banking applications on bank profitability of Kenyan commercial banks is an empirical study that has been derived from a few studies. This is mainly because it is as a result of recent integration of the Information and Communication Technology sector with the service industry or rather the banking sector. This is in comparison to a difference of greater than twenty years of how the banking industry used to operate. The main purpose of this study is to investigate the effect of mobile banking applications on the profitability of Kenyan commercial banks in Kenya as well as establish if there is indeed a relationship between mobile banking applications and growth of Kenyan commercial banks. This may, to some extent, improve and better the economy.

This research paper is a causal study, mainly because it aims to establish whether there is a relationship between the profitability of the chosen Kenyan commercial banks as a result of the mobile banking applications. According to Chandran et.al, (2004), a causal study involves an investigation of what causes the other among different variables.

This research paper is quantitative in nature mainly because there is or are frameworks on the determinants of applying mobile banking applications to bring about possible profitability. The quantitative studies include; applying multiple regression analysis on the bank's pre-tax profits to Total assets (ROA) as well as to its Equity (ROE). The studies revolve around the financial statements of the chosen banks in study as well as different macroeconomic variables in the Kenyan economy.

### **3.2. Measurement of the study.**

The impact of mobile banking applications on bank profitability of the eleven Kenyan commercial banks would be measured using the various dependent and independent variables. The dependent and independent variables offer insights into a context of a relationship between bank profitability and mobile banking applications.

#### **3.2.1. The independent variables;**

Within studies of the impact of mobile banking applications on bank profitability; independent variables under study will include: Investment in mobile banking measured in Kenya shillings. Another is the number of registered mobile banking customers by banks. The number of mobile banking transactions by the banks will also be analyzed.

#### **3.2.2. The dependent variables;**

According to Onay et al, (2008) these include; in general, the bank performance measured by: Return on Assets (ROA). In this research paper, it is more reliable to use the before-tax figures as opposed to after-tax figures since tax rates may differ across banks. This is based on non-performance related factors such as ownership structure.

Return on Equity (ROE). Rather than total assets, we will calculate the pre-tax profits divided by the shareholder equity. This is because; banks with higher equity ratio should also have a higher return on assets. However, in some cases, governments may be involved in financial intermediation, or they could give guarantees to some banks, which could enable them operate with low equity. This could inflate banks' return on equity and may lead to inconsistent results (Onay et al., 2008).

### **3.3. Population and Sampling Techniques**

The samples of this study are the chosen 7 Kenyan commercial banks, from the various tier categories, that have greatly employed the use of mobile banking within their operations. This is because, the diversity of the eleven commercial banks, would offer an insight on the impact of mobile banking on financial performance at the different levels. Obtaining data on these banks is also quite easy since the financial statements are public information. The m-banking services were also introduced by the respective banks in order to rival Safaricom's M-Pesa application's longstanding dominance with the changing times (Muthoki, 2017).

### **3.4 Data Collection Techniques**

The research study would be looking at to what extent the impact of mobile banking applications would be on bank profitability of Kenyan commercial banks. Thus, for the purpose of the study, there would only be a need to obtain secondary data. The data covers the periods 2010 to 2016 with the periods 2013 – 2016 being analyzed semi-annually.

The data set, will be drawn from the audited financial statements of each of the commercial banks under study and will include: The return on assets of the various commercial banks, the return on equity of the same banks, the number of customers registered on mobile banking and lastly, the number of m-banking transactions carried out using the mobile banking applications. There will also be the use of Investor published reports by the individual banks.

Secondary Data: This would be obtained from; the Financial Statements from the Central Bank of Kenya as to enable computation within a multiple regression model on the impact of mobile banking applications on bank profitability of Kenyan commercial banks.

### **3.5. Data Analysis**

This study investigates the impact of mobile banking applications on bank profitability of Kenyan commercial banks. That is, whether a bank taking the initiative to invest in mobile banking would increase or decrease the bank profitability.

The data collected will be analyzed using quantitative procedures such as use of graphs for comparison purposes of the data obtained from the secondary sources as well as the regression analysis method. To add on, it will have to be cleaned and sorted out within a series of excel sheets to easily find the data needed to carry out the multiple regression and thus analyze.

To analyze the study, there will be intention of the use of the Statistical Package for Social Sciences (SPSS) and thus will employ the use of inferential tests such as the Analysis of Variance (ANOVA) in analyzing the data (Kingoo et.al, 2012). This is in order to test the relationship between the variables. This will be employed to test for the strength of the model and the effects of mobile banking on the financial performance of the commercial banks in Kenya under study. On extracting the ANOVA statistics, the results will be compared to the significance value. The study will be tested at 95% confidence level and 5% significant level. If the significance number will be found to be less than the critical value, set 2.4, then the conclusion will be that the model is significant in explaining the relationship.

Analysis will be done with the help of the R and R-Studio application or Microsoft Excel. On the other hand, descriptive statistics such as frequencies and percentages for each variable will be calculated and tabulated using line graphs and/or bar charts.

Second, multiple regression analysis will be used to analyze the impact of mobile banking on bank financial performance. Given the six-year structure of the sample data gathered, regression analysis will be conducted to investigate the relationship between mobile banking on bank financial performance. As pointed out by Campbell (2008), the multiple regression models are used when exploring relationships between variables that involve establishing the effect of two or more independent variables on a dependent variable.

We follow an empirical model based on previous works by (Onay et al., 2008) who implored the use of multiple regression model in the research. The multiple regression model that will be used is represented as follows for simplicity;

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

$Y$  = Financial performance of the bank represented by return on assets and return on equity.

$\alpha$  = constant

$X_1$  = Number of customers registered on mobile banking.

$X_2$  = Number of mobile banking cash transactions by the banks.

$X_3$  = Mobile banking loan value.

$X_4$  = Bank Crisis is a dummy/ control variable represented by 0 if there was none and 1 if there was a crisis.

$\varepsilon$  = the error term

This model is further supported by Aduda et al., (2012) in studying the relationship between electronic banking and financial performance of commercial banks in Kenya by looking at the wider electronic banking.

In this study, relationship between electronic banking and financial performance of commercial banks in Kenya can be found to have a positive effect on the other commercial banks. However, there may not be a positive relationship hence the need to carry out research.

A dummy variable of any banking crisis that may have affected any of the banks under study. A second dummy variable that is, the internet or rather the mobile banking applications in regards to when they were introduced by the bank. Lastly, macroeconomic variables such as the percentage change in real GDP per capita or the average lending rate charged by banks in the various years.

## **CHAPTER 4: RESULTS, FINDINGS AND DISCUSSION.**

### **4.1. ANALYSIS.**

This research project investigates the impact of mobile banking on the financial performance of Kenyan commercial banks. The analyzed data under this section includes; the financial performance represented by return on assets, the mobile banking loans disbursed measured in Kenya shillings, the number of registered mobile banking customers by the banks and the number of mobile banking transactions by the banks all for the seven commercial banks.

The study used both descriptive and inferential statistics in analyzing the data. Analysis was done with the help of Microsoft Excel due to a limitation of resources. First, the data collected was cleaned, sorted and collated. Then, data was entered into the computer, after which analysis was carried out.

In order to test the relationship between the banks, the inferential tests including the Pearson product-moment correlation coefficient and regression analysis was used. First, Pearson product-moment correlation coefficient as a measure of association was used to examine the relationship between mobile banking and financial performance as well as the relationship between the banks. Pearson's correlation coefficient calculates a relationship between two variables. Correlation co-efficient is a measure of the strength of linear association between two variables.

## 4.2. FINDINGS AND DISCUSSIONS.

Under this section, there is a summary of the independent and dependent variables under study and the relationship to the averages of all the parameters under study for all the banks.

### 4.2.1. Model regression analysis.

In order to establish the relationship between mobile banking and the financial performance of Kenyan commercial banks, the study conducted a multiple regression analysis. The findings were as shown in the table 4.1 below:

**Table 4.1: Model regression analysis.**

<i>Regression Statistics</i>					
Multiple R					0.8
Adjusted R Square					0.64
Standard Error					0.4856
Observations					0.0026
					11
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	8.51684E-05	2.83895E-05	4.1475	0.0553
Residual	7	4.79152E-05	6.84503E-06		
Total	10	0.0001			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.0493	(0.0016)	1.11946E-08	0.0455	0.0532
TOTAL REGISTERED CUSTOMERS	-0.0008	(0.0004)	0.0862	-0.0017	0.0001
TOTAL LOAN DISEMBURSEMENTS	** 1.12885E-07	(8.50122E-08)	0.2259	-8.81367E-08	3.13907E-07
TOTAL MOBILE BANKING TRANSACTIONS	**1.08407E-06	(9.579E-07)	0.2950	-1.181E-06	3.34914E-06

Source: Own computation results, 2017.

## KEY.

\*\* - Statistically significant at 5%

Coefficient of determination explains the extent to which changes in the dependent variable; financial performance of commercial banks in Kenya, can be explained by the change in the independent variables or the percentage of variation in the dependent variable that is explained by the three independent variables; mobile banking loans disbursed, number of registered mobile banking customers and number of mobile banking transactions. There were 11 observations in total.

The three independent variables that were studied, explain around 63.996% of the changes in the financial performance of commercial banks in Kenya as represented by the R-Square. The study shows that there is a significant relation between mobile banking and financial performance of commercial banks in Kenya.

The probability value of 0.0553 indicates that the regression was significant in predicting how mobile banking impacts the financial growth of the banks. The F critical at 5% level of significance was 4.1474 and since F calculated is greater than the F critical value of 2.371, this shows that the overall model was significant.

A regression analysis was conducted so as to determine the relationship between mobile banking and financial performance of banking industry in Kenya. The regression equation;  $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$  resulted, to be:

$$Y = 0.0493 + -0.0008X_1 + 1.12885E - 07X_2 + 1.08407E - 06 X_3 + \varepsilon$$

Whereby  $Y$  = Financial performance of the bank represented by return on assets,  $X_1$  = Number of customers registered on mobile banking,  $X_2$  = Number of mobile banking cash transactions by the banks,  $X_3$  = Mobile banking loan value and  $\varepsilon$  = the error term.

According to the regression equation established, taking all factors, number of registered mobile banking users, total mobile banking loans disbursed and amount of mobile banking transactions by the bank constant at zero, the financial performance of the banking sector will be 4.934%.

The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in total registered customers will lead to a -0.0008 decrease in financial performance of the banking sector. This means that there is no relationship between the two variables. A unit increase in the total mobile banking loans disbursed will lead to a 1.12885E-07 increase in in the financial performance of the commercial bank. Lastly, a unit increase in total mobile banking transactions results in a change of 1.08407E-06 in financial performance of the sampled banks. Nonetheless, the study shows that there is a positive relationship between mobile banking and financial performance of commercial banks in Kenya.

The results of this study are similar to Gakure and Ngumi (2013) findings that concluded that m-banking applications had a moderate influence on profitability of commercial banks in Kenya. The analysis produced a coefficient of determination of 47.8% which showed that the percentage of variations in profitability is explained by m-banking innovations. The significance test showed that influence of bank innovations on bank profitability was statistically significant. This means that the combined effect of the m-banking innovations in their research was statistically significant in explaining the profits of commercial banks in Kenya. This is in agreement with Maina (2013) the study on the contribution of mobile banking to financial performance of commercial banks in Kenya investigated the relationship between mobile banking and financial performance. The study also sought to find the financial strategies that had been adopted by the institutions to enhance growth and efficiency of mobile banking. From the findings of the study, 70% of financial institutions in Kenya had adopted process innovation, mobile banking, which enabled them to serve more clients within a shorter time hence boosting the financial performance over time. She concludes that adoption of mobile banking by financial institutions is very important in improvement of financial adequacy of commercial banks as well as improving operations and thus reducing costs in the long run thereby increasing earnings.

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

### **5.1 SUMMARY AND CONCLUSION.**

The main aim of the research was to establish the impact of mobile banking on overall financial performance of commercial banks. This was represented by the sampled 7 Kenyan commercial banks within various tiers of classification. The study covered the time frame of the years 2010 to 2016, with the periods 2013 to 2016 being studied semi-annually.

The study found evidence of relationship between mobile banking and financial performance of commercial banks in Kenya. The results show that, as the yearly mobile banking loans disbursed increases, the profitability of the commercial banks increases. This is because, mobile banking has helped reduce unnecessary costs, increase efficiency and thus improve on service delivery to customers.

The research thus concludes that mobile banking is being used to improve financial operations. Banks have put in place measures to become more competitive by keeping pace with the technological advancements. It can also be observed from the findings on the number of users that the mobile banking application users keep increasing yearly. This could be an indication that customers, due to the technological age, readily embrace mobile banking. This could be attributed to the advantages offered by mobile banking such as; convenience and flexibility. However, this research project proposes further studies on this area especially on the adoption rate of mobile banking by customers. Seen by the immense penetration of cell phones as observed by Maina & Muturi (2013), banks have a very large potential to offer mobile banking services to individuals living in remote villages compared to the brick and mortar branches. This was one of the limitations prior faced in trying to access bank branches as opposed to widespread mobile phone penetration. Gakure & Ngumi (2013) suggested that the emerging mobile banking may enable banks to reach the unbanked population and therefore provide their services as they do not have bank accounts.

## **5.2 POLICY RECOMMENDATIONS.**

Policy makers should consider mobile banking in the formulation of policies due to the ever-changing technological developments and the probable switch from physical branch networks to technologically supported banking services. This is because, the impact could be pronounced if the change is recorded and more customers adopt mobile banking services. This is because the relationship may be an indirect one resulting from the convenience that the mobile banking services offers to commercial banks.

Commercial banks should keep adopting and using mobile banking in their operations. Some banks have still not yet adopted this technological innovation. This is because; the number of people with access to a mobile hand set is increasing. The convergence of mobile phones and commercial banks has revolutionized the banking operations. For example, Safaricom Ltd together with Commercial Bank of Africa launched M-Shwari services. This service provides those registered with an opportunity to borrow money from the bank and repay conveniently. This has introduced another perspective likely to revolutionize the banking operations for increased profitability.

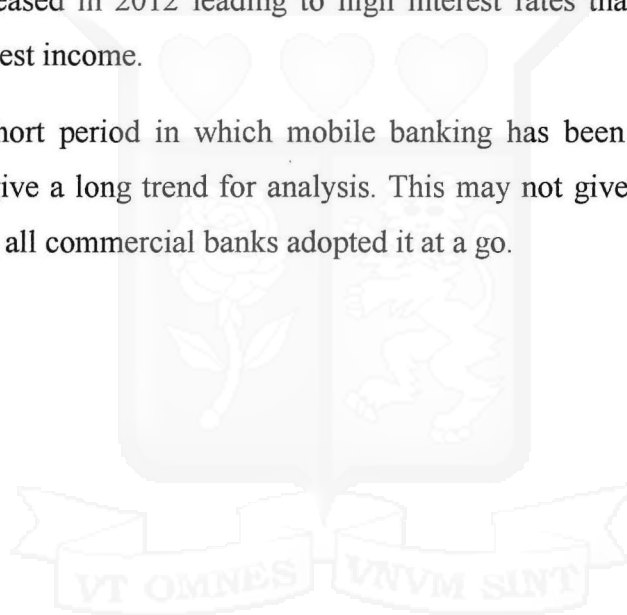
Governments should view mobile technology as a means of achieving financial inclusion, especially among the unbanked population. This is better than leaving it to for-profit firms who view this as an opportunity to grow and reach new customers. New services involve using a mobile phone and its SIM card to store money, make person to person transfers to friends and family, and mobile payments to small merchants. The Government should ensure regulation of the telecommunication industry by reducing or removing avoidable costs of implementing mobile commerce and m-banking in order to increase access to mobile devices by the unbanked population. The Central Bank of Kenya must stipulate standards for banks to follow to avoid making the Kenyan banking sector a dumping ground for the outdated technological infrastructures.

### **5.3. LIMITATIONS TO THE STUDY.**

The main limitations were as follows; some of the secondary data required for used from the individual bank's websites were missing and thus the research had to choose different banks instead.

Some of the secondary data was generated for other purposes hence may not have accurately predicted the relationship among the variables. The measures used may have kept on varying from one year to the other subject to the prevailing condition. For example the financial performance of commercial banks was subject to the total assets owned by commercial banks. In addition, changes in the macroeconomic environment could have affected the profitability of commercial banks for example, the level of inflation had increased in 2012 leading to high interest rates that in resulted in banks earning more interest income.

To add on, the short period in which mobile banking has been heavily implemented which could not give a long trend for analysis. This may not give a clear picture of the relationship as not all commercial banks adopted it at a go.



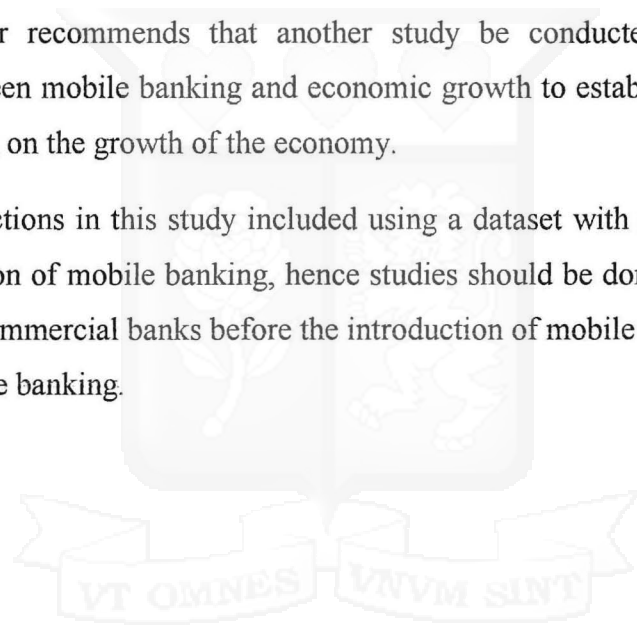
#### **5.4. AREAS FOR FURTHER RESEARCH.**

The research project suggests that further research should be conducted on the relationship between mobile banking and financial performance of banks within the East African Community. This study only concentrated on Kenya yet mobile banking has been adopted in all members of the East African Community.

Research should also be carried out in establishing the adoption rate of mobile banking. This being given that fast advances in the ICT sector and the intensive penetration of cell phones have motivated banks to increase investments within the sector. Therefore, research to enrich current knowledge about what affects individuals to use mobile banking is required.

The study further recommends that another study be conducted in Kenya on the relationship between mobile banking and economic growth to establish the contributions of mobile banking on the growth of the economy.

Finally, the restrictions in this study included using a dataset with a restriction of a few years after adoption of mobile banking, hence studies should be done that will factor the performance of commercial banks before the introduction of mobile banking and after the adoption of mobile banking.



## APPENDICES.

### Appendix I: List of Commercial Banks in Kenya.

(In order of tiers.)

#### TIER 1.

1. Equity Bank Ltd.
2. Barclays Bank of Kenya Ltd.
3. Kenya Commercial Bank (KCB) Ltd.
4. Cooperative Bank of Kenya Ltd.
5. Standard Chartered Bank Kenya Ltd.
6. Commercial Bank of Africa Ltd.

#### TIER 2.

1. Diamond Trust Bank Kenya Ltd.
  2. Stanbic Bank Kenya Ltd (Formerly CfC Stanbic Bank Ltd).
  3. NIC Bank Ltd.
  4. Chase Bank (K) Ltd.
- IN RECEIVERSHIP.**
5. I&M Bank Ltd.
  6. Bank of Africa Kenya Ltd.
  7. Ecobank Kenya Ltd.
  8. Family Bank Ltd.
  9. Bank of Baroda (K) Ltd.
  10. Bank of India
  11. Citibank N.A Kenya.

#### TIER 3.

12. African Banking Corporation (ABC) Ltd.
13. Paramount Bank Ltd.
14. Credit Bank Ltd
15. Guardian Bank Ltd.

16. Charterhouse Bank Limited.

**UNDER- STATUTORY MANAGEMENT.**

17. Fidelity Commercial Bank Ltd.

18. Consolidated Bank of Kenya Ltd.

19. Development Bank of Kenya Ltd.

20. Spire Bank Ltd (Formerly Equatorial Commercial Bank Ltd).

21. Guaranty Trust Bank (K) Ltd.

22. First Community Bank Ltd.

23. Giro Commercial Bank Ltd.

24. Gulf African Bank Ltd.

25. Habib Bank A.G Zurich.

26. Habib Bank Ltd.

27. Imperial Bank Ltd.

**IN- RECEIVERSHIP.**

28. Jamii Bora Bank Ltd.

29. Sidian Bank Ltd (Formerly K-Rep Bank).

30. Middle East Bank (K) Ltd.

31. National Bank of Kenya Ltd.

32. M-Oriental Commercial Bank Ltd.

33. Prime Bank Ltd.

34. Trans-National Bank Ltd.

35. UBA Kenya Bank Ltd.

36. Victoria Commercial Bank Ltd.

**Source: (Central Bank of Kenya).**

**Appendix II: Number of registered mobile banking customers in the study.**

	Equity	StanChart	CBA	DTB	COOP	ABC	TOTAL REGISTERED CUSTOMERS
0.00		0	0.00	0	0.00	0	0.00
0.00		0	0.00	0	0.00	0	0.00
0.10		0	0.00	2.5	0.00	0	0.00
0.11		0	0.00	4.05	0.00	0	0.00
0.20		0	0.00	5.6	0.00	0	0.00
0.40	0.21	0.00	0.00	7.1	0.00	0.65	0.00
2.60	0.35	0.00	0.00	8.6	0.00	1.3	0.00
3.10	0.9	0.00	0.00	12.25	0.00	2.02	0.00
6.70	1.5	0.00	0.00	15.9	0.00	2.74	0.00
8.50	2.19	0.00	0.00	16.6	0.00	2.97	0.00
10.20	2.45	0.00	0.00	17.3	0.00	3.2	0.00

**Appendix III: Number of mobile banking transactions.**

B	Equity	StanChart	CBA	DTB	COOP	ABC	TOTAL MOBILE BANKING TRANSACTIONS
0.00	KES -	0.00	0.00	0.00	0.00	0	0.00
0.00	KES -	0.00	0.00	0.00	0.00	0	0.00
0.60	KES -	0.00	1500.00	0.00	0.00	0	1500.60
0.65	KES -	0.00	2900.00	0.00	0.00	0	2900.65
0.80	KES -	0.00	3480.00	0.00	0.00	0	3480.80
2.00	KES 2.90	0.00	4750.00	0.00	3.7765	0.00	4758.68
11.00	KES 2.95	0.00	5600.00	0.00	7.553	0.00	5621.50
10.90	KES 11.30	0.00	6800.00	0.00	10.0205	0.00	6832.22
21.60	KES 114.90	0.00	7600.00	0.00	12.488	0.00	7748.99
22.40	KES 253.00	0.00	8150.00	0.00	16.3155	0.00	8441.72
23.85	KES 382.00	0.00	8700.00	0.00	20.143	0.00	9125.99

**Appendix IV: Mobile banking loan transaction disbursed in the study.**

	Equity		StanChart		CBA		DTB		COOP		ABC		TOTAL LOAN DISEMBURSEMENTS	
-	KES	-	KES	-	KES	-	KES	-	KES	-	KES	-	KES	-
-	KES	-	KES	-	KES	-	KES	-	KES	-	KES	-	KES	-
-	KES	-	KES	-	KES	1,000.00	KES	-	KES	-	KES	-	KES	1,000.00
-	KES	-	KES	-	KES	4,000.00	KES	-	KES	-	KES	-	KES	4,000.00
-	KES	-	KES	-	KES	10,000.00	KES	-	KES	-	KES	-	KES	10,000.00
-	KES	0.05	KES	-	KES	15,000.00	KES	-	KES	112.50	KES	-	KES	15,112.55
589.00	KES	0.16	KES	-	KES	18,000.00	KES	-	KES	225.00	KES	-	KES	18,814.16
600.00	KES	0.62	KES	-	KES	25,000.00	KES	-	KES	934.50	KES	-	KES	26,535.12
2,400.00	KES	1.92	KES	-	KES	40,000.00	KES	-	KES	1,644.00	KES	-	KES	44,045.92
4,300.00	KES	4.40	KES	-	KES	59,000.00	KES	-	KES	3,254.50	KES	-	KES	66,558.90
17,000.00	KES	6.33	KES	-	KES	78,000.00	KES	-	KES	4,865.00	KES	-	KES	99,871.33



## REFERENCES.

- Abubakar, A. A., & Tasmin, R. B. H. (2012). The Impact of Information and Communication Technology on Banks' Performance and Customer Service Delivery in the Banking Industry. *International Journal of Latest Trends in Finance and Economic Sciences*, 2(1).
- Aduda, J., Kingoo, N., & others. (2012). The relationship between electronic banking and financial performance among commercial banks in Kenya. *Journal of Finance and Investment Analysis*, 1(3), (pp. 99–118).
- Alber, N., & others. (2011). The Effect Of Banking Expansion On Profit Efficiency Of Saudi Arabia Commercial Banks. *Journal of Global Business and Economics*, 3(1) (pp. 11–23).
- Al-Jabri, I. M., & Sohail, M. S. (2012). Mobile banking adoption: Application of diffusion of innovation theory.
- Allen, F., & Santomero, A. M. (1997). The theory of financial intermediation. *Journal of Banking & Finance*, 21(11),(pp. 1461–1485).
- Barclays Personal Banking. (n.d.). Retrieved from <https://www.barclays.co.ke/personal>.
- Bisignano, J., & others. (1998). *Towards an understanding of the changing structure of financial intermediation: an evolutionary theory of institutional survival*. SUERF Vienna.
- Brealey, R., Leland, H. E., & Pyle, D. H. (1977). Informational Asymmetries, Financial Structure, and Financial Intermediation. *The Journal of Finance*, 32(2),(pp. 371–387).
- Chandran, V. G. R., Sharma, S., & Madhavan, K. (2010). Electricity consumption–growth nexus: the case of Malaysia. *Energy Policy*, 38(1), (pp. 606–612).

- Donner, J., & Tellez, C. A. (2008). Mobile banking and economic development: Linking adoption, impact, and use. *Asian Journal of Communication*, 18(4), (pp. 318–332).
- Equity Bank Group• Equity officially launches Equitel as subscribers hit one million mark |Blog. Retrieved from <http://equitybankgroup.com/blog/2015/07/equity-officially-launches-equitel-as-subscribers-hit-one-million-mark>
- Francesca, A., & Claeys, P. (2010). Innovation and performance of European banks adopting Internet. University of Milan and Cass Business School, City University London and University of Barcelona Centre for Banking Research, Cass Business School. *City University London Working Paper Series, WP*, 4(10).
- Gakure, R., & Ngumi, P. (2013). Do bank innovations influence profitability of commercial banks in Kenya. *Prime Journal of Social Science*, 2(3), (pp. 237–248).
- Greenwood, J., & Jovanovic, B. (1990). Financial Development, Growth, and the Distribution of Income: *Journal of Political Economy*: Vol 98, No 5, Part 1.
- Gurley, J. G. S., Gurley, E. S. J. G., & Shaw, E. S. (1960). *Money in a Theory of Finance*.
- Hannan, T. H., & McDowell, J. M. (1984). Market Concentration and the Diffusion of New Technology in the Banking Industry. *The Review of Economics and Statistics*, 66(4),(pp. 686–691).
- <https://www.capitalfm.co.ke/business/2015/12/airtel-standard-chartered-partner-to-improve-mobile-banking-services/>
- Jayawardhena, C., & Foley, P. (2000). Changes in the banking sector – the case of Internet banking in the UK: *Internet Research*: Vol 10, No 1.

KCB Mobi Bank. Retrieved from <https://ke.kcbgroup.com/home/ways-of-banking/47-kcb-mobi-bank>

Khrawish, H. A., & Al-Sa'di, N. M. (2011). The impact of e-banking on bank profitability: Evidence from Jordan. *Middle Eastern Finance and Economics*, 13,(pp. 142–158).

Kigen, M. (2011). Impact of mobile banking on transaction costs of microfinance institutions: A survey of microfinance institutions in Nairobi. *Unpublished MBA Thesis, University of Nairobi*.

Kiprop Too, V., Ayuma, D. C., & Kemboi, D. A. (2016). Effects of Mobile Banking on the Financial Performance of Commercial Banks in Kapsabet (Kenya): A Case of Selected Banks in Kapsabet Town.

Maina, G. M., & Muturi, W. (2013). Determinants of financial performance of commercial banks in kenya. *Jomo Kenyatta University of Agriculture and Technology*, 207.

Mas, I., & Morawczynski, O. (2009). Designing mobile money services lessons from M-PESA. *Innovations*, 4(2), (pp. 77–91).

Murugan Anandarajan, Magid Igbaria, & Uzoamaka P. Anakwe. (2000). Technology acceptance in the banking industry: A perspective from a less developed country. *Information Technology & People*, 13(4),(pp. 298–312).

Muthoki, M. (2017, February 17). Kenyan banks launch 'PesaLink', their own mobile money transfer platform.

- Onay, C., Ozsoz, E., & Helvacioğlu, A. (2008). The impact of internet-banking on bank profitability-The case of Turkey. In *2008 Oxford Business & Economics Conference Program*.
- Popovici, A., Turliuc, D., & others. (2015). The Performance Of Global Banks In Their Cross-Border Activity. *SEA-Practical Application of Science*, (7), (pp. 473–478).
- Porteous, D. (2007). Just how transformational is m-banking,?. *Commissioned by Finmark*.
- Rogers Everett, M. (1995). Diffusion of innovations. *New York*, 12.
- Tiwari, R., Buse, S., & Herstatt, C. (2006a). Customer on the move: strategic implications of mobile banking for banks and financial enterprises. In *E-Commerce Technology, 2006. The 8th IEEE International Conference on and Enterprise Computing, E-Commerce, and E-Services, The 3rd IEEE International Conference on* (pp. 81–81). IEEE.
- Tiwari, R., Buse, S., & Herstatt, C. (2006b). *Mobile banking as business strategy: Impact of mobile technologies on customer behaviour and its implications for banks* (Vol. 4). IEEE. Retrieved from <http://ieeexplore.ieee.org/abstract/document/4077590/>
- Tregenna, F. (2009). The fat years: the structure and profitability of the US banking sector in the pre-crisis period. *Cambridge Journal of Economics*, 33(4), (pp. 609–632).
- Ukai, Y. (2005). *Economic Analysis of Information System Investment in Banking Industry*. Springer.
- Uppal, R. K. (2010). Emerging issues and strategies to enhance M-banking services. *African Journal of Marketing Management*, 2(2), (pp. 029–036).

Why does Kenya lead the world in mobile money? Retrieved from <https://www.economist.com/blogs/economist-explains/2013/05/economist-explains-18>

