# RELATIONSHIP BETWEEN ELECTRONIC BANKING AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

BY

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# DECLARATION

I, the undersigned, declare that this research project is my original work and has not been submitted to any other college, institution or university for academic credit

Signature: ……………………..          Date: ……………………

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

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# DEDICATION

To my parents, my dad ABDI MOHAMED, my mom, HALIMA HUSEIN, my brother
ABDIRIZAK, my sisters, MIRIAM and NIMA, for their financial and mental support
and for making me who I am today and getting bright future.

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# ABBREVIATIONS AND ACRONYMS

**ATMs:** Automated Teller Machines

**ADF:** Augmented Dickey Fuller

**PP:** Philippe and Perron

**CBK:** Central Bank of Kenya

**EFT:** Electronic Fund Transfer

**NIM:** Net Interest Margin

**PIN:** Personal Identification Number

**POS:** Point of Sales

**ROA:** Return on Assets

**ROE:** Return on Equity

**RTGs:** Real Time Gross Settlement

**SACCOs:** Savings and Credit Cooperatives

**SPSS:** Statistical Package for Social Sciences

**TAM:** Technology Acceptance Model

ABSTRACT

Commercial banks today face a number of challenges whose solution lies in adoption of electronic banking platforms. Customers today are demanding for banking products at their convenience without the need to physically access the banking hall. The growing level of competition emanating from other financial service providers require that commercial banks come up with the best strategy of retaining past customers while attracting new ones. The study had the objective of determining the relation between the electronic banking and financial performance of commercial banks in Kenya, and it worked with a descriptive method having 43 commercial banks as population. Secondary data was gathered on volume of M-banking and ATM transactions, the assets base and the income of ten year period 2008 all through to 2017. A multiple linear regression model was employed to analyze the relation among variables. From the result, there is an important relation among electronic banking and financial performance of commercial banks in Kenya. Indeed, the regression findings showed that 64.8% of the difference in the dependent variable is interpreted by the two independent variables. ATM volume was the main independent variable with a coefficient's value of 0.76 which means that an increase by 1% in ATM transactions leads to 0.76% increase of financial performance. The study suggest that the top management of these banks should increase investing electronic banking to take part growing of financial performance of the banks. CBK should come up policies and principles to direct the growth of electronic banking among commercial banks in Kenya.

# CHAPTER ONE: INTRODUCTION

## 1.1. Background of the Study

The increasing forces of competition have affected the way organizations carry out their operations. The business environment is ever changing requiring organizations to come with the best way of remaining competitive and therefore improving on their performance. The forces of globalization have shaped the landscape of business operations today by ushering in new forms of technologies. Advancement in technology has made firms to effectively meet or exceed customer expectations. Technology had opened up alternative channels and streams of revenues of organizations today resulting into maximization of the wealth of shareholders (Pham, Cao, Nguyen & Tran, 2013).

Technology acceptance model (TAM) and diffusion of innovation theories will be used to support this study. TAM theory argues that the decision to incorporate technology in operations of the business is informed by the views ease of use and usefulness (Davis, 1989). Based on this, the decision to adopt e-banking as a form of technologies is informed by views ease of use and usefulness of the e-banking platforms. The theory of diffusion of innovation on the other hand argues that as a process, innovation is communicated via relevant channels among participants in a given period of time. According to this theory, the spread of new ideas in an organization is informed by social systems, time span, channels of communication and the innovation itself (Rogers, 1962). Hence, the adoption and subsequent spread of e-banking is an innovation itself which is supported by this theory.

According to the planed behavior theory, the ability of an individual to perform a given behavior is influenced by the intention towards that behavior. These intentions are shaped

by the beliefs and attitudes held by people in an organization (Ajzen, 1991). Thus, the adoption of the e-banking in an organization is influenced by multiple factors including the prevailing culture in an organization.

Central Bank of Kenya (CBK) is the regulatory association for Kenyan commercial banks, and they play an important role by mobilizing savings and deposits from customers hence contributing towards the nation's economic growth. Commercial banks today face a lot of competition from other firms offering financial services including insurance companies, SACCOs and digital lending platforms. Given the fact that a significant portion of revenues for commercial banks is earned from the amount of loans lend to customers, customers today can access similar loans from digital lending platforms like Tala Ltd and Branch International Ltd (CBK, 2018). Most corporate and high income customers today require banking services at their convenience without the need to physically visit the banking halls. Customers today seek for payment channels that are secure, timely and reliable. This however can only be attained through adoption of technology in the electronic banking platform (CBK, 2016). therefore It is against these challenges and issues that many commercial banks today have adopted electronic banking in their operations. The current study attempt to determine how this adoption of electronic banking between commercial banks has affected their financial performance.

## 1.1.1 The Concept of Electronic Banking

Electronic banking (also denoted as e-banking) is concerned with the application of hardware and software with the aid of telecommunication and networks to relay financial data and information in an electronic format. With e-banking, the customer is not

necessarily needed to physically visit the bank in order to access banking services (Pouramirarsalani, Khalilian & Nikravanshalmani, 2017). According to Basel Committee (2003), e-banking is the use of electronic channels to provide retail and small value banking operations to customers in a more effective and convenient way. The advancement in information and communication technology has greatly contributed towards adoption of e-banking among commercial banks today.

E-banking is today used in carrying out financial transaction on a local, regional and global scale. Banks today rely on e-banking platforms to deliver products to customers while at the same time receiving compliments and complaints from customers for improvement. E-banking is simply the automation of the operations of the bank (Turban, Outland, King, Lee, Liang & Turban, 2017). Electronic banking is the electronic link between customers and the bank, the purpose is to plan, administer and govern all the financial transactions. E-banking is implemented through a number of platforms including mobile and internet banking, automated teller machines (ATMs), PesaLink, and M-visa (Gaitán, Peral & Jerónimo, 2015).

Commercial banks today have invested in these e-banking platforms with an aim of improving efficiency and effectiveness and thus meeting the needs and wants of the customers. Mobile banking is supported by a reliable telecommunication network operator like Safaricom and Airtel.

Internet banking requires accessibility to reliability network connectivity mostly on Wi-Fi. At inception, ATMs required the customer to place a card that prompted for their Personal Identification Number (PIN) in order to access banking services (Montazemi & Qahri-Saremi, 2015). Today, commercial banks have refined and modified ATMs such

that customers can access banking services without the ATM card or the PIN but only the account number. PesaLink is the most recent form of e-banking among commercial that facilitate interbank transfer of financial data and information (Kaur & Kiran, 2015).

## 1.1.2 Financial Performance

Performance relates to the specific ways of quantifying how organizations attain the set goals and objectives over a given period. Performance can be determined based on either financial or non-financial measures whereas information on financial performance of an organization is extracted from relevant yearly published statements and reports. The key financial measures of performance in an organization include ROA, ROE, and ROI. Most measures of financial performance are expressed in ratio that facilitates comparison between firms in a similar industry (Turban, King, Lee, Liang & Turban, 2015).

Return on assets determines the ability of the company to generate income by use of its asset portion in the balance sheet. Return on equity is related the organization's ability to make profit by using of equity portion in the balance sheet. Return on investment is the minimum required rate of return on an investment that maximizes the wealth of shareholders. Apart from ROA and ROE, Net interest margin (NIM) is an important financial measure in the banking industry. NIM is measured by the diversity among interest income and interest expenses (Mortimer, Neale, Hasan & Dunphy, 2015).

## 1.1.3 Electronic Banking and Financial Performance

Commercial banks have adopted e-banking to improve efficiency and effectiveness that overall transpiring into financial performance. It has remained a subject of discussion whether in deed, the adoption of e-banking influences financial performance. In Iran, Karimzadeh, Emadzadeh and Shateri (2014) investigated how expansion of e-banking

platforms influenced profitability among commercial banks, and the key finding was that electronic banking has direct and important influence on profitability.

Siddik, Sun, Kabiraj, Shanmugan and Yanjuan (2016) conducted an empirical research conducted in Bangladesh relating to how electronic banking impacted on performance of commercial banks, and it determined that e-banking had a positive influence on financial performance. In Nigeria, Ugwueze and Nwezeaku (2016) assessed how e-banking influenced financial performance of the banking sector. The findings indicate that there exists a long run influence of e-banking on financial performance of a banking institution. With specific reference to Kenya Commercial Bank based in Uganda, Namuyomba (2014) assessed how investment in e-banking affected its financial performance. Mixed results of positive and negative influence were established between e-banking components (ATMs, internet banking and electronic money transfer) and financial performance. Vekya (2017) on how e-banking impacted on profitability of Kenyan commercial banks noted e-banking had positive and significant influence on financial performance.

## 1.1.4 Commercial Banks in Kenya

Commercial banks are specialized in the provision of financial services to customers including acceptance of deposits, lending, and investment advisory and insurance services. They play an essential part as far as the country's economic growth is concerned by mobilizing savings and investment from customers. By ensuring availability and access to credit facilities in an economy, commercial banks help in boosting investments

undertaken that positively influence the growth of an economy (Shaikh & Karjaluoto, 2015).

The operations of commercial banks in Kenya are closely monitored and controlled by the CBK. To effectively play its oversight role, CBK formulate various polices and prudential guidelines that all commercial banks are expected to strictly adhere by. There are currently 43 commercial banks operating in Kenya (CBK, 2016). these banks are divided into three parts large, medium and small, based on the weighted composite index. Commercial banks today are faced with a number of challenges that can best be solved through adoption of technology hence e-banking. Customers today are demanding for reliable and safe means of carrying out financial transactions. The changing lifestyles have resultant into customers that require banking services at their own convenience without necessarily visiting the physical branch of the bank. The rise in level of globalization and competition at the market especially the financial sector forces commercial banks to be strategize in the best manner so as to sustain their financial performance (Amin, 2016). Thus, in countering all these challenges, commercial banks have opted to invest in e-banking platforms which form the basis of this study.

## 1.2 Research Problem

Commercial banks today face a number of challenges whose solution lies in adoption of electronic banking platforms. Customers today are demanding for banking products at their convenience without the need to physically access the banking hall. The growing level of competition emanating from other financial service providers require that commercial banks come up with the best strategy of retaining past customers while attracting new ones. Some of the rival organizations of commercial today include digital

6

lending platforms like Tala Ltd that simply electronic data of customers to extend short term credit facilities without physical contact (CBK, 2018). These challenges are crucial to the existence and ultimately financial performance of commercial banks and thus require urgent strategic responses. If this is not done, the future of commercial banks is likely to be uncertain and thus the overall growth of the economy (Tan & Lau, 2016).

Although commercial banks have largely adopted e-banking platforms over the last decade, there is no sufficient evidence to conclude whether this has influenced financial performance. The key e-banking platforms being used among commercial banks today include mobile banking, internet banking and m-visa and Pesalink (CBK, 2017). Empirical analysis of the link among electronic banking and financial performance has yield mixed results of positive and negative influence. It is therefore economically feasible to determine whether investment in e_banking among commercial banks has in any way influenced their financial performance.

A number of studies have been done to establish how e-banking impacts on financial performance. On the international scale, Karimzadeh, Emadzadeh and Shateri (2014) examined the influence of e_banking on profitability of Iranian commercial banks.

The study found out positive and significant influence of e-banking on profitability. Using a case of commercial banks in Bangladesh, Siddik et al. (2016) examined the effect of e-banking on financial performance. The key finding was that e-banking positively and significantly influenced financial performance. In Ethiopia, Worku, Tilahun and Tafa (2016) assessed how e-banking resulted into satisfaction of customers. The study established that e-banking had significant influence on customer satisfaction. These

studies however were in other countries that are much developed thus limiting their applicability in Kenya thus resulting into contextual gaps.

In Kenya, Mwangi (2014) examined how internet banking influenced firms in the banking sector and established that investment in e-banking positively influenced financial performance of commercial banks. Atavachi (2013) looked at how e-banking influenced financial performance among Kenyan deposit taking microfinance institutions and noted that RTGS had significant influence on financial performance in the banking industry. Osewe and Muturi (2017) analyzed how e-banking affected financial performance of Kenyan commercial banks and revealed that e-banking has positive and significant relationship with financial performance. Vekya (2017) assessed how e-banking impacted on profitability of Kenyan commercial banks and noted that POS and ATM transaction had positive affect on financial performance. Some of the Kenyan studies focused microfinance institutions resulting into gaps. To fill these gaps, the current study sought to determine relationship between electronic banking and financial performance of commercial banks in Kenya.

## 1.3 Research Objectives

The study had the objective of determining the relationship between electronic banking and financial performance of commercial banks in Kenya.

## 1.4 Value of the Study

The study would be important to theory, policy, and practice. In theory, it would add to existing knowledge on e-banking and how it influences financial performance. Future scholars will rely on the findings of the study to carry out similar studies. The study will also open out areas for further studies for future scholars and academicians.

In policy, the study will help regulatory bodies like the Central Bank of Kenya for come up with rule, regulations and guidelines that would support the e-banking adoption among commercial banks. By providing a conducive environment, commercial banks will rapidly adopt e-banking banking and thus improve on their financial performance. This would play an important role in stabilizing the growth and development of the country's economy.

The study would be important to the management team of commercial banks and all other firms in the financial sector including insurance, SACCOs and microfinance. By utilizing these findings, the management of these institutions will have glue on how best to strengthen their e-banking platforms. This would positively influence financial performance.

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 Introduction

This section discussed literature related to the study. The chapter starts by reviewing the theories that will form the basis of the study. The factors determining financial performance of banking sector are also pointed out. The empirical studies related to the current study are also reviewed. The reviewed literature is then summarized pointing out gaps to be filled. The conceptual framework indicating interrelationship between the variables of the study is also indicated.

## 2.2 Theoretical Review

A theoretical review plays an important role in the study by pointing out theories that underpins the study. The study was informed by the TAM, the theory of diffusion of innovation and the theory of planned behavior. The discussion of each of these theories is presented in subsequent sections.

### 2.2.1 Technology Acceptance Model

This theory was advanced by Warshaw, Bagozzi and Davis (1989) to explain factors affecting the adoption of technology in a social setting. According to the theory, two factors determine the adoption of technology in a social system, and they are usefulness and ease of use. In perceived usefulness, someone believes that the acceptance and adoption of technology would increase efficiency and thus improving job performance whereas ease of use arises when employees believe that the use and operation of a particular technology is easy. However, these two important factors to some extent are influenced by external factors like forces within the environment.

TAM has been used extensively in much research on information and communication technology. For instance, Arnett and Liu (200) looked at critical variables in building a website in view of the TAM theory. An e-commerce acceptance model of online consumers is proposed by Pavlou (2003) through separation and use of survey and experimental designs. Based on this theory, a positive relationship is expected between implementation of e-banking and financial performance of firms.

## 2.2.2 Theory of Diffusion of Innovation

This theory was put forward by Rogers (1995). The theory suggests stages that an innovation follow as it get spread through a social system. Information with regard to an innovation, the key features flow through social systems where adopters are located. Through information seeking behavior, potential adopters get to know the benefits accruing from the use of that innovation. Whenever a new innovation is introduced in an organization, there exist a number of adopters ranging from innovators all through to laggards.

The theory argues that at the initial stages of an innovation, a firm stands to earn super normal profits. However, with time, these adopters come in and eat the generated profits of the company. In most cases however, early adopters act as opinion leaders with ability to convince others in adopting an innovation through provision of information that is evaluative (Amin, 2016). A clear comprehension of the features and attributes of such individuals plays an important role in implementation of new forms of technology in an organization. One of forms of technologies is the e-banking platform. The theory therefore justifies the need to adopt the e-banking platform in an organization.

### 2.2.3 The Theory of Planned Behavior

This theory was advanced by Ajzen (1991) to establish how attitudes and behavior influence an individual to undertake given action or sets of actions. The theory started as the theory of reasoned actions that try to explain all forms of behavior that individuals may have self-control over. The key components in the theory of planned behavior are the behavior intentions that are shaped by attitudes on probability that a given behavior would result into an anticipated outcome. In undertaking a given action, an individual thus evaluates the benefits and risks accruing from the outcome.

The theory has been criticized on several grounds resulting from its basis premises. First, the theory unrealistically assumes that irrespective of an individual's intention, a person with resources and opportunities would easily acquire the desired behavior. Several factors like threat and fear are set aside by this assumption. The theory further precedes on assumption that one's behavior directly result from the linear process of making decisions and thus not regarding changes occurring over time (Ajazen, 2006). This theory is relevant to the study since the adoption of e-banking in organization dependents not only on technical factors but the social factors as well.

### 2.3 Determinants of Financial Performance of Commercial Banks

This section deals with elements that influence on the financial performance of commercial banks. In general, it presents literature on e-banking, size of the banks, managerial efficiency, capital adequacy and liquidity management as key factors determining financial performance of commercial banks.

### 2.3.1 Electronic Banking

E-banking comprises of various components including mobile banking and internet banking among others. Firms investing in e-banking increases efficiency and effectiveness in processes and operations that transpires into better financial performance. Ndungu and Okiro (2013) assessed how internet and mobile banking influence financial performance among Kenyan financial institutions. The findings confirmed that investment and adoption of e-banking improved financial performance of organizations.

### 2.3.2 Size of the Bank

Banks are classified into tiers based on their market share and relative asset base and weighted risk. The tier system of classification results into Tier I, Tier II and Tier III banks. Tier I banks are deemed to be large enough and thus access economic of scale hence better financial performances. Large commercial banks are deemed to be more profitable compared to those whose sizes are smaller. Size has commonly been measured by the natural log of asset base (Ayo, Oni, Adewoye & Eweoya, 2016).

### 2.3.3 Managerial Efficiency

Presence of a sound management team in the banking sector plays an important role in generating profits and thus financial performance. Managerial efficiency is measured by use of several indicators including expenses ration, cost per loan and average size of the loan. With a sound management team in place, informed decisions will be made aimed at generating revenues and profits of the organizations. Thus, all factors kept constant; there is an expected positive relationship between size and financial performance (Shaikh & Karjaluoto, 2015).

### 2.3.4 Capital Adequacy

Capital adequacy is a measure that determines how efficiently an institution shocks towards the balance sheet statements by considering all inherent risks likely to affect operations. It shows how well an organization can withstand financial shocks without interfering with operations of lending and accepting deposits from customers. The key measure of capital adequacy in an organization is the leverage ratio that is the ratio of book value of capital in a bank to asset book value (Montazemi & Qahri-Saremi, 2015).

### 2.3.5 Liquidity Management

Liquidity indicates how well an organization is able to meet its most current obligation as and when they fall due. This is the most important aspect that determines overall profitability. Too much liquidity is undesirable since it shows that the organization has large amount of tied up capital which could be best utilized in generating profitability. A small level of liquidity on the other is also not desirable since it may set in bankruptcy and ultimate dissolution of the business due to creditors and other thirty parties (Pham et al., 2013). Commercial banks should strive to stay liquid at all times since customers would always want to withdraw money at any time. The ratio of current assets to current liabilities is considered to be the most important measure of liquidity.

### 2.4 Empirical Literature Review

In Iran, Karimzadeh, Emadzadaeh and Shateri (2014) looked at how expansion of e-banking influenced profitability among firms in the banking sector. The variables employed included ROA, ATMs, credit cards and size. Secondary data over a period of 2004 all through to 2012 had been gahered. The study established that ATMs, credit

cards and size of the bank had positive and significant influence on financial performance.

This study however was conducted in Iran that is faced with different contextual factors as those of Kenya hence resulting into knowledge gap. In India, Rani (2017) sought to find out how investment in e-banking technologies influenced financial performance of firms in the banking sector. This was an empirical, and it relied on past studies. The reviewed literature indicated that e-banking has mixed influence on financial performance characterized by positive and negative effect. As a recommendation, the study noted that commercial banks should increase the adoption of e-banking in operations so as to improve on profitability and thus financial performance. The study was done in India hence limiting applicability of the findings in Kenyan context. There is therefore need for a similar study in Kenyan context.

In Lebanon, Sujud and Hashem (2017) examined how innovation in the banking sector influenced financial performance. The variables of the study were electronic fund transfer, internet banking, credit and debit cards, m-banking, automated teller machines and point of sale. Financial performance4was measured by profitability and ROA. The study collected primary data using a sample size of 200 staff. From the findings, only EFT significantly influenced financial performance of commercial banks. However, it only focused on innovation and not e-banking, which can be treated as a form of innovation in the banking sector.

In Bangladesh, Siddik, Sun, Kabiraj, Shanmugan and Yanjuan (2016) assessed how e-banking impacted on performance of commercial banks, and they adopted a panel data

methodology covering 13 commercial banks. Secondary data was collected over a period ranging from 2003 all through to 2013.

The study established that e-banking had mixed influence of positive and negative effect on performance of commercial banks based on the time lag. It used a sample size of 13 commercial banks in Malaysian context; the current study will use a larger sample size of all the 43 commercial banks in the Kenyan context.

In Nigeria, Abaenewe, Ogbulu and Ndugbu (2013) did a study to determine how e-banking influenced financial performance among commercial banks. Judgmental sampling method was applied to select four commercial banks forming the sample size of the study. Profitability of the studied banks was measured by use of ROE and ROA. The study collected secondary data. The findings indicated that incorporation of e-banking in operations of commercial had a positive and significant influence on ROE unlike ROA where the effect was insignificant. The study was done in Nigeria resulting into a contextual gap for the current study to fill.

In Ghana, Korankye (2014) investigated how e-banking influenced profitability among commercial banks, and it relied on primary data gathered by use of questionnaires from 270 respondents that included customers and employees. The analysis of the collected was done by use of simple frequencies and percentages. according to the results, most of respondents agreed the implementation of e-banking improved customer's service and thus financial performance of an institution. The study related e-banking and profitability and not financial performance in general. The study was also done in Ghanaian context thus limited applicability of the findings in the Kenyan context.

In Botswana, Mapharing and Basuhi (2017) examined how e-banking influenced performance of commercial banks, and it used descriptive design. The variables employed included ATMs, EFT and POS terminals.

The study relied on secondary data collected over a period of ten years. The study established that investment in e-banking resulted into positive and significant influence on financial performance of a banking institution. The study was done in Botswana hence bringing about a contextual gap.

In Kenya, Ngumi (2013) examined how financial innovation influenced financial performance among commercial banks. The study relied on primary data collected using questionnaires from 222 respondents that comprised of managers from senior positions of the selected 20 banks. From the findings, financial innovation in the banking sector has significantly influenced financial performance. The study related financial innovation and financial performance, it therefore failed to assess how e-banking in specificity influenced financial performance of commercial banks.

Mwangi (2014) examined how internet banking influenced firms in the banking sector. The variables used in the study included ROA, M-banking, ATM and Internet banking. The study relied on secondary data collected from 44 commercial banks. Collection of data covered a period from 2009 all through to 2013. The study established that investment in e-banking positively influenced financial performance of commercial banks.

 Atavachi (2013) looked at how e-banking influenced financial performance among Kenyan deposit taking microfinance institutions. The variables used in the study were internet and mobile banking and real time gross settlement.  A survey study was

17

employed among the 44 commercial banks in Kenya. The study collected primary data from employees using questionnaires. From the findings, RTGS had significant influence on financial performance of firms in the banking sector. It was done among Micro-finance institutions and not the commercial banks resulting into a contextual gap for the current study to fill.

Osewe and Muturi (2017) analyzed how e-banking affected financial performance of Kenyan commercial banks. A descriptive design was employed. Primary data was employed in the study collected using questionnaires. In total, 220 respondents were issued with questionnaires. The analysis of the collected data showed that e-banking has positive and significant relationship with financial performance. questionnaires were only used for collecting the primary data resulting into a methodological gap. To fill this gap, the current study will use secondary data.

Vekya (2017) did a study to assess how e-banking impacted on profitability of Kenyan commercial banks. The variables of the study included ROE, ATMs, POS and M-banking. Data was collected using a sample size of 43 Kenya commercial banks. Data collection covered the period of 2007 all through to 2015 on a quarterly basis. From the findings, POS and ATM transaction had positive and significant influence on financial performance. The study specifically linked e-banking and profitability and not financial performance in general.

## 2.5 Conceptual Framework

The conceptual framework illustrates how research variables are interrelated. Figure 2.1 shows the conceptual framework showing how e-banking influences financial performance.
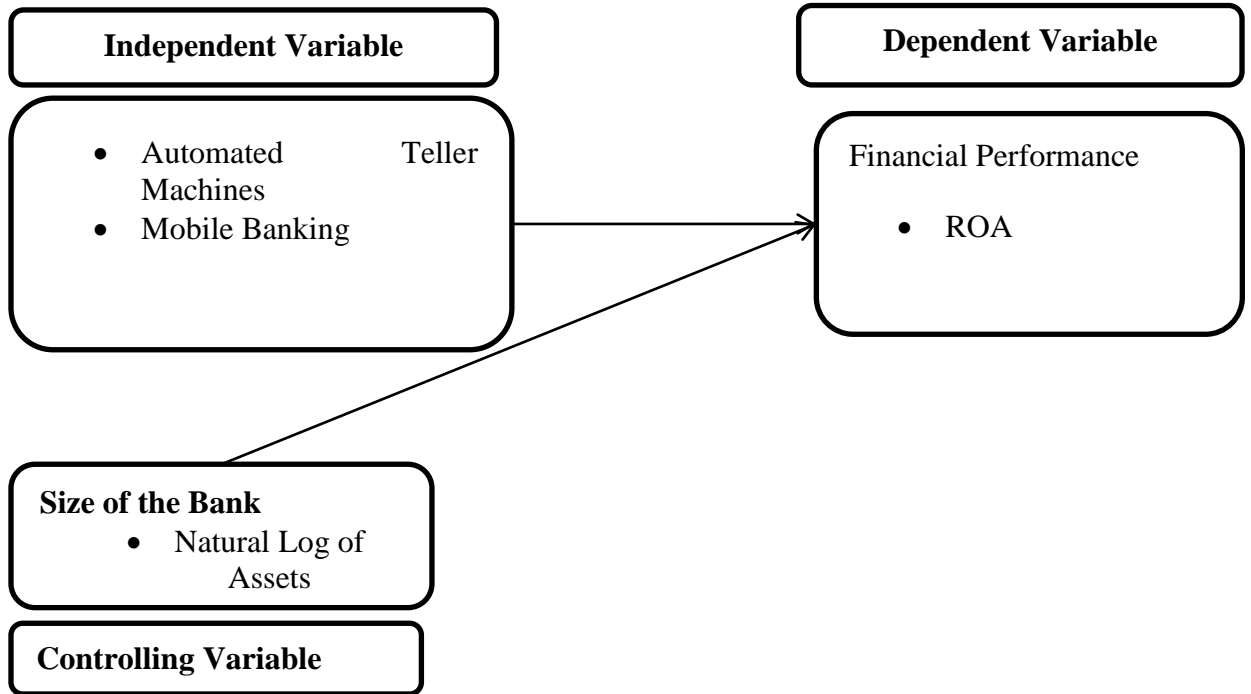
Figure: Conceptual Framework

## 2.6 Summary of Literature Review

This chapter has extensively reviewed theories and empirical literature supporting a link between e-banking and financial performance. The chapter has reviewed the TAM, the theory of diffusion of innovation and the theory of planned behavior. According to these theories, a positive relationship is anticipated between implementation of e-banking and financial performance since they inform significant factors that ease the implementation and acceptance of e-banking platforms in organization.

The empirical review covered international and Kenyan studies. Internationally, Karimzadeh, Emadzadaeh and Shateri (2014) conducted a study in Iran, and they looked at how expansion of e-banking influenced profitability among firms in the banking sector. In the Indian context, Rani (2017) sought to find out how investment in e-banking technologies influenced financial performance of firms in the banking industry.

Using data of Lebanon, Sujud and Hashem (2017) examined how innovation in the banking sector influenced financial performance. In Africa, Abaenewe, Ogbulu and Ndugbu (2013) did a study to determine how e-banking influenced financial performance among commercial banks in Nigerian context. Locally, Ngumi (2013) examined how financial innovation influenced financial performance among commercial banks. Atavachi (2013) looked at how electronic banking influenced financial performance among Kenyan deposit taking microfinance institutions. The local studies however related innovation and financial performance thus failing to assess how e-banking influences financial performance.

# CHAPTER THREE: RESEARCH METHODOLOGY

## 3.1 Introduction

The chapter discusses the steps the researcher followed to attain the stated objectives. It also concerns with the type of the research design adopted as guided by the study objectives. The population of the study used to offer information for the study is also covered. The chapter also outlines how the researcher went about in sampling the population to a manageable size. The researcher also reviews methods to use in collecting data from the identified population and how the collected data was analyzed and presented so as to draw inferences, make conclusions and recommendations.

## 3.2 Research Design

A research design is a structure that directs the researcher on the methods to use in collection and analysis of data. It is a structure that guides the methods of collecting and analysis of data. A descriptive research design has been implemented. According to Yin (2017), a descriptive research design helps in giving an account of the way things exist in their status quo. A descriptive design helps in answering questions of what? Where? When? How?

The study employed a descriptive research design, and according to Mugenda and Mugenda (2003), it gives an account of the way things are. It answers questions on how, what, why and when? This design was used to give an account of how e-banking affect financial performance of commercial banks in Kenya. The design helped the researcher to collect both primary and secondary to achieve the set objectives. Through this design, the researcher was able to collect both qualitative and quantitative data.

## 3.3 Population

Population is the whole elements of the study that have common attributes and features, and it comprised of 43 commercial banks in Kenya (Appendix II). All these 43 commercial banks formed the sample size of the study because they are small for sampling. The study thus employed a census. According to Yin (2013), a census is appropriate where elements of the population are less than 200.

## 3.4 Data Collection

The study collected secondary data on net income, volume of transactions moved through ATMs, volume of transactions moved through mobile banking and the total asset base (Appendix II). Data collection covered a period of 10 years (2008-2017). The period was selected because it has the most current data which is readily available from CBK financial statements over this period.

## 3.5 Data Analysis

Data analysis is about the means of changing raw data into information for reporting. It helps in drawing meaningful inferences and conclusions with recommendations.

### 3.5.1 Diagnostic Tests

The study carried out normality, autocorrelation, heteroskedasticity and multicollinearity tests to ensure that the data set does not violate regression assumptions. Normality was tested by Jarque-Bera. Autocorrelation was detected using Breusch-Godfrey Statistics. Heteroskedasticity was tested using White test.

Multicollinearity was detected using Variance of Inflation Factor (VIF). In essence, VIF values of between 1 and 10 suggest that there is no multicollinearity in the data set.

## 3.5.2 Analytical Model

The adopted regression model will take the following firm;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + +\varepsilon$$

Where

$Y$ is = Financial Performance (ROA=Net Income/Total Assets)

$X_1$ = ATM (Natural Logarithm of Volume of Transaction)

$X_2$ = Mobile Banking (Natural Logarithm of Volume of Transaction)

$\beta_0$ = Constant; $\beta_1$ and $\beta_2$ are Coefficients and $\varepsilon$ = Error Term

## 3.5.3 Test of Significance

The study used the coefficient of determination R square to determine how change in financial performance of commercial banks is explained by the e-banking platforms put in place. The usage of F test determined the overall significance of the model where T-test determined the individual significance of the predictor variables. The interpretation of p values was done at 5% significance level. Probabilities less than 0.05 indicates that the variables are significant. On the other hand, probabilities greater than 0.05 shows insignificance of the variables.

# CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

## 4.1. Introduction

Once data had been gathered, it was edited and cleaned before being entered into the EVIEWS and SPSS software. The study relied heavily on secondary data about the volume of ATM and mobile banking transactions, the net income and the asset base of the studied commercial banks. The findings were presented using Tables and Figures.

## 4.2. Descriptive Analysis

This part provides a description of variables that were utilized to describe how the financial performance is related to the variables of electronic banking in commercial banks in Kenya. Results are given in figures.

**Figure 4.1: Trend of Financial Performance**
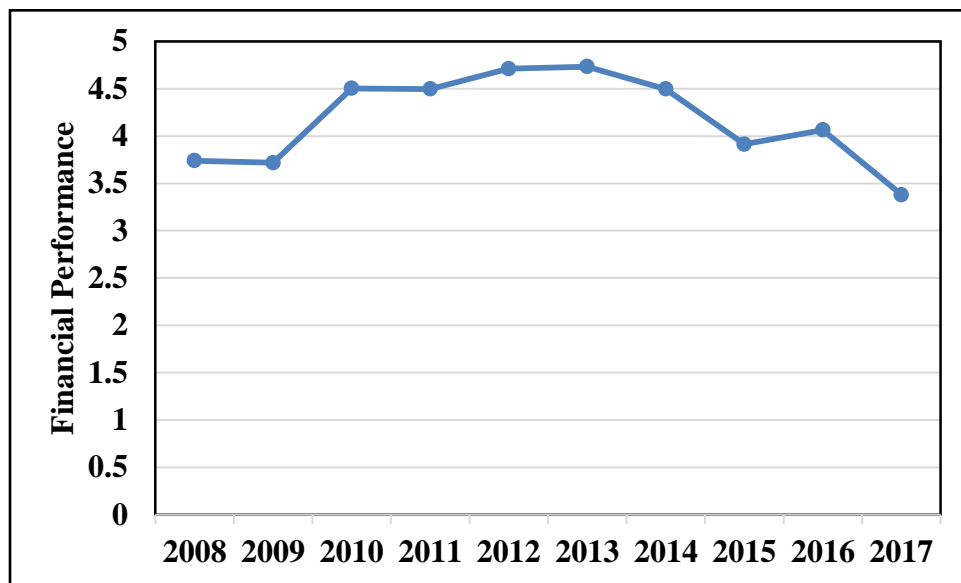


**Source**: Research data

The results in figure 4.1 show that the movement of financial performance was up sloping for the study period. The variation was higher in 2010 up to 4.5% while a low variation was found in the year 2017 (3.38%).

**Figure 4.2: Trend of Volume of ATM**

The above figure 4.2 shows that the ATM transactions recorded an erratic movement from 2008 to 2017 with a considerable minimum of KES.1902 million in 2008 and a maximum of KES.9040.92 million in 2013.

**Figure 4.3: Trend of Volume of M-Banking**

The above figure 4.2 shows that the M-banking transactions were in in rise for the whole period of the study. This means that M-Banking has been used at high extend in commercial banks of Kenya.

**Figure 4.4: Variation of financial Performance, Volume of ATM, and Volume of M-Banking**
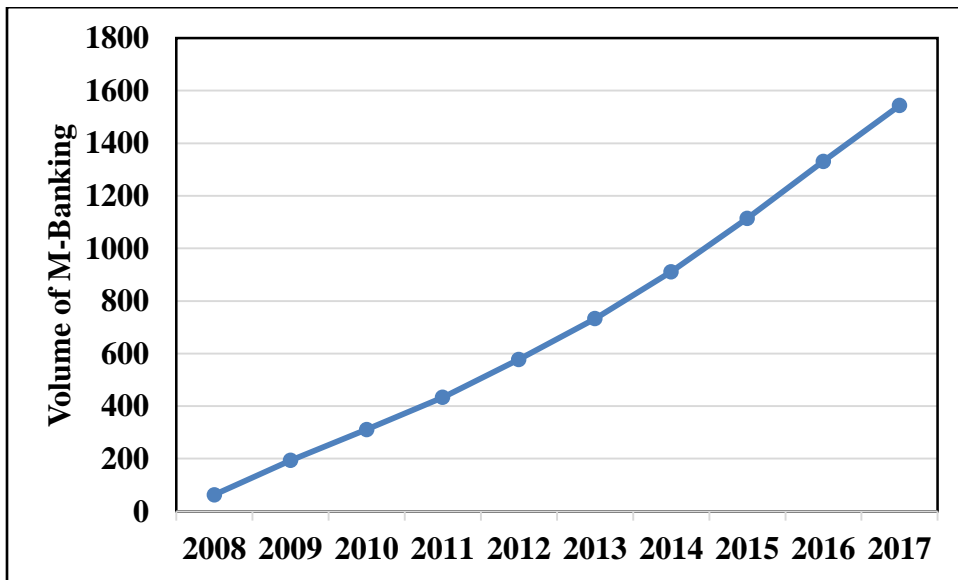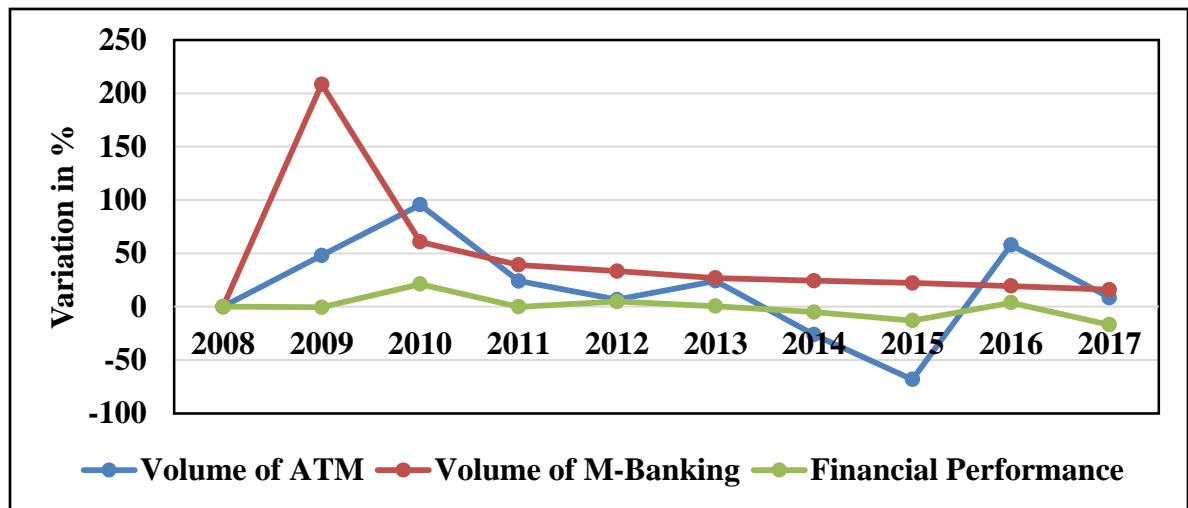


**Source**: Research data

The above figure shows the existence of relationship between financial performance and ATM and M-banking transactions for many periods of time. For periods 2008-2009, 2012-2013, 2015-2016, an increase in the variation of the ATM and M-Banking transactions has led to the rise in financial performance, while an opposite relationship is found for the period 2009-2010 between financial performance and M-banking transactions. However, the general view is that there might be a linear relationship between the three variables, a relationship which will be well shown by the following regression analysis part.

## 4.3. Regression Analysis

To examine the effect of electronic banking to the financial performance, a multiple linear regression model by OLS was done from the year 20058 to 2017, using the equation specified before i.e.

$Y = \beta_0 + \beta_1 LX1 + \beta_2 LX2 + \varepsilon$

Where,

Y          Financial performance (ROA = Net income/Total assets)

LX1        Volume of ATM transactions, in natural logarithm

LX2        Volume of M-banking transactions, in natural logarithm

$\beta_0$          is the intercept

$\beta_1, \beta_2$       are coefficients

$\varepsilon$           the error term

## 4.3.1. Unit Root Test

Unit root test is concerned with checking whether regression series are stationary. This means that their mean and variance are time invariant.

However, if the data is not stationary in level, it has to be differenced d times to make it stationary and then series are assumed to be integrated of order (d) and represented as I(d).

**Table 4.1: Results of Stationarity Test**

| Variables | | Stationarity in Level | | Stationarity in $1^{st}$ Difference | |
|---|---|---|---|---|---|
| | | ADF-test | PP-Test | ADF-Test | PP-Test |
| Y | t-stat | -1.460 | 0.0059 | -6.041 | -12.511 |
| | Prob. | 0.756 | 0.984 | 0.0083 | 0.001 |
| | Decision | **Non-stationary** | **Non-stationary** | **Stationary** | **Stationary** |
| LX1 | t-stat | 0.292 | 0.271 | -2.473 | -2.490 |

|      |          |                    |                    |            |            |
|------|----------|--------------------|--------------------|------------|------------|
|      | Prob.    | 0.747              | 0.741              | 0.021      | 0.0203     |
|      | Decision | **Non-stationary** | **Non-stationary** | **Stationary** | **Stationary** |
| LX2  | t-stat   | 5.656              | 2.309              | -4.455     | -4.978     |
|      | Prob.    | 0.999              | 0.98               | 0.001      | 0.0003     |
|      | Decision | **Non-stationary** | **Non-stationary** | **Stationary** | **Stationary** |

**Source:** Research data, from regression results with Eviews 8

The results above indicate that series are not stationary in level, but they are all stationary in first difference. This means that all series are then integrated of order one I(1). Therefore, the next step consists of continuing with the cointegration analysis by Ordinary Least Square (OLS).

## 4.3.2. Cointegratation Test (OLS)

Cointegration test consists of verifying the presence of a long-run equilibrium relationship between variables. The regression output is presented in the following figure 4.2

**Table 4.2: Regression Results (OLS)**

Dependent Variable: Y
Method: Least Squares
Date: 11/10/18   Time: 08:22
Sample: 2008 2017
Included observations: 10

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -1.712636 | 1.437052 | -1.191770 | 0.2722 |
| LX1 | 0.768874 | 0.179321 | 4.287708 | 0.0036 |
| LX2 | -0.087703 | 0.099620 | -0.880371 | 0.4079 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.726768 | Mean dependent var | | 4.176130 |
| Adjusted R-squared | 0.648701 | S.D. dependent var | | 0.474703 |
| S.E. of regression | 0.281359 | Akaike info criterion | | 0.544954 |
| Sum squared resid | 0.554140 | Schwarz criterion | | 0.635729 |
| Log likelihood | 0.275232 | Hannan-Quinn criter. | | 0.445373 |
| F-statistic | 9.309607 | Durbin-Watson stat | | 1.609532 |
| Prob(F-statistic) | 0.010663 | | | |

**Source:** Research data, from regression results with Eviews 8

From the results, it is concluded that there is a unique long-run equilibrium relationship between the variables. The model of the study is good as its adjusted coefficient of determination (Adjusted $R^{-2}$ = 0.648) is much greater than 50%. This means that the variation of dependent variable (Financial performance) is explained by the independent variables taken together at 64.8%. The implementation is that there is a relationship between financial performance and electronic banking in commercial banks of Kenya. The probability of F-statistic is also significant (0.0106).

From the above results, it is found that all independent variables are statistically significant at the 5% level.

Therefore, the estimated coefficients substituted from the above figure 4.2 are as follows:

$$Y = -1.7126 + 0.7688*LX1 - 0.0877*LX2 + \varepsilon$$

Prob:   (0.2722)   (0.0036)    (0.4079)

Thus, the coefficient of volume of ATM (LX1) is positive and significant, which means that an increase by 1% of ATM transactions corresponds to an increase of 0.76% in the financial performance

The coefficient of M-banking is negative and insignificant which is against the study expectation. This result contradicts the economic theory because the mobile banking is supposed to affect positively the financial performance of any banking institution. However, this unfortunate coefficient sign of M-banking may due to the lack of other variables that have not been included in the regression but that have a significant influence on the financial performance.

## 4.3.3. Autocorrelation Test

In doing a regression for a data that has a time series, it is important to test that variables do not show serial correlation. Means that the error terms should not be correlated to avoid the infringement of the OLS assumption.

**Table 4.3: Autocorrelation Test**

| Breusch-Godfrey Serial Correlation LM Test: | | | |
|---|---|---|---|
| F-statistic | 2.065077 | Prob. F(2,5) | 0.2219 |
| Obs*R-squared | 4.523641 | Prob. Chi-Square(2) | 0.1042 |

**Source:** Research data, from regression results with Eviews 8

Results showed that the model did not have a serial correlation problem based on the probability associated with Chi-Square (2), which was higher than 5%.

## 4.3.4. Multicollinearity Test

Collinearity is when two or more independent variables are linearly associated. Multicollinearity can be identified by the use of two collinearity diagnostic factors such as tolerance and the Variance Inflation Factor (VIF). Tolerance measures collinearity generated by SPSS and the tolerance of the variable is 1-R2. A tolerance value smaller than 0.1 must be investigated further. The following table shows the results generated by the multicollinearity diagnostic.

**Table 4.4: Collinearity Statistics between Financial Performance and Independent Variables**

| Model | | Collinearity Statistics | |
|---|---|---|---|
| | | Tolerance | VIF |
| 1 | (Constant) | | |
| | LX1 | .902 | 1.108 |
| | LX2 | .902 | 1.108 |

**Source:** Research data, from regression results with SPSS

The above table shows that tolerance values are greater than 1, which justifies that there is collinearity between the dependent variable and explanatory variables. Therefore, there is evidence to reject the existence of collinearity of the two explanatory variables; Volume of ATM and M-banking.
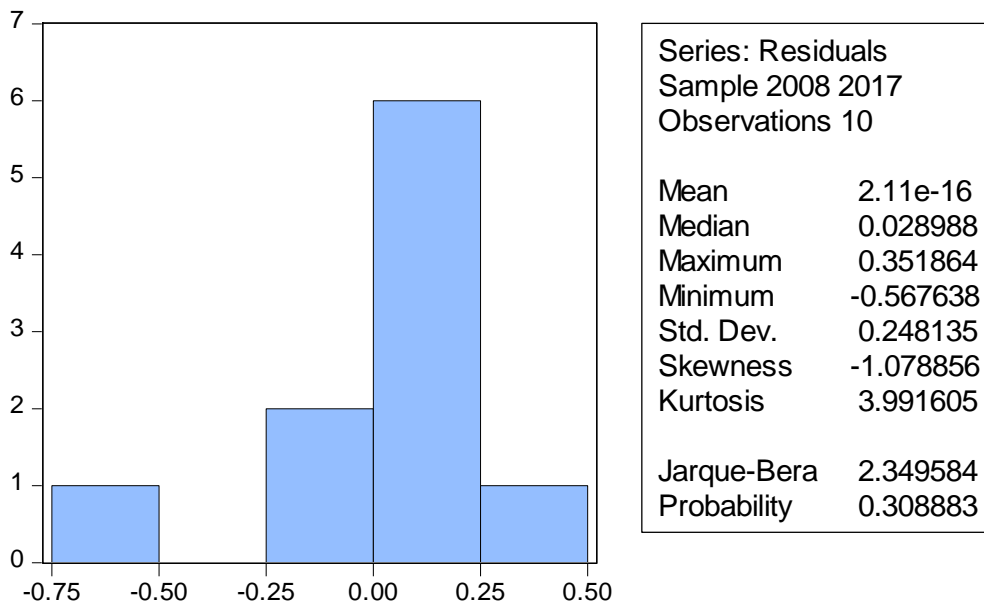
## 4.3.5. Normality Test

The test is concerned with checking the normal distribution of the residuals, and to do it, Jarque and Bera normality test have been adopted indicating Skewness and Kurtosis aspects. Skewness measures the asymmetry of the distribution around the mean and its

flattening degree. Therefore, to decide the normality test, the probability is used. If the probability with Jarque and Bera is higher than 5% of significance level, then residuals are distributed normally.

**Figure 4.4: Normality Test**



| | | |
|---|---|---|
| Series: Residuals | | |
| Sample 2008 2017 | | |
| Observations 10 | | |
| | | |
| Mean | | 2.11e-16 |
| Median | | 0.028988 |
| Maximum | | 0.351864 |
| Minimum | | -0.567638 |
| Std. Dev. | | 0.248135 |
| Skewness | | -1.078856 |
| Kurtosis | | 3.991605 |
| | | |
| Jarque-Bera | | 2.349584 |
| Probability | | 0.308883 |

**Source:** Research data, from regression results with Eviews 8

The above figure shows that model residuals are normally distributed as shown by the probability associated with Jarque-Bera is much higher than 5% (0.3088).

**4.3.6. Heteroskedasticity Test**

The non-constant of the variance of error is called heteroscedasticity, and it is important to check whether differences that are in the population regression are homoscedastic, (Gujarati, 2003). Test of heteroscedasticity of White is used to check if the square of the residuals can be explained by the independent variables in the model.

**Table 4.5: Heteroskedasticity Test**

| Heteroskedasticity Test: White | | | |
|---|---|---|---|
| F-statistic | 0.974653 | Prob. F(5,4) | 0.5245 |
| Obs*R-squared | 5.492076 | Prob. Chi-Square(5) | 0.3588 |
| Scaled explained SS | 4.025380 | Prob. Chi-Square(5) | 0.5458 |

**Source:** Research data, from regression results with Eviews 8

The results above show that there is no heteroscedasticity problem. Thus, the study residual is homoscedastic.

## 4.4. Discussion of Research Findings

From the descriptive analysis, it was found that the movement of financial performance was up sloping for the study period. The variation was higher in 2010 up to 4.5% while a low variation was found in the year 2017 (3.38%). Also, ATM transactions recorded an erratic movement from 2008 to 2017 with a considerable minimum of KES.1902 million in 2008 and a maximum of KES.9040.92 million in 2013. Indeed, the M-banking transactions were in in rise for the whole period of the study. This means that M-Banking has been used at high extend in commercial banks of Kenya. In nutshell, the descriptive statistics showed the existence of relationship between financial performance and ATM and M-banking transactions for many periods of time. For periods 2008-2009, 2012-2013, 2015-2016, an increase in the variation of the ATM and M-Banking transactions has led to the rise in financial performance, while an opposite relationship is found for the period 2009-2010 between financial performance and M-banking transactions.

The findings of regression analysis showed that ATM volume has a positive and significant effect on the financial performance while the mobile baking has negative and

nonsignificant effect on the dependent variable. Thus, it was concluded that an increase by 1% in the ATM transactions corresponds to an increase by 0.76% in the financial performance of commercial banks. This finding is consistent with Osewe and Muturi (2017) who analyzed how e-banking affected financial performance of Kenyan commercial banks. Abaenewe et al. (2013) did a study to determine how e-banking influenced financial performance among commercial banks and indicated that incorporation of e-banking in operations of commercial had a positive and significant influence on ROA. Karimzadeh, Emadzadaeh and Shateri (2014) looked at how expansion of e-banking influenced profitability among firms in the banking sector and established that ATMs, credit cards and size of the bank had positive and significant influence on financial performance. Similarly, Vekya (2017) did a study to assess how e-banking impacted on profitability of Kenyan commercial banks and established that POS and ATM transaction had positive and significant influence on financial performance. However, the non-significance effect of M-banking in this study may due to others factors with an important effect on financial sector, but that have not been considered and included in the model

# CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1. Introduction

The chapter gives a breakdown of the analysis findings informed by the objectives. The conclusions from these findings are also presented. The recommendations for policy, theory and practice are also presented. Suggestions are also indicated for further studies.

## 5.2 Summary of the Findings

The study had the objective of determining the relationship between electronic banking and financial performance of commercial banks in Kenya, it used a descriptive design with a population of interest consisted of 43 commercial banks. Secondary data was collected on volume of M banking and ATM transactions, total assets, net income for a ten year period 2008 all through to 2017 and a multiple linear regression model was used. Therefore, regression through OLS showed that 64.8% discrepancy in the financial performance is rationalized by the independent variables taken together. The study revealed a positive and significant effect of ATM volume on the financial performance. This can be interpreted to mean that an increase in investment in e-banking channels would result into an increase in financial performance. When commercial banks increase their investment in e-banking channels, financial performance of the commercial banks would definitely increase. Indeed, findings showed a negative and non-significant effect of M-banking on the financial performance and this is against the economic theory. It may due to others factors with an important effect on financial sector, but that have not been considered and included in the model.

The study also conducted diagnostics tests whose values were within the required thresholds showing suitability for analysis.

## 5.3 Conclusion

The study analyzed the relationship between electronic banking and financial performance of commercial banks in Kenya. Yearly data on volume of ATM, M-banking, total assets, net income, all information from 2008 to 2017 was used. Total assets and net income were used to compute the ROA which was used as dependent variable of the study model. Therefore, regression through OLS showed that 64.8% discrepancy in the financial performance is explained by the independent variables taken together.

Indeed, the study findings revealed that ATMs have positive and significant relationship with financial performance of commercial banks. The implication was that an increase by 1% in the volume of ATM transactions leads to an increase by 0.76% in the financial performance. The mobile banking variable encountered a negative relationship with financial performance of commercial banks which is doesn't agree with the economic theory.

## 5.4 Recommendations of the Study

The study suggested that senior management team of 43banks of commercial in Kenya should increase investments in ATMs to positively affect financial performance of their organizations. The top management team of all commercial banks should also invest more in mobile banking channels and platforms in order to increase financial performance. The management team of commercial banks ought to allocate sufficient resources for expansion which would grow the sizes and thus financial performance would increase.

The Central Bank of Kenya should formulate sound policies and guidelines that guide the growth of e-banking among commercial banks and this financial performance. The CBK should speed up approval of all new e-banking innovations that commercial banks strive to put in place in order to improve on financial performance.

## 5.5 Limitation of the Study

The study limitation was occurred during data collection stage. The study was unable to get monthly data from the CBK; therefore it was necessarily to use yearly data. The study also unable to get individual data for each commercial bank, reason why it opted to use aggregated data for the 43 commercial banks as published by the CBK. The study was limited to banks other than other nonbank institution, which used e-banking like mobile phone money transfer were not considered in the study. Further, the study was limited to the time frame which was only 10 years since the mobile banking started operating in Kenya. This might have affected the regression results because the more number of observations is high in a linear regression, the more the regression results are good. Another limitation is due to the relationship between e-banking and financial performance among commercial banks. In fact, there are factors that can affect financial performance of the commercial banks such as, CBK regulations number and type of customers. Due to the lack of those other factors, the study found an unexpected coefficient sign of variable mobile banking.

## 5.6 Suggestions for Further Studies

From regression results, the current study had an R square of 0.72, which meant that 72% change in financial performance of commercial banks is explained by the e-banking put in place. This, therefore, showed that other aspects existed apart from e-banking that influence financial performance of commercial which future studies should be done to determine. The study focused on commercial banks in Kenya. In total, 43 banks were involved in the study. Future studies should be extended to other firms in the financial sector including insurance companies, Micro finances, and the deposit taking SACCOs. This would facilitate comparison of the findings hence generalization of the findings.

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# APPENDICES

**Appendix I: List of Commercial Banks In Kenya**

1) African Banking Corporation Ltd

2) Bank of Africa Kenya Ltd

3) Bank of Baroda Ltd

4) Bank of India Ltd

5) Barclays Bank of Kenya Ltd

6) CFC Stanbic Bank Ltd

7) Charterhouse Bank Ltd

8) Chase Bank Kenya Ltd

9) Citibank N.A Ltd

10) Commercial Bank of Africa Kenya Ltd

11) Co-operative Bank of Kenya Ltd

12) Credit Bank Ltd

13) Development Bank of Kenya Ltd

14) Diamond Trust Bank Kenya Ltd

15) Dubai Bank Kenya Ltd

16) Ecobank Kenya Ltd

17) Equatorial Commercial Bank Ltd

18) Equity Bank Ltd

19) Family Bank Limited

20) Fidelity Commercial Bank Ltd

21) Fina Bank Ltd

22) First community Bank Limited

23) Giro Commercial Bank Ltd

24) Guardian Bank Ltd

25) Gulf African Bank Limited

26) Habib Bank A.G Zurich

27) Habib Bank Ltd

28) Imperial Bank Ltd

29) I &M Bank Ltd

30) Jamii Bora Bank Limited

31) Kenya Commercial Bank Ltd

32) K-Rep Bank Ltd

33) Middle East Bank (K) Ltd

34) National Bank of Kenya Ltd

35) NIC Bank Ltd

36) Oriental Commercial Bank Ltd

37) Paramount Universal Bank Ltd

38) Prime Bank Ltd

39) Standard Chartered Bank Kenya Ltd

40) Trans-National Bank Ltd

41) UBA Kenya Bank Limited

42) Victoria Commercial Bank Ltd

43) Housing Finance Ltd

**Source: CBK, 2018**

**Appendix II: Absolute Data for the 43 commercial banks**

| Date | Volume of ATM | Volume of M-banking | Total asset | Net income | ROA |
|------|---------------|---------------------|-------------|------------|-----|
| 2008 | 1,902 | 62.7 | 1,157,769 | 43,293 | 0.037393 |
| 2009 | 2,816.10 | 193.5 | 1,315,937 | 48,928 | 0.037181 |
| 2010 | 5,507.32 | 311.05 | 1,648,786 | 74,272 | 0.045046 |
| 2011 | 6,827.41 | 433 | 1,988,846 | 89,453 | 0.044977 |
| 2012 | 7,283.75 | 577.3742 | 2,289,649 | 107,899 | 0.047125 |
| 2013 | 9,040.92 | 732.5971 | 2,656,639 | 125,760 | 0.047338 |
| 2014 | 6,666.99 | 911.31 | 3,138,905 | 141,145 | 0.044966 |
| 2015 | 2,123.82 | 1,114.18 | 3,423,835 | 134,017 | 0.039142 |
| 2016 | 3,355.10 | 1,331.00 | 3,627,858 | 147,445 | 0.040642 |
| 2017 | 3,638.50 | 1,543.50 | 3,940,615 | 133,196 | 0.033801 |

**Source:** Central Bank of Kenya

**Appendix III: Data used for regression**

| Date | ROA | Natural logarithm of ATM | Natural logarithm of M-banking |
|------|-----|--------------------------|--------------------------------|
| 2008 | 3.73935 | 7.550661 | 4.138361 |
| 2009 | 3.71811 | 7.943108 | 5.265278 |
| 2010 | 4.50465 | 8.613833 | 5.739954 |
| 2011 | 4.49773 | 8.828701 | 6.070738 |
| 2012 | 4.71247 | 8.893401 | 6.358483 |
| 2013 | 4.7338 | 9.109516 | 6.5966 |
| 2014 | 4.49663 | 8.804924 | 6.814883 |
| 2015 | 3.91424 | 7.660972 | 7.015874 |
| 2016 | 4.06424 | 8.118237 | 7.193686 |
| 2017 | 3.38008 | 8.199327 | 7.341808 |

**Source**: Researcher's computations