EFFECT OF TECHNOLOGICAL INNOVATIONS ON FINANCIAL PERFORMANCE OF BANKING INDUSTRY IN KENYA

BY

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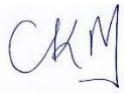
DECLARATION

This project is my work that has not been submitted for any award to any other College or University.

Signature  Date: 01/12/2020

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DEDICATION

I dedicate this study to my dear parents who have gladly walked with me in this academic journey. Your contribution is unmeasurable.I love you all.

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ABBREVIATIONS AND ACRONYMS

ATM - Automated Teller Machine
CBA - Commercial Bank of Africa
CBK - Central Bank of Kenya
CRBs - Credit Reference Bureaus
GMM - Gaussian Mixture Modelling
ICT - Information Communication Technology
KCB - Kenyan Commercial Bank
MFIs - Micro Finance Institutions
MFS - Mobile Financial Services
OLS - Ordinary Least Squares
POS - Point of Sale
R&D - Research and Development
ROE - Return on Equity
ROA - Return on Assets
RTGS - Real Time Gross Settlement
ROCE - Return on Capital Employed

ABSTRACT

The study had an objective of determining impact of digital innovations on the performance of banking industry in Kenya. The study involved a population of 42 registered commercial banks which were in operation as at 31st December 2019. Secondary data was collected for the period ranging between 2012 to 2019. Quarterly data on net income, Asset quality, and liquidity, was retrieved from the individual commercial banks' annual reports. Data on transactions numbers through the mobile devices, value of bank transactions through the Internet devices in the whole year, and the value of transactions through the ATMs was obtained from the CBK's annual survey report. Diagnostic examinations on normality, linearity, multicollinearity, and autocorrelation were done on the collected data to establish its suitability in the formulation of linear regression model. The study applied statistics of description such as median and mode for data analysis. Inferential statistics were used in the study through the multiple regression models so as to find out the link between the explained and explanatory variables. Correlation analysis established ATM banking showed positive relationship with financial performance while internet banking showed a positive but insignificant linkage with banking industry performance. Regression analysis on the other hand revealed that ATM banking and internet banking had a tangible and significant relationship with performance of commercial banks while mobile banking had negative and insignificant relationship to the financial performance. The study recommended banking industry to increase their application of such digital innovations as mobile banking, ATM banking and internet banking..

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Technological innovation is a key force for bank performance as it directly impact consumers due to its capability to improve profitability within the banking sector (Tahir et al., 2018).Application of technological innovations enhance bank productivity, quality of service and profitability (Tunay, Yüksel & Tunay, 2019).Innovations based on technology provide chances of having substantial cost advantages leading to a rise in profits as well as lowering risks as compared to traditional banking practices (Akhisar Tunay & Tunay, 2015). Technological efficiency reduces transaction costs therefore boosting bank revenue. For instance, technology enables the banking sector to cross-market the new as well as the existing products to potential customers leading to improvement in financial performance (Lawrence, 2010).

Theoretically, this study was anchored on, diffusion of innovation theory and the Schumpeter theory of creative destruction. The diffusion of innovation theory explains such policy making processes which apply innovations that are optional through authority, collective and liable innovation decisions and explains why some banks are faster in adapting to new technologies (Liu& Li, 2009). The constraint - induced financial innovation theory points out that financial innovation exists to ensure profit maximization of any financial institution is achieved (Silber, 1983).

Contextually, the concept of technological innovation has been greatly adopted and embraced by financial institutions in Kenya. The 10 prominent banks in Kenya have established more than 10600 agents with the Equity bank and Kenya Commercial Bank taking the lead in introducing more agency networks across the country than any other bank. Kenyan commercial banks have constantly embraced innovations with the intention of enabling service delivery to customer. In Kenya among the technological innovations adopted include, internet banking, ATM cards, debit cards and electronic fund transfers. Technological innovations save on banking transaction costs, enable convenience and ensure safety in cash transfers leading to customer satisfaction (Musyoka, 2014).

1.1.1 Technological Innovation

Technological innovation is referred to as the process through which financial institutions utilize the efficiency of information communication technology (ICT) in coming up with products and services as well as new ways of providing bank services (Gardeva & Rhyne, 2011). The existence of new financial technologies, new financial markets and new financial instruments is what constitute to financial innovation (Tufano, 2012). Technological innovation relates to the planning, the developing as well as the execution of relevant financial instrument accompanied with innovation and creativity in providing solutions to the incumbent puzzling issues in the financial sector (Lawrence, 2010).

Technological innovation represents a major tool linking both the economic and the banking sector (Chaarani & Abiad, 2018). Technological innovations are tools embraced by financial institutions to ensure services are rendered to customers effectively. Technological innovations within the banking industry have the objective of fastening service delivery as well as widening the market share of particular financial institutions (Jack & Suri, 2010). Financial institution competitive advantage distinctiveness can be known due to successful innovations especially in a highly unstable working environment thus placing banking institutions a distinct competitive edge leading to higher-level financial performance (Zu, Gu, & Bonsu, 2019).

Mobile banking and ATM banking remains key forms of technological innovations within the financial sector. The core concept of electronic banking is to enable customers easily access their accounts through a website and ensure they perform several certain transactions through tight security checks (Essinger, 1999). Therefore technological innovations are not only advantageous to the banks and other financial institutions but also to the nation as whole since they ensure financial services are accessible to all people. In the study, the technological financial innovations were measured by the use of ATM, internet, as well as mobile banking. The study operationalized mobile banking by using number of transactions through mobile devices, internet banking by using value of bank transactions through internet devices and ATM banking by using value of transactions through the ATM.

1.1.2 Financial Performance

This is application of techniques to determine the degree, to which an objective is achieved, inputs needed to avail the needed financial resources as well as supporting bank with investment avenues (Heremans, 2007). Rutagi (1997) explains that the measure of how well a firm is faring on is what constitutes financial performance. This therefore means a measure of how well an organization creates and enhances value for its various shareholders (Ahmed, Raza, Amjad & Akram, 2011).

Several financial institutions with inclusion of banks entail a variety of financial indicators as well as other indicators to engage in measuring financial performance. A lot of literally work on financial performance of banks focus only on maximizing returns and lowering the risks (Boot & Thakor, 2007). There is always a primary relationship between return and risks which associates high risks with higher returns sand lower risks with lower returns. The continuous increase in competition among the banking sector dictates that there is a reason to create new processes to ensure banks remain competitive in the market.

Financial performance in an organization can be evaluated in various means. Commonly used vital financial ratios applied in measuring profitability include (ROE), (ROA) and operating profit margin not neglecting the net revenues (Zenios, 1999). The ROA is definite measure of return from all assets of the firm, hence therefore the greater the value the greater the profitability while the lower the value the lower the profitability. The ROE is carefully analyzed in comparison to return on assets to ascertain if a firm makes a considerate return on the money borrowed. This

study operationalized financial performance by using return on total asset as the key financial performance indicators.

1.1.3 Technological Innovation and Financial Performance

Products based on technology avail a number of advantages to the banks. For example, cost related benefits for the bank, rise in profitability, and lowering of risks compared to traditional banking products (Tunay, Yüksel & Tunay, 2019). Managers of banks are therefore encouraged to adopt new technological financial innovations that are directed towards cost reduction and consequently profit maximization (Nader, 2011).

Banks acquire competitive edges and enhance performance by embracing branchless banking mechanisms (Mckay & Pickens, 2010). This is attributed to the fact that branchless mechanisms are cheaper to maintain owing to it that they are less labour intensive as opposed to traditional banking mechanisms. Gutu (2014) posits that continued application of technological innovations in the Romanian banking sector has significantly reduced the costs therefore leading to an increase in bank revenue. Innovations have tendency to reduce the overdependence on manual labour through establishing platforms where account holders can comfortably transact through self-service capabilities.

An innovation for example, use of ATMS, agency and internet banking leads to a reduction of banking overhead costs (Krawish & Al-Sadi, 2011). Innovations hence do not only lead to cost reduction but also enhance bank profitability. Electronic banking reaps benefits by enabling customer satisfaction and reducing any moral

hazard. Online banking ensures customers can transact and have access to their accounts on a timely basis. Banks also benefits through online banking as they can transact faster and conveniently hence leading to positive influence on the performance.

1.1.4 Banking Industry in Kenya

During end of 31st December 2019, the banking industry in Kenya comprised of forty two commercial banks, one mortgage financing firm, thirteen microfinance banks, nine foreign bank representatives, seventy four licensed bureaus of foreign exchange, nineteen providers of money remittance and three CRBs(CBK Annual report, 2019).The acts governing the Kenyan banking industry include the Central Bank Act (Cap. 491 of 1966), the Companies' Act (Cap.17 of 2015) as well as the Banking Act (Cap.488 of 1989). In addition, there are certain policies and procedures which are normally issued and guided by Central Bank of Kenya. All the bank operations including digitalized operations including mobile applications, which facilitate transfer, deposit and withdrawals are under the control of CBK. Kenyan commercial bank industry remains an integral key contributor to the Kenyan economy. The Kenyan banking sector forms the greatest part within the entire financial sector in Kenya since the capital market is still evolving, hence less popular.

The key function of banking industry in Kenya in fostering economic development through their financing mechanism necessited the need to study and clearly understand their operation structure (Nyathira, 2012). Financial Technologies in Kenya have been adopted by the Kenyan commercial banks in a mighty way. The continued use of mobile banking platforms remains a clear evidence of digitalization.

According to a report issued by KCB in 2019, KCB lent over 212 billion through the mobile Mpesa platform representing more than 70% of total loans rent by bank.

From the Equity report issued in 2019 the first mobile virtual network operator (MVNO) to be introduced in Kenya, Equitel, and Equity Bank's mobile banking account for more than 77% of all the banking group transactions. The report further indicates that more than 89% of all processed loans are currently originated through the mobile platforms. Kenya has continued to invest heavily on digital technological innovations as well as equipping human resource necessary skills to handle pertinent innovations. The agency banking rose to around 157.2 million in year 2018 from around 92 million experienced in 2010 (CBK 2018). The total assets also increased to 4 billion in 2018 from 1.7 billion in 2010 (CBK 2018).

1.2 Research Problem

The application of technological innovations in the banking industry leads to delivery of quality services with reduced efforts and enhanced performance of banks (Chaarani & Abiad, 2018). Technological innovation investment opens doors for a new enabling environment leading to an increase in performance of banks (Tahir et al., 2018). However, in the global competition world of bussiness have been facing many challenges arising from globalization, liberalization, advancements in technology, as well changing customer's expectations (Abdullah, 2017).

The banking industry in Kenya has continually invested heavily on digital technological innovations as well as equipping human resource with necessary skills to handle pertinent innovations (Korir, 2014). Significant reforms involving the emergence of credit reference bureaus, agency banking, and use of e-commerce to

improve payments system have been undertaken by Kenyan banks (Okiro & Ndungu, 2013).

Nevertheless, despite adoption of technological innovation by Kenyan banks, the sector experiences long queues, errors relating to transactions, insecurity, network challenge among other Challenges (Cherotich et al., 2015).The big question remains whether mobile banking, internet banking, use of credit cards, as well as agency banking necessarily leads to a rise in financial performance of commercial banks. Continued adoption of technological innovation in third world countries such as Kenya necessited the need for this study. (Joseph et al. 2003).

Despite many studies having been conducted especially on the area of customer satisfaction and excellent banking industry services in the banking sector in Kenya, only few studies in Kenya have narrowed down to the impact of financial technology on commercial banks using financial performance as an indicator (Mugambi, 2006). Though technological innovation is important in

highlighting financial performance in banking, the effect of technological innovation on performance, remains misinterpreted because of two major reasons, first, there is limited knowledge in regard to the key motivators of technological innovation and secondly, the considerable effect of technological innovation on banks' performance is still fairly tested (Mabrouk and Mamoghli, 2010). Empirically, several studies have been carried out in relation to how performance of banks is influenced by technological innovations but the results have always been conflicting.

Francesca and Claeys (2010) found out technological innovation significantly affected performance of commercial banks hence leading to a rise in performance of banking industry in Kenya. A research done by Lerner and Tufano (2011) on the consequences innovations on performance of commercial banks revealed that current empirical evidence suggest more about technological innovation but still several questions remain unanswered in the area of social welfare by technological innovations as well as the effect of technological innovations on financial institutions with major studies being case studies. Hendrickson and Nicholas (2011) engaged on a research to explore the impact of interstate branching on performance of banks and found out that commercial banks recorded high financial performance by adopting innovations across all the branches.

In Kenya, Ngumi (2014) endeavored to examine the consequences of technological innovations to financial markets and revealed that financial innovations were integral in adding value to commercial banks. However, Kariuki (2011) found out that some aspects of financial innovations such as transacting trough agents and use of debit cards were not effective in improving the bank profits.

These studies hence formed the foundation of engaging a research on associated topic in the banking industry that has enjoyed a continuous rise in application of technological innovations in the recent past so as to compare the findings from other researchers locally, regionally as well as globally.

1.3 Research Objective

To find out impact of technological innovations on financial performance of commercial banks in Kenya.

1.4 Value of the Study

The research will have an implication in policy enhancement and development. The outcome benefits the makers of policies as they make regulations and policies governing banks in the process of embracing digital financial innovations. The study may also play a key role in assisting the regulators form guidelines for commercial banks aspiring to embrace the financial innovations. The policy makers therefore may need information from this study to advice on risk minimization especially when dealing with technological innovations.

The study will also benefit managers. Commercial bank managers will make managerial decisions regarding application of technological innovations by deeply understanding the conclusion from this study. The management through this study will be in a position to understand the challenges associated with innovation and technology and how to address them.

This study will also assist individuals seeking knowledge in various fields such as economies and research methods. In addition, researchers will also engage on further researches based on recommendations provided in the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This brings out key theories guiding the research, the determinants of performance as well as various studies on the study variables. The chapter further presents an analysis and a conclusion of the reviewed studies.

2.2 Theoretical Review

This study embraced diffusion of innovation theory as the main anchoring theory. Diffusion of innovation theory state that, with high rate of diffusion, the impact is higher and consequently a higher financial return on the initial investment. (Akhavein, Frame & White, 2005). This highlights the level to which the bank performance of the commercial banks across the globe has really depended on technological innovations.

2.2.1 Diffusion of Innovation Theory

The theory was formulated and expounded by Rogers (1995). It is well known as the theory embraced In ICT research in explaining the technology adoption. Rogers (1995) defines diffusion as the process through which any means of innovation acquires momentum and then spreads it to a particular demography or any social integration. The outcome of this is that people hence embrace and apply the new concept or product through perception. This therefore means diffusion is only possible through perception and integration in the social system. The diffusion of innovation theory states that the diffusion rate is characterized by any innovation's dynamism, integration, superiority, testability, the degree of being compatible and perception (Rogers, 1983 & 2003).

The major critique of this theory is that it fails to address on whether it's applicable in all types of firms or not (Lundblad & Jennifer, 2003). The theory is also unconcerned on whether the innovative characteristics comes into play to influence its adoption and also if the type or size of the industry affects its adoption.

The theory however remains in force as it highlights key reasons why some banks are quick to adapt to new technological innovations. The main reason however why the banks apply the technical superiority is to acquire a competitive advantage and consequently gain financial advantage compared to other banks which do not apply.

2.2.2 Constraint-Induced Financial Innovation Theory

This was conceptualized by Silber (1983). The theory argued the desire to achieve maximization of profit by any financial institution is the main reason of innovation. According to Silber (1983), there some limitations such leadership styles and organization management which interfere with efficiency of financial institution hence the institutions fight to wipe them out. However, it insists innovation is directed towards profit through fighting off certain conditions facing the financial institutions. The theory explains how commercial banks develop new means of creating income amid the changing environment.

The theory highlights of possible constraints within and outside an organization which prompt an organization to develop innovations which avail a means of playing in the market with the objective of increasing financial performance. The theory however discussed financial innovation from microeconomics perspective therefore failing to demonstrate the phenomena of financial innovation from the increasing trend of liberal finance. It emphasizes innovation in adversity excessively.

This theory however remained relevant to this study as it explained how innovations affect the profitability of firms through enhancing performance in the services provided which consequently leads to improved financial performance of banks.

2.2.3 Schumpeterian Theory of Innovation

Joseph Schumpeter (1928, 1939) initiated the Schumpeter theory of innovation. The theory viewed innovations as continuous processes of creative destruction which were vital in facilitating growth in capital systems. Schumpeter's theory highlights innovation as evolving cycle which starts when lure new entrants as a result of experiencing profit chances, and therefore a wave of investments do occur hence reducing total profits (Chaarani & Abiad, 2018).

Schumpeter (1928) argues that the inconsistent and the disruptive nature of changes in technology in capitalism brings forth an inseparable merge between short term and long-term growth rate. Schumpeter largely depended on both the social and organization forces which had a share throughout the different cycles of industrial change. A major critique of the Schumpeter theory of innovation is that though Schumpeter really stressed the benefits emanating from innovation through his insights, he never mentioned the source of the innovation.

Porter (1992) echoes the work done by Schumpeter by arguing that innovation is important for long-term growth of any nation and its competitive advantage. The country through its financial sector should therefore invest more in innovations so as to attain competitive advantage and be in a position to effectively compete in the international financial markets. Until today, the innovation work which originated

from the foundation laid by Schumpeter has been narrowed down to the innovation creation among firms. The Schumpeter theory therefore remained relevant to this study since new technology applied replaces old technology which is of worth as the new technology brings value addition to the adopter.

2.3 Determinants of the Financial Performance

Technological innovation, liquidity and asset quality were incorporated in this study as key determinants of commercial banks 'financial performance.

2.3.1 Technological Innovations

From the perspective of technology, innovation is viewed as a science-based process. Theoretically technological innovations are therefore expected to decrease the associated costs of doing business in banks and therefore lead to higher profits (Lyons, Chatman & Joyce, 2007). Technological innovations are therefore tools embraced by financial institutions to ensure services are rendered to customers effectively. Innovations within the Banking industry have the objective of fastening service delivery as well as widening the market share of particular financial institutions (Jack & Suri, 2010). The adoption of technology is to therefore ensure that the large volume of transactions executed by Banks take the shortest time possible.

For example, mobile banking, internet banking and ATM banking do enable customers access banking services throughout, this is likely to lead to higher earnings for the banks due to the reduced transaction costs and also reduced distribution channels (Stavins, 2011).

2.3.2 Liquidity

Liquidity is influenced by availability of funds in the market (Schildbach (2017). Liquidity entails the cash balance at the bank's disposal to settle the short term maturing obligations. In the financial services and in particular in deposit taking business, liquidity management is crucial in order to cater for the credit demand while also giving out the demand deposits to the depositors. Due to the need for liquidity, financial entities must hold sufficiently liquid assets against cash outflows for 30 days to support short-term resilience.. Moreover, they held a view that the enterprise should have adequate cash balance as it greatly affects the earnings whereby part of it is given out as dividends to the shareholders (Blankenburg & Palma, 2009). Liquidity is usually measured using the liquidity ratio.

2.3.3 Asset Quality Management

Ombaba (2013), explained that asset quality which is also known the quality of loan as the entire risk which is attributed towards the particular assets held by any institution. This is normally applied by various commercial banks to evaluate how many of their assets could be a particular risk as well as potential losses they could make.

2.4 Empirical Review

2.4.1 Global Studies

Zu, Gu and Bonsu (2019) assessed the impact of technological innovation on banks profitability in Africa between 2015 and 2018. Analysis was done through dynamic panel data method and GMM estimations methods. The findings indicated that, use of

ATM significantly and positively affected banks' financial performances with the exception of POS terminal and internet banking.

Chaarani and Abiad (2018) assessed the impact of digital innovation Lebanese banks' performance from the year 2010 to 2017. The study involved ROA and ROE as indicators of financial performance. Digital innovation elements under consideration comprised of; internet banking, mobile banking, ATM machines as well as investment in the computer software. The study found out that investment in internet banking showed significant impact on financial performance of Lebanese banks.

Tahir et al (2018) sought to find out if innovation improves Pakistan's banks performance. Secondary data was collected between 2007 and 2016 and analysed using the multiple regression model. The study result documented a significant effect the web/internet transactions on the bank performance. However, the study found an insignificant relation between ATM innovation and mobile banking and bank performance.

Abdullah (2017) examined the impact of innovations related to technology on banks' performance in Jordan. Primary data was collected through questionnaires from 11 banks and the regression model employed for analysis. The study found that with the use innovations, performance of commercial banks improved. Technological innovations were also reported to have shown a significant positive effect on customer service through ensuring that banking services were easily accessible to customers..

Akhisar Tunay and Tunay (2015) did a study on how electronic-based banking services affect profitability of banks. Data was collected from banks in 23 developing and developed nations between 2005 and 2013 and then analysed using the dynamic panel regression. The study revealed that bank profitability increased with the number of ATMs while internet banking led to reduced bank performance. The study however focused on electronic banking as the only source of technological innovation.

2.4.2 Local Studies

Kamau and Oluoch (2016) examined the link among technological innovation and performance of kenyan banks. Analysis was incorporated for the study and data was collected between 2012 and 2015 from 41 banks. Using correlation analysis the study revealed that ATM banking showed the greatest influence on performance of commercial banks hence more ATM services ought to be made available. The outcome from regression found that there was positive correlation between use of ATM and other elements of technological innovation.

Cherotich et al (2015) sought to explore the impact of digital innovations on performance of banking industry Kenya. The study incorporated secondary data collected from the 44 Kenyan banks and analyzed it using the regression model. The study indicated that technological innovations study significantly affected performance. The research found out that technological innovations positively influenced banking industry in Kenya.

Ngari and Muiruri (2014) sought to determine the impact of digital innovations on performance of banking industry in Kenya. A sample of sixteen banks was done and questionnaires were used to collect data with the regression model being incorporated

for analyzing data. The outcome indicated that a number of banks in Kenya had continually applied certain innovations such as digital banking. Further the research indicated that the innovations applied had a significant impact on commercial banks's performance in Kenya.

Gichungu and Oloko (2015) explored the impact of technological innovations commercial banks 'performance in Kenya. The research adopted agency banking, internet and mobile banking as key
variables. The study incorporated descriptive research design involving secondary data . The study found that technological innovation showed significant impact on the performance of commercial banks in Kenya.

Monyoncho (2015) embarked on a research to find out the impact of technologies on financial performance of banking industry in Kenya. The study indicated that electronic banking significantly affected performance of commercial banks. Through e-banking customers can easily transfer cash, as well as pay bills through various accounts. Further the findings indicated that internet related banking showed a considerable effect performance of banks in Kenya.

2.5 Conceptual Framework

This comprise of technological innovations as explanatory variable and financial performance as the explained variable as shown by figure 2.1. The study also incorporated asset quality management and liquidity as control variables.

Independent variable **Dependent Variable**

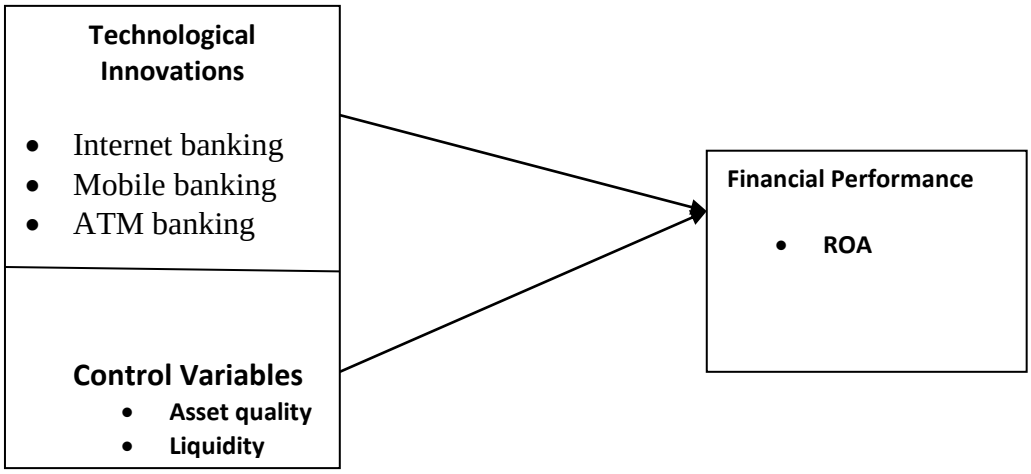

Figure 2.1: Conceptual Framework

Source: Author (2020)

2.5 Summary of Literature Review

Chapter two emphasis was an in-depth analysis of empirical and theoretical literature of technological financial innovations and financial performance. Theoretically, the diffusion of innovation theory highlights that the main reason why the banks apply the technical superiority is to acquire a competitive advantage and consequently gain financial advantage compared to other banks which do not apply. The constrained induced financial innovation theory explains how financial innovations affect the firms' profitability through enhancing performance through the services provided which consequently leads to improved financial performance of banks. According to the Schumpeter theory new technology applied replaces old technology which is of worth as the new technology brings value addition to the adopter.

Empirical studies provide contradictory outcome in regard to impact of technological innovations on commercial banks' performance. Studies done by Akhisa and Tunay (2015) reveal that ATM banking positively affected bank performance while financial performance reduced with application of internet banking. However, studies done by Zu, Gu and Bonsu (2019), Chaarani and Abiad (2018), Abdullah (2017), Tahir et al (2018) , Kamau and Oluoch (2016), Gichungu and Oloko (2015) and Monyoncho (2015) reveal that technological financial innovations do have a significant effect to the banking industry in Kenya.

The reviewed studies also make use of different research methodologies while the study contexts also vary making it difficult to generalize previous findings to the

existing Kenyan context. Due to these inconsistencies from most studies carried out both locally and globally, the motivation of this study remained relevant and justified.

CHAPTER THREE:

RESEARCH METHODOLOGY

3.1 Introduction

This encompasses the design, target cluster, study patterns, data collection techniques analysis of data techniques. The methodology means the general principle which guides a researcher on how to carry out a study, (Dawson, 2009).

3.2 Research Design

This encompasses an highlight of data collection and data analysis. It also addresses how research questions are addressed (Kumar, 2011). Choice of any design for research depends on type of data and the type of data analysis adopted by a given researcher (Cooper & Schindler, 2013).The research applied descriptive research design which strives to collect data and ascertain the existence of relationship among the variables. The main reason of using descriptive analysis is that it involves data collection without having to tamper with its natural endowment (Mugenda & Mugenda, 2003). Descriptive research attempts to explain particular patterns while referring to situations in the past and inferring to future happenings.

3.3 Target Population

This includes the aggregate collection of all the elements with similar features that can be applied to make inferences (Kothari, 2004). The study population encompassed all the 42 registered banks which were in operational as at 31st

December 2019. The research hence undertook a census of the 42 registered banks in Kenya.

3.4 Data Collection

The process of gathering data is critical as it ultimately impacts on the authenticity of the results.Quartely data on liquidity and Asset quality was retrieved from the individual commercial banks annual reports. Quarterly data on the number of transactions through the mobile devices, value of bank transactions through the Internet devices in the whole year, and the value of transactions through the ATMs was obtained from the CBK's annual survey report.

Secondary data was collected for the period ranging between 2012 to 2019. The period chosen was relevant since during the period the Kenyan banking sector had witnessed major developments in adoption of financial technology innovation.

3.5 Diagnostic Tests

This study relied on secondary data and as such performed the following diagnostic tests:

3.5.1 Unit Root Test for Stationarity

This study relied on the Augmented Dicky Fuller Test to investigate whether the data collected was stationary

3.5.2 Auto-Correlation Test

The data collected was subjected to the auto-correlation check that is aimed at determining correlation between data points at different times of similar variables. This revealed if there was correlation between the data points of the individual

variables collected over the 8-year period and whether the subsequently computed standard errors are accurate.

3.5.3 Test for Heteroscedasticity

The data collected was also subjected to the heteroscedasticity test. One of the basic assumptions of regression modeling is that the variances are homogenous, and errors of the model are similarly distributed. The Breusch-Pagan/Cook-Weisberg test was used to test for heteroscedasticity

3.5.4 Test for Multicollinearity

Multicollinearity suggests that at least two independent variables are closely related in a research model. Multicollinearity leads to large covariances and variances which affects t statistics which are significant and reduces data information reliability leading to biased results. Multicollinearity was assessed using the variance inflation factors

3.6 Data Analysis

The collected data was done using stata study applied such as median and mode for data analysis. Inferential statistics will was also used in the study through the multiple regression models so as to find out the link among the explained and explanatory variables.

3.6.1 Analytical Model

The analytical model therefore to be applied is shown below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where, Y =Financial Performance (Return on assets)

β_0 = is the regression constant

β_1 - β_5 = regression coefficients

X_1 = Mobile banking.

X_2 = Internet banking

X_3 = ATM banking

X_4 = Liquidity

X_5 = Asset Quality

ε = Error term.

3.6.2 Measurement of Variables

Table 3.1 Operationalization of the Study Variables

Variable	Proxy	Operational Definition	Measurements
Financial Performance	Y	Capability to come up with resources, manage them to attain competitive advantage	Return on Total assets **(Net Income/Total Assets**
Mobile-banking	X1	The ability to apply mobile phone to enhance banking operations	**Log** of the value of transactions through the mobile devices
Internet banking	X2	The application of ATMs to perform the Banking operations	**Log** of the value of bank transactions Through the Internet Devices in the whole year
ATM banking	X3	The adoption of ATMs to perform banking operations	**Log** of the value of transactions through the ATMs.
Liquidity	X4	Rate of supply and demand of funds in the market	**Liquidity ratio**
Asset Quality	X5	Overall risks attached to assets held by a financial institution	**Non-performing loans ratio(NPLR)**

3.6.3 Tests of Significance

To determine significance, T- test and F-test was utilized. The F - test and analysis of variance was employed in assessing statistical significance of the regression equation. T-test was adopted in assessing the statistical implication of regression coefficients. Both the F and T-test was done at 95% confidence level.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND INTERPRETATION

4.1 Introduction

This chapter gives the findings as well as results of the analysed data. The chapter thus comprises of the summary statistics results and the test of assumption under diagnostic tests. The chapter further presents the results of analysis and their interpretation.

4.2 Descriptive Data Analysis

Descriptive statistical instruments were used to do a summary of the study's quarterly data which had been collected for period of 8 years between 2012 and 2019. Table 4.1 depicts the findings

Table 4.1: Descriptive Data Analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	32	.0209933	.0195659	-.046364	.0408084
Log Internet banking	32	7.37525	.1263278	7.085616	7.572718
Log mobile banking	32	8.281321	.2335316	7.82313	8.608387
Log ATM banking	32	4.469239	.4640403	3.267453	4.979894
Assets quality	32	.0812406	.031972	.041	.139
Liquidity	32	.4600469	.0323747	.378	.5145

According to the results in Table 4.1, the (ROA) recorded a min of –0.046364 and a max of 0.0408084for the eight years period. This averaged at 0.0209933 while a standard deviation of 0.0195659 was recorded. The number of mobile banking transactions on the other hand recorded a min of 7.82313 and a max of 8.608387 with a mean of and a deviation of 0.1263278. Further, ATM banking averaged at 4.469239 deviating from the mean by 0.4640403 ATM banking transactions also showed a min of 3.267453 and a max of 4.979894. The number of transactions through the internet recorded a low of 7.085616 and a high of 7.572718 with a mean of 7.37525 and a deviation of 0.1263278. Additionally, Asset quality recorded a low of 0.041and a high of 0.139 averaging at 0.0812406 and a deviation of 0.0812406. Finally, Liquidity had a min record of 0.378and a max of 0.5145 averaging at 0.4600469 and deviation of 0.0323747.The results also revealed that mobile banking had the highest number of transactions followed by internet banking and finally ATM banking.

4.3 Exploratory Data Analysis

This entailed a graphical representation of Return on Assets (ROA), and technological innovations. The results were as follows

4.3.1 ROA Trend

Figure 4.1: ROA Trend

Source: Study Data (2020)

Figure 4.1 shows that the trend for ROA sharply declined from the first quarter of 2012 to the first quarter of 2014 followed by a sharp rise from the first quarter of 2015 to the first quarter of 2016. The sharp decrease between 2012 to 2013 is attributed to the electioneering period in 2013 that had a major adverse effect to banks' earnings and consequently reducing return on assets. Thereafter, the ROA trend has been fluctuating with gradual increases and decreases being recorded between the first quarters of 2016 and 2019 respectively. The ROA of the Kenyan banking industry is unstable and has been fluctuating over the years. The interest capping that came into effect in September 2016 also had a major effect leading to reduction of ROA in the first quarter of 2016, followed by the electioneering period in the 2017 period.

Between 2018 quarter 1 to the present the banking industry has been slowly recovering with major fluctuations as shown by the low periods within the period

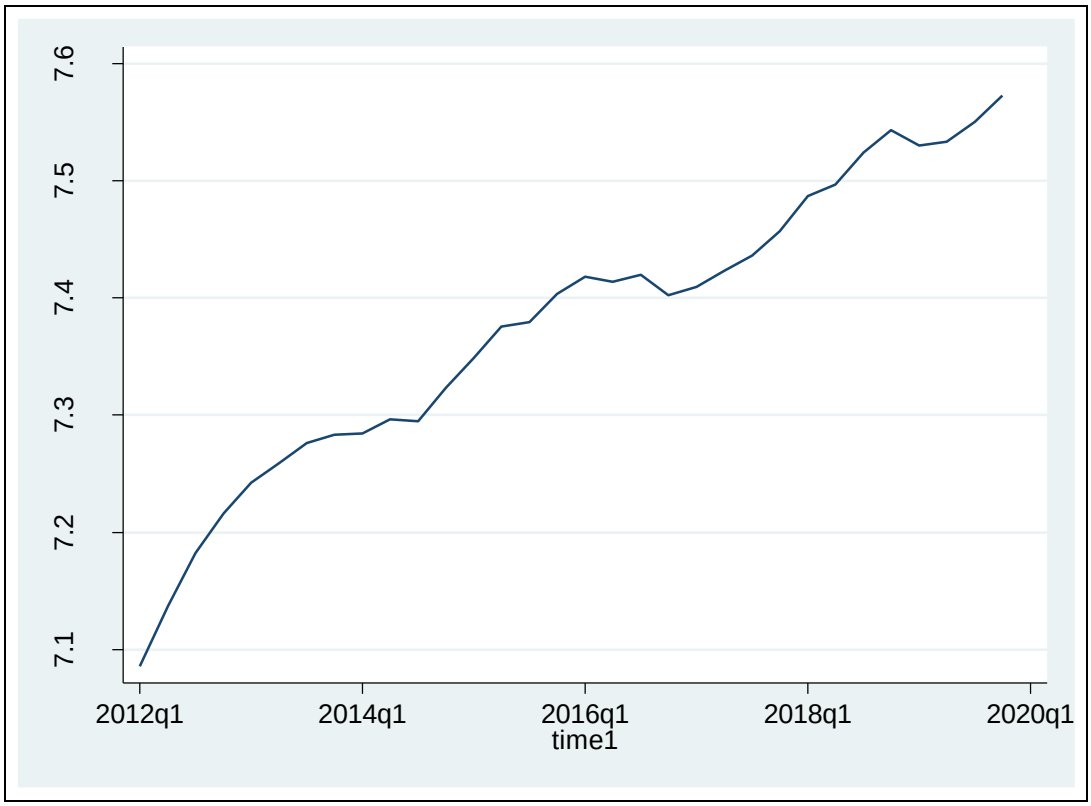

Figure 4.2: Internet Banking

Source: Study Data (2020)

The Internet banking transactions trend in figure 4.2 indicates a steady rise in number internet banking transactions over the considered study period with very minimal declines experienced in the first quarter of 2017 and 2019 respectively. This shows that banks in Kenya have consistently embraced internet banking as they find them more appropriate and convenience for their operations.Despite the major forms of internet banking having some adverse effects to the economy,within the study period most Kenyans have accepted the digital innovations for their daily operations hence the increasing trend though the ROA for major banks in Kenya has been fluctuating over the different quarters of the period, internet banking has always on the upward trend.

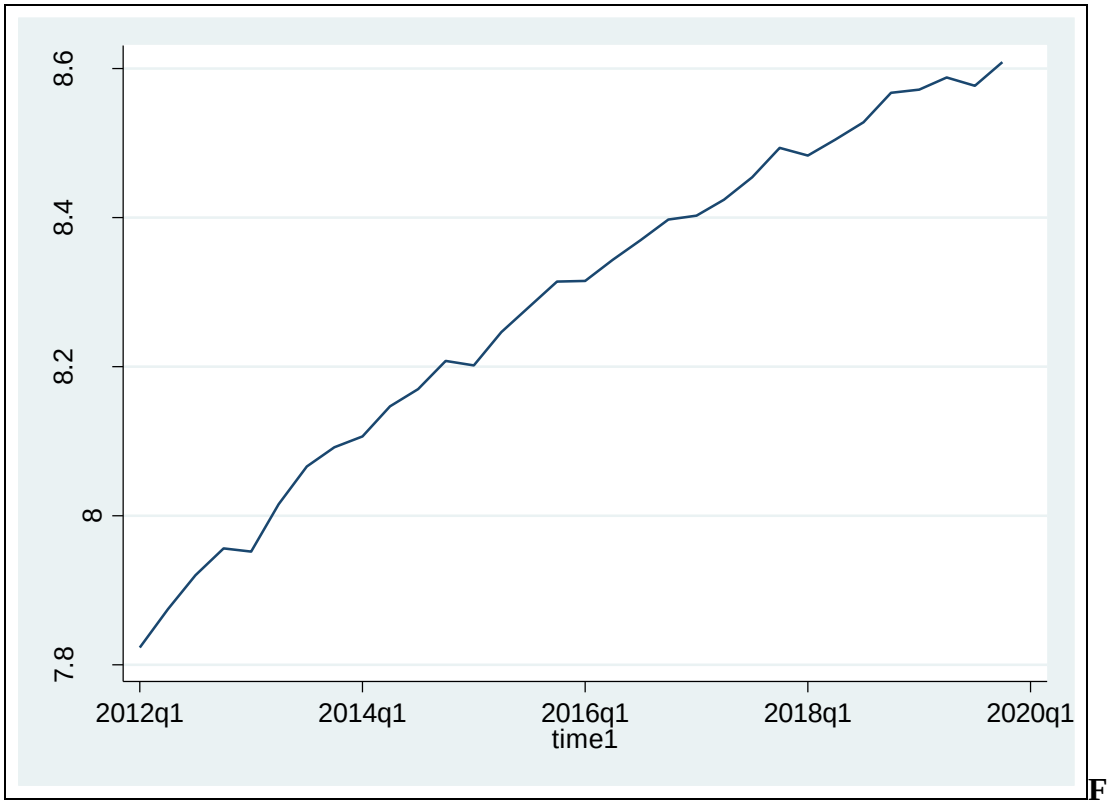

Figure 4.3: Mobile Banking

Source: Study Data (2020)

The results in figure 4.3 depicts that the mobile banking transactions within the banking industry in Kenya have been on a steady rise over the entire study period.Neverthless, minimal up and down fluctuations were witnessed in some quarters. Just like Internet banking, mobile banking is one of the major digital innovations being embraced by the banking industry in Kenya day in day out hence the continous steady rise over the quarters of the study period.

Figure 4.4: Asset Quality

Source: Study Data (2020)

Figure 4.4 shows that there has been a continous increase in Assets quality within the quarters of the years 2012 to 2019.This is attributed to the fact that non performing loans have continually declined over the study period. There is sharp rise in Asset quality between quarter I of 2016 and quarter 1 2019 with minimal low fluctuations, this was majorly as a result of interest capping effect which came into effect in 2016 hence banks were able to issue performing loans hence leading to increase in asset quality. The handshake in 2018 significantly had an effect to the asset quality and reduction of nonperforming loans as banks were able to manage their liquidity hence the rise of asset quality between quarter 1 of 2018 to the last quarter of 2019.The decrease in asset quality from 2019 signifies a struggling banking industry in dealing with non performing loans.

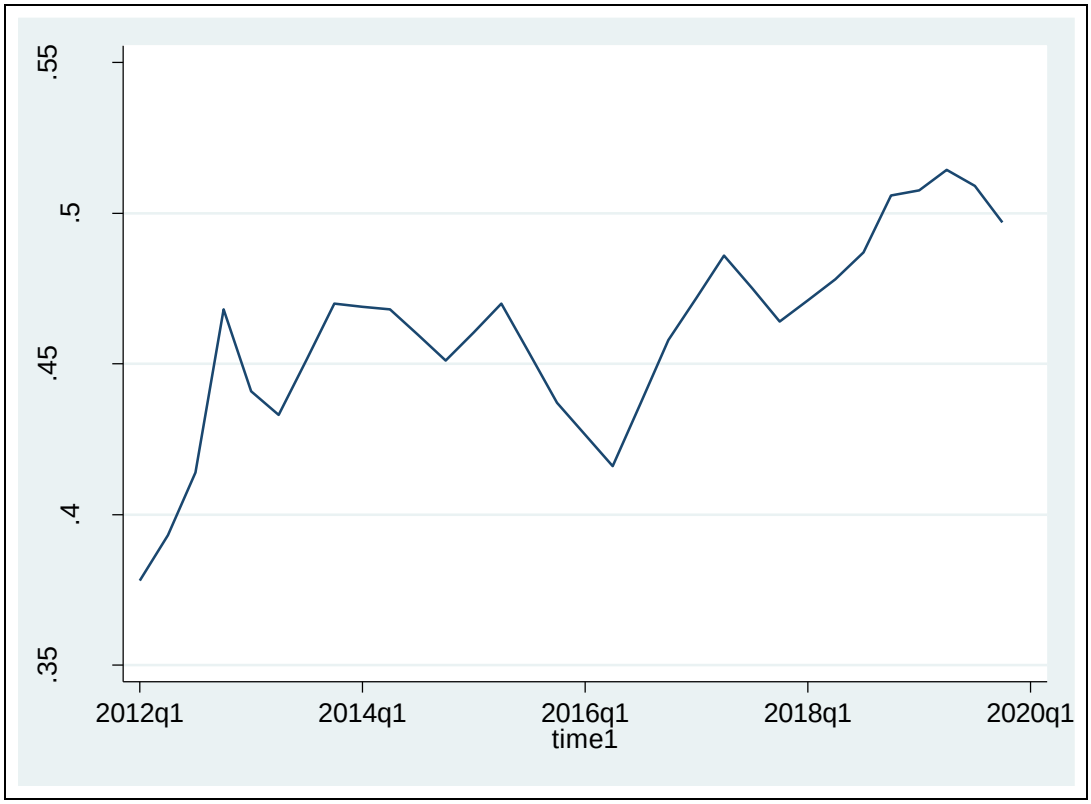

Figure 4.5: Liquidity

Source: Study Data (2020)

Figure 4.5 above shows the trend for liquidity. Between quarter 1 of 2012 and quarter 2 of 2013 the liquidity rose up significantly, this implies that the adequate available cash to meet credit obligations was available . The liquidity then went down between quarter 1 of 2013 and quarter 1 of 2014 due to the electioneering period which had adverse effect to the economy and the inflation rate also shot high. The first quarter of 2016 and the last quarter of 2017 also suggest that the liquidity significantly went down due to next wave of electioneering period that also majorly affected the economy and precisely the banking industry. However over the entire period the liquidity has gradually rose up with major rise being experienced after quarter 1 of 2018 immediately after the handshake between the government and the opposition which reveal banks have been able to regain and maintain a higher liquidity.

4.4 Correlation Analysis

This was done to find out the direction of the explanatory variables and explained variable. The findings were presented ion Table 4.2

Table 4.2 Correlation Analysis

	ROA	Log Internet banking	Log mobile banking	Log ATM banking	Assets quality	Liquidity
ROA	1.0000					
Log Internet	0.5004	1.0000				
banking	0.049					
Log mobile	-0.2239	-0.4483	1.0000			
banking	0.2180	0.0101				
Log ATM	0.2740	0.5319	-0.5504	1.0000		
banking	0.047	0.0000	0.0011			
Assets quality	0.5505	0.5828	-0.3852	0.6756	1.0000	
	0.0011	0.0000	0.0295	0.0000		
Liquidity	0.1491	0.5654	-0.4061	0.6461	0.6728	1.0000
	0.4613	0.0000	0.0211	0.0001	0.0000	

Table 4.2 indicates that the association among ROA and internet banking was positive and significant as shown by correlation coefficient of 0.5004(p=0.049). Mobile banking had a negative and insignificant correlation with ROA9(r=-0.2239,p=0.2180). ATM banking had a positive and significant correlation with ROA(r=0.2740,p=0.047)).This concurred with Oluoch and Kamau and (2016) who established that there is a positive relationship among use of ATM and performance of banking industry Asset quality depicted a positive and strong correlation with ROA(p=0.5505,r=0.0011) .Liquidity on the other hand had a weak positive (r=0.1491,p=0.4613) correlation with ROA. From the table, none of the correlations was above 0.7 thus an indication that the variables were not highly correlated.

4.5 Diagnostic Tests

The study undertook diagnostic tests as below.

4.5.1 Normality Test

The researcher engaged the Shapiro-Wilk test to confirm the normality test.

Table 4.3 below presents the results

Table 4.3 Normality Test

	Obs	**W**	**V**	**z**	**Prob>z**
Residuals	32	0.94763	1.747	1.158	0.12340

The results show that all the p value was greater than the significant value of 0.05. This satisfies the adoption of alternative hypothesis that data is normally distributed .

4.5.2 Multicollinearity Test

This test was undertaken using the variance inflation factor (VIF) whose threshold value is normally 10. Table 4.4 show the results

Table 4.4 Multicollinearity test

Variable	VIF	1/VIF
Log Internet banking	4.81	0.207900
Assets quality	4.79	0.208609
Log ATM banking	3.94	0.253923
Liquidity	2.44	0.409131
Log Mobile banking	1.46	0.686110
Mean VIF	2.50	

The multicollinearity test on table 4.4 conclude all values obtained were less than 10 therefore indicating the absence of multicollinearity .among the variables.

4.5.3 Autocorrelation Test

The study used the Breusch-Godfrey LM to assess for autocorrelation. Table 4.5 shows the results

Table 4.5 Autocorrelation Test

lags(p)	chi2	df	Prob > chi2
1	0.241	1	0.6237
H0: no serial correlation			

Source: Study Data (2020)

The findings table 4.5 indicated p value was 0.6237 greater than that the significance expected value of 0.05. Showing that the data set does not suffer from autocorrelation.

4.5.4 Homoscedasticity Test

Breusch-Pagan / Cook-Weisberg test was used to test for heteroscedasticity

.Table 4.6 shows the outcome.

Table 4.6 Heteroscedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of ROA
chi2(1) = 5.04
Prob > chi2 = 0.0248

Source: Author, 2020

The results on table 4.6 reveal that the model suffered from heteroscedasticity as shown by P -value of 0.0248 that is lower than 0.05. However, the existence of heteroscedasticity was corrected by use of Robust Standard Errors.

4.5.5 Stationarity Test

The study used Augmented Dickey-Fuller (ADF) test to establish for stationarity. Table 4.7 reveals the outcome

Table 4.7 Stationarity Test

		---------- Interpolated Dickey-Fuller ---------		
Variable	Test Statistic	1% critical value	5% critical value	10% critical value
ROA	-3.874	-4.325	-3.576	-3.226
Log Internet banking	-4.365	-4.325	-3.576	-3.226
Log Mobile banking	-7.255	-4.325	-3.576	-3.226
Log ATM banking	-3.591	-4.325	-3.576	-3.226
Asset quality	-4.169	-4.325	-3.576	-3.226
Liquidity	-4.767	-4.325	-3.576	-3.226

Source: Study Data (2020)

Table 4.7 shows that all the P values are less than the significance value of 0.05. This means that all the variables are stationary.

4.6 Regression Analysis

The researcher developed a liner regression model to establish the linkage among the variables. The obtained results were as follows.

Linear regression					Number of obs = 32 F(5, 26) = 12.49 Prob > F = 0.0000 R-squared = 0.4907 Root MSE = .01525	
ROA	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]	
Log internet banking	.144087	.0436746	3.30	0.003	.0543125	.2338614
Log mobile banking	-.1555061	.1337754	-1.16	0.256	-.4304853	.1194731
Log ATM banking	-.0194763	.0083454	-2.33	0.028	-.0366304	-.0023221
Assets quality	.2263076	.1741131	1.30	0.205	-.131587	.5842022
Liquidity	-.3473092	.0751501	-4.62	0.000	-.5017824	-.192836
_cons	-.8092065	.2990644	-2.71	0.012	-1.423942	-.194471

Under model, the results indicate that the R square value was 0.4907 thus indicating that internet banking, mobile banking, Atm banking, Assets Quality and liquidity account for 49.07% of the variation on Return on Assets. The significant (P value = 0.000<0.05) F statistics value of 12.49 reveal the model is statistically significant. The coefficient results indicate that internet banking had a positive (B=0.144087) and significant (P value=0.003<0.05) correlation with performance of the banking industry in Kenya. Mobile banking had a negative (B=-1.555061) and insignificant (P value=0.256>0.05) relationship with performance of banking industry. ATM banking had a positive (B=0.194763) and significant (P value=0.028<0.05) correlation with financial performance of banking industry.Neverthless the Assets Quality had a positive (B=0.2263076) and insignificant (P value=0.205>0.05) relationship with financial performance of the banking industry while liquidity had a negative (B=-0.3473092) and significant (P value=0.000<0.05) relationship with financial performance of banking industry in Kenya .

The model was therefore confirmed as;

$Y=-0.8092065+-0.1555061+0.144087X_2+-0.0194763X_3+0.2263076X_4+-0.3473092X_5$

Where,

Y =Financial Performance (Return on assets)

β_0 = is the regression constant

β_1 - β_5 = regression coefficients

X_1 = Mobile banking.

X_2 = Internet banking

X_3 = ATM banking

X_4 = Asset Quality

X_5 = Liquidity

4.7 Interpretation of the Findings

It was noted that mobile banking had a negative and insignificant correlation with performance (B=-1.555061, p=0.256). This agreed with the findings by Chaarani and Abiad (2018) who concluded that there was a negative impact of mobile banking on performance of banks. This shows that a unit increase in mobile banking negatively and insignificantly reduces the performance of the banking industry by 1.56 units.This also reveals that despite the rising trend of digital innovations being embraced by the banking industry in Kenya at a fast speed,the effect to the banking industry could be adverse and not necessary lead to higher financial performance. .Despite adoption of technological innovation by Kenyan banks, the sector experiences long queues, errors relating to transactions, insecurity, network challenge among other Challenges (Cherotich et al., 2015).The big question remains whether mobile banking, as well as agency banking necessarily leads to a rise in performance of banking industry in kenya.

Also the outcome showed that ATM banking exhibited positive and significant linkage with performance (B=0.194763, p=0.042).This implies that a unit rise in Atm banking positively and significantly leads to a rise in financial performance of banks by 0.194763 units. The results however disagreed with findings by Tahir et al (2018) who identified a negative impact of ATM banking on performance of banking industry. The correlation between internet banking and performance was positive and significant (B=0.144087, p=0.003). The findings agreed with findings by Tahir et al (2018) who identified a considerable linkage between internet banking and performance of banks. A study by Monyoncho(2015) indicated that electronic banking significantly affected the Kenyan banking industry.

The findings were also able to establish that internet related banking revealed a considerable effect performance of banks in Kenya.

Finally, the control variables, Asset Quality had a positive and negligible correlation with performance (B=0.2263076, p=0.205) while liquidity had a negative but significant correlation with performance of banking industry in Kenya.(B=-0.34730, p=0.000 respectively).This indicates that a unit rise in bank liquidity significantly but negatively leads to a unit reduction in performance by 0.34730 units. Nevertheless, Blankenburg and Palma (2009) reveals that liquidity potray a consinderable impact on the profitability of an enterprise, hence any organization should strive to maintain a sustainable cash balance to avoid depleting earnings as most cash as paid out to shareholders as dividends.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Chapter five contains an highlight of the findings already discussed in the previous chapter. In addition the chapter also makes the study's conclusion which is anchored on findings and recommendations. The chapter finally provides the suggestions for further studies.

5.2 Summary of Findings

The aim of the of the research was to find out the impact of technological innovations on performance of the banking industry in Kenya. Specifically, the study assessed the impact of mobile banking, internet banking and ATM banking on financial performance using the intervening variables asset quality and liquidity. The Study findings indicated that the different technological innovations that the banks had adopted had differences in the number of transactions with mobile banking leading followed by ATM banking and internet banking had the least number of transactions.

Correlations analysis showed that mobile banking exhibited a negative and insignificant correlation with performance. This implied that a unit rise in digital banking leads to a unit reduction in performance. The findings also revealed that ATM banking had a positive and significant correlation with financial performance implying that a unit rise in ATM banking would result into a unit rise in financial performance. This was in line with Akhisar Tunay and Tunay (2015) whose study

revealed that bank profitability increased with the number of ATMs. However, internet banking depicted a positive and significant correlation with financial performance implying that a unit rise in internet banking would result into an significant rise in financial performance.

This agreed with Monyoncho (2015) who established a significant impact of internet banking on performance of banks. The findings also revealed that he analysis from regression revealed that ATM and internet banking, showed a considerable relationship with performance of banking industry in Kenya while mobile banking revealed an insignificant correlation with financial performance of mobile banking industry in Kenya. Moreover, Asset quality and Liquidity had insignificant and significant relationship with performance respectively.

5.3 Conclusion

The research suggested that digital innovations have a significant effect on performance of banking industry in Kenya. Increased ATM banking and internet banking would lead to increased financial performance of commercial banks. This concurred with Abdullah (2017) who concluded that with the use innovations, performance of banking industry improved. Cherotich et al (2015), Gichungu and Oloko (2015) and Ngari and Muiruri (2014) also concluded that technological innovations study significantly affected performance. Gutu (2014) asserted that continued application of technological innovations in the banking sector significantly lower costs therefore leading to an increase in bank revenue. The study also concludes that despite the adoption of certain technological innovations in the banking industry, not all necessary lead to increase in financial performance as some adverse effects to

financial performance such as mobile banking as revealed by the results in the previous chapter.

5.4 Recommendations

The research suggest the banking industry in Kenya to increase their application of such technological innovations as, ATM banking and internet banking. The management of commercial banks should come up with strategies and internal policies and procedures that would guide effective and efficient of adoption of the technological innovations. They should also ensure that the procedure of banking through the mobiles, internet and ATM is easy for customers. The study also recommends that authorities such as the government in conjunction with central bank of Kenya to form policies that would encourage the adoption of internet banking and ATM banking in the banking industry. The government could also offer support to the commercial banks such as trainings as well as financial support for enhanced adoption of technological innovations in the banks. The banking industry should also weigh the benefits that may accrue from adopting the best technological innovations so as to maintain a higher financial performance.

5.6 Areas for Further Research

The research was done on impact of digital innovations and financial performance of banking industry in Kenya. Future scholars who wish to undertake their studies in the field of technological innovations would consider doing this in other sectors such as the manufacturing sector which is very critical in the nation's economic performance. Other studies could consider adopting other technological innovations such as digital lending.

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APPENDICES

Appendix I: List of Licensed Commercial Banks

1) African Banking Corporation
2) Guaranty Trust Bank(K)
3) Bank of Baroda(K)
4) Guardian Bank
5) .Bank of India
6) Gulf African Bank
7) Barclays Bank of Kenya.
8) Habib Bank A.G. Zurich
9) Bank of Africa Kenya
10) Habib Bank
11) Charter House Bank.
12) Imperial Bank
13) Standard Bank of Mauritius
14) I & M Bank
15) Citibank N.A Kenya.
16) Commercial Bank of Africa
17) Jamii Bora Bank
18) Consolidated Bank .
19) Cooperative Bank
20) KCB Bank Kenya
21) Credit Bank.
22) Middle East Bank(K)
23) Development Bank of Kenya
24) National Bank of Kenya
25) Diamond Trust Bank
26) NIC Bank
27) DIB Bank
28) M-oriental Bank
29) Ecobank Kenya
30) Paramount Bank
31) Spire Bank.
32) Prime Bank
33) Equity Bank Kenya
34) Sidian Bank
35) Family Bank.
36) Stanbic Bank
37) Fidelity commercial Bank
38) Standard Chartered Bank Kenya
39) First Community Bank
40) Trans National Bank
41) UBA Kenya bank
42) Victoria Commercial Bank.

Appendix 1: Study Data

Year	Quarter	ROA	Internet Banking	Log10 Internet Banking	Mobile Banking	Log10 Mobile Banking	Mobile Loans	Log10 Mobile Loans		Liquidity	Asset Quality
2012	Q3	0.008076	15223900	7.1825259	83184000	7.9200398	191810000	8.282871245		0.311	0.17569
	Q4	0.002924	16446300	7.2160682	90475500	7.956531	217932800	8.338322599		0.33	0.1377
2013	Q1	0.006493	17465300	7.242176	89481000	7.9517308	240766000	8.381595158		0.34	0.1988
	Q2	0.000412	18146900	7.2588024	103593300	8.0153317	273103800	8.436327743		0.271	0.2921
	Q3	0.002346	18891600	7.2762687	116489500	8.0662868	315749400	8.499342534		0.214	0.2051
	Q4	-0.01477	19191000	7.2830976	123434400	8.0914362	339531000	8.530879433		0.487	0.4228
2014	Q1	0.000187	19239300	7.2841893	127782400	8.106471	356844000	8.552478399		0.437	0.5356
	Q2	0.001248	19795600	7.2965687	140191800	8.1467226	369783000	8.567946942		0.363	0.548
	Q3	0.003526	19710000	7.2946866	147990000	8.1702324	391350000	8.592565338		0.422	0.5462
	Q4	-0.04636	21060000	7.3234584	161410000	8.2079304	426830000	8.630254936		0.415	0.5786
2015	Q1	0.029718	22329200	7.3488732	159270000	8.202134	418225000	8.62140999		0.784	0.2716
	Q2	0.035543	23750000	7.3756636	176369300	8.246423	453879000	8.656940089		0.781	0.3097
	Q3	0.040808	23970000	7.379668	190850000	8.2806922	496450000	8.695875515		0.656	0.2602
	Q4	0.031944	25326300	7.4035717	206107800	8.3140944	533005000	8.726731283		0.674	0.2809
2016	Q1	0.028559	26208000	7.4184339	206627000	8.3151871	543970000	8.735574949		0.615	0.2879
	Q2	0.034877	25928400	7.4137757	220671500	8.3437462	574706000	8.759445731		1.032	0.3764
	Q3	0.028489	26299500	7.4199475	234538600	8.3702143	614053000	8.788205857		0.844	0.3633
	Q4	0.025503	25249200	7.4022476	249498000	8.3970671	639065000	8.805545033		0.684	0.3473
2017	Q1	0.022797	25690200	7.4097675	252741600	8.4026767	650508000	8.813252642		0.61	0.4079
	Q2	0.019937	26502800	7.4232918	265476600	8.4240262	671819000	8.827252282		0.565	0.4323
	Q3	0.026278	27312000	7.4363535	284438500	8.4539884	734524000	8.866005991		0.198	0.2291
	Q4	0.034318	28644700	7.4570443	311520000	8.4934859	759248000	8.880383657		0.354	0.1566
2018	Q1	0.036882	30696000	7.4870818	304358000	8.4833847	773142000	8.888259266		0.334	0.192
	Q2	0.030868	31386000	7.496736	319669000	8.5047005	818733000	8.913142295		0.283	0.1763
	Q3	0.037432	33435000	7.5242013	337256000	8.5279597	863138000	8.936080237		0.341	0.2276
	Q4	0.038583	34957000	7.5435342	369731000	8.5678859	900092000	8.954286902		0.584	0.1092
2019	Q1	0.033218	33919000	7.530443	372861000	8.571547	899052000	8.953784811		0.543	0.0779
	Q2	0.039808	34178000	7.5337466	387237000	8.5879768	912674000	8.960315679		0.524	0.1246
	Q3	0.03692	35537000	7.5506808	377207000	8.5765797	896151000	8.952381194		0.546	0.1497
	Q4	0.030368	37386800	7.5727183	405870000	8.608387	930597000	8.968761648		0.74	0.164

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