EFFECT OF DIGITAL FINANCIAL SERVICES ON PROFITABILITY OF COMMERCIAL BANKS IN KENYA: A CASE OF KENYA COMMERCIAL BANK

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A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS AND ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF BUSINESS ADMINISTRATION (FINANCE OPTION) OF MAASAI MARA UNIVERSITY

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DECLARATION

This Research Project is my original work and has not been presented for conferment of a degree in Maasai Mara University or any other University.

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Approval

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DEDICATION

I dedicate this work to my family: parents William and Grace Kaelo; wife Valerie Kaelo and Children Hope, Morgan and Goodluck.

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ABSTRACT

The banking sector has experienced major revolution. The revolution has been brought about by modern technology and the need to minimize cost and increase revenues. In order to minimize costs commercial banks adopted digital financial services namely: Internet banking, automated teller machines, mobile banking and credit cards. However, despite the adoption of digital financial services by commercial banks, bank failures are still being witnessed in Kenya. The objective of this study was to determine the effect of digital financial services on profitability of Kenya Commercial Bank. The study was guided by the following specific objectives: To determine the extent to which internet banking affected profitability of Kenya Commercial Bank; to establish the effect of automate teller machines on profitability of Kenya Commercial Bank; to find out the effect of mobile banking on profitability of Kenya Commercial Bank and to investigate the effect of credit cards on profitability of Kenya Commercial Bank. The study was guided by the following three theories: the theory of financial innovations, technology acceptance model and diffusion innovation theory. The study applied descriptive research design. The study used purposive sampling to select Kenya Commercial Bank from the list of all licensed commercial banks in Kenya. Kenya Commercial Bank was selected as it is the largest commercial bank in Kenya with highest technological advancement. The study used secondary data. The empirical model was based on simple linear regression. The study established that internet banking was an important factor in enhancing profitability of the Kenya Commercial Bank (r= 0.706, p- value = 0.022), the study also established that automated teller machines was important in enhancing profitability of the Kenya Commercial Bank (r = 0.757; p- value = 0.011). The study further noted that mobile banking was important in enhancing profitability of the Kenya Commercial Bank (r = 0.630; p- value = 0.021). On the effect of credit cards on profitability of the Kenya Commercial Bank (r = 0.669; p- value = 0.035). The hypotheses were tested using simple linear regression analysis, where all the four null hypotheses were rejected based on the t-values which were all greater than critical t-values. It was concluded that profitability of the Kenya Commercial Bank was influenced by internet banking, automated teller machines, mobile banking and credit cards. The study therefore recommended that commercial banks that seek to enhance their profitability should embrace digitized financial services. The findings of the study will be important in informing bank managers on mechanisms of enhancing their profitability

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABREVIATIONS AND ACRONYMS

ANOVA: Analysis of Variance

ATM: Automated Teller Machine

ATMR: Automated Teller Machines Revenues

CAMELS: Capital, Asset quality, Management, Earnings, Liquidity, and Sensitivity to market risk

CBK: Central Bank of Kenya

CCR: Credit Cards Revenue

DFS: Digital Financial Services

DF: Degrees of Freedom

EFT: Electronic Funds Transfer

E-Wallet: Electronic Wallet

FGLS Feasible Generalized Least Squares

FinTech: Financial Technology

GLS Generalized Least Squares

HELB: Higher Education Loans Board

IBR: Internet Banking Revenue

ICT: Information Communication Technology

KBA: Kenya Bankers Association

KCB: Kenya Commercial Bank

MBR: Mobile Banking Revenue

MS Mean of Squares

PC: Personal Computer

POS: Point of Sale

PU: Perceived Usefulness

P2P: Peer-to-Peer

ROA: Return on Assets

ROE: Return on Equity

RTGS: Real Time Gross Settlement

SE: Standard Error

SMS: Short Message Service

SS: Self Service

SS Sum of Squares

TAM: Technology Acceptance Model

UK: United Kingdom

OPERATIONAL DEFINITION OF TERMS

ATM Revenue: This is revenue generated through provision of ATM services to clients.

Credit Card: Is a small plastic card issued by a bank. It allows a holder of the card to purchase goods and services on credit. In other words, a credit card is a card given by a bank to a customer loaded with some money where the customer will return that money with some interest. The interest will be revenue of a bank and that will add to profit to the bank.

Credit Cards Revenue: This is revenue generated through provision of credit cards services to clients.

Digital Financial Services: Are a set of financial services delivered through digital pathways that include mobile phones, computers, point-of-sale and ATMs. These digital financial services help customers of a bank to be able to operate their accounts any time anywhere conveniently.

Internet Banking: Is a method of banking in which transactions are conducted electronically via the internet. The more clients of a bank use internet while transacting their transactions the more the bank earns revenue.

Internet Banking Revenue: This is revenue generated through provision of internet banking services to clients.

Mobile Banking: Is the act of making financial transactions through a mobile phone. The use of Mobile banking by clients of a bank makes them to contribute revenue to the bank because of the charges they are charged by the bank.

Mobile Banking Revenue: This is revenue generated through provision of mobile banking services to clients.

Profitability: Is a measure of an organization's profit which can be determined through financial ratios such as Return on Asset (ROA) and Return on Equity (ROE). For an organization to get profit there must be assets that contribute to profit. Digital financial services in banks are some of the assets that contribute to profit in commercial banks. For this study ROA was used as a measure of profitability.

Return on Assets: Return on assets is a profitability ratio that provides how much profit a company can generate from its assets. In other words, return on assets (ROA) measures how efficient a company's management is in earning a profit from their economic resources or assets on their balance sheet.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Digital financial services (DFS) are a set of financial services delivery through digital pathways. In other words, DFS are financial services provided and accessed on the customers' respective mobile phones, computers, Point-of-Sale (POS) and ATMs (Kumarr, 2019). Through electronic payments, consumers can transfer funds, pay bills and pay for goods and services from their home, or in a market or store setting, with limited physical contact. DFS enable a rapid, secure way for governments to reach vulnerable people with social transfers and other forms of financial assistance, especially during times when transportation and movement around the country is unsafe or limited (World bank, 2020). The current Covid-19 pandemic has amplified the benefits of expanding DFS, because it significantly reduces the need for physical contact in retail and financial transactions and helps government respond more quickly to extend liquidity to firms and people most at risk (CBK, 2020). DFS particularly through the use of mobile banking, ATMs, internet banking and credit card has also permitted remote payments and transactions, enabling the social distancing recommended to reduce contagion.

Globally, digital financial services such as mobile banking, ATMs, internet banking and credit cards are heavily used by banks to efficiently serve their customers and increase profits in banks (World Bank, 2016). In 2012, India witnessed the changes in the payment system. During that period digital growth was witnessed where mobile banking, E-wallets, internet banking and smart card banking was seen growing very fast. This growth was

necessitated by the government regulations, availability of internet, Mobile phones, mobile applications and technological advancements. (Mishra, 2019).

In Africa digital financial services have grown exponentially, most countries are adopting the use of digital pathways to solve their financial needs instead of going physically to banks. In south Africa digital financial services rate is expected to experience a major leap over the next few years. With the country ranking third in future growth behind only China and India its percentage growth is 71 percent (Mishra, 2019). The growth of DFS in south Africa have been encouraged by technological advancement, friendly government regulations, banks investing more on the DFS, good network and availability of affordable mobile phones. In East Africa DFS have grown despite the challenges like poor network, illiteracy where people do not have the knowledge to use digital platforms, lack of mobile phones etc. In Tanzania, use of mobile money has experienced explosive growth since the service was introduced in 2008. With several providers competing for market share, a range of new use cases have been introduced, including digital credit, savings, and bill payments. In 2017, nearly a decade after the first mobile money deployment launched, 60 percent of Tanzanians had used mobile money (CGAP, 2018).

As a result of IT advancement, Kenya has undergone a transformation, thanks to the new financial advances. Digital wallets and currency have currently taken the role of physical money. According to Andrew (2001), paper money is anticipated to lose ground in the upcoming years as new e-money instruments become more widely accepted for a wider range of transactions. In order to provide financial services, Kenyan banks have dramatically embraced the use of information and communication technology. This has improved the implementation of e-payments in banking services, claims CBK (2019).

The banking industry's service delivery standards have improved as a result of the development of technology (CBK, 2012).

1.1.1 Concept of Digital Financing

Globally the financial and banking sectors are growing faster than previously and hence digitalization is at a vital position on how to acquire a gain on market advantage against the rivaling banks (Gartner, 2016). Considering the new age of technology in banking sector, the daily operations are becoming easier for customers to use, faster and cheaper hence every bank is grasping to adjust their own operations to fit the needs of a demanding customer. When the computers were introduced consumer markets in the 1980's this is said to be the start of the digitalization. This opened new channels to the consumers to become more communal and aware of civil democratic issues than previously (Gartner, 2016). Currently technology and digitalization have extracted hindrances of the modern society, this includes aspects such as; involvement, time, data acquirement and space which grants consumers more freedom to have interactions with various parties regardless of space or even time. Also, the process of digitalization is a business gap for the banks to step up their business activities. As a result of digitalization and advancement in technology the interaction between banks and official authorities towards the consumers and citizens has also been intensified and have made new ways of reaching to one another. This can be seen easily in the commercial banking sector, where digitalization has given the banks additional ways to reaching out to potential customers and also at the same time to give them a hand to improve their services (Gartner, 2016).

In Africa continent the digitalization impacts on the financial sector can easily be attributed to the amount of people using internet banking for settling their bills because it is the major factor for the average people banking errands (Pohjola, 2015). Like other industries, commercial banks and financial sector are increasingly molding to new shape this is because of the rapid improvements to digitalization and technology. The trail of digitalization in commercial banking and financial sector in Africa is heavily impacting towards cost-saving potential and also creating fresh revenue sources (Olanrewaju, 2014). The advancements that digitalization has had on financial sector so far are mainly to daily banking services and to no-knowledge-intensive services, such as payments solutions and internet banking. These services were no big deal to standardize and according to big banks, these solutions lowered the customer's frequent visit to banks. According to Barclays Bank Africa, which was one of the pioneer banks to see the potential in digitalization and digital banks, after they shifted to online and mobile banks, their customers now visit the bank's branches two times a month on average, and the rest of the days they use services of mobile banking 18 times per month (Deutsche Bank, 2016).

Over time, the financial industry in Kenya has been extremely dynamic. The sector has undergone several changes that have driven the growth of financial activities, exercises, and hierarchical structures that have improved and increased the productivity of the financial framework. This adjustment was necessary due to advances in innovation and shifting financial conditions. Gorton and Metrick (2016) summarize and list the factors that have contributed to the growth of modern financial innovation and they include things like lower insolvency costs, points of interest imposed by the government, a decline in the risk of death, lower administrative costs, simplicity and customization.

A very unstable financial situation encourages progress that leads to an excellent aggressive position and fortunate position that inspire an unmatched execution. The item and the technique must vary continuously and predictably to maintain the financial environment. Michelle (2016) says that it is crucial to recognize how the financial market has been significantly impacted by financial innovation due to its capacity to create new opportunities and markets as a result of new products.

Many banks have arrived with new banking technology that took place in the new scenario of banking customers that is called “Digital finance”. Thus, digital finance has given a new shape to the banking industry. Digital finance is a financial service delivered through mobile phones, personal computers, the internet or cards linked to a reliable digital payment system Digital finance has the potential to provide affordable, convenient and secure banking service. Digital finance provides greater control of customer personal finance, quick financial decision making, and the ability to make and receive payments (Villasenor, 2015).

In the financial sector, digital financial services represent a number of radical innovations that have beneficial effects on the financial outcome, diversification, international structural redesign, and sophistication of the financial structure. All of this results in increased financial system funding, which tends to raise the ratio of financial assets to overall assets. This study aims to present the effects of digital financial services on the profitability of Kenya Commercial Bank without taking into account the study's historical context. These digital financial services represent an unexpected shift in the range of financial commodities and tools that is enabled by an unexpected shift in client preferences

and demands; they evaluate strategy, innovation and operational motives (Bhattacharyya & Nanda, 2015).

Digital Financial Services is a relatively new, low-cost means of access to transactional financial services (Di Castri & Gidvani, 2014). With its increasing ubiquity and expansion of basic mobile coverage across emerging and developing countries, new technologies and innovations in vendor platforms have facilitated the use of the mobile phone to evolve from a basic telecommunications utility of calls and messages to that of a new enhanced role as a payment and person-to-person (P2P) transfer instrument (Muthiora, 2015). Digital finance includes Internet banking, Mobile banking, Mobile Wallets (apps), Credit card and ATMs. According to Zhou et al. (2015) in the financial sector, digital financial services represent a number of radical innovations that have beneficial effects on the financial outcome, diversification, international structural redesign and sophistication of the financial structure.

Internet and mobile banking have become the single largest channel at the moment for reaching customers and for customers to handle their bank transactions (Deutsche Bank, 2016). As shown in the statistics by Deutsche Bank in 2016, almost 20% of customers of international banks use internet banking daily and 10% of customers use mobile banks on a daily basis, whereas only 4% use branch services on a daily basis and almost 37% of customers say that they rarely or never use the call centers. As illustrated by statistics by Statistics Finland for the year 2015 in Finland 98% of the young people aged between 25-34 years indicated to have used internet for purpose of internet banking which this was the largest age group to do so. In accordance to the same research 95% of the working population in Finland indicated to have used internet banking services for the last three

months (Statistics Finland, 2015). Through studying these statistics, it becomes a clear observation that via mobile banking services and internet banks are reaching the majority of the people. There is however, limited literature linking these financial services on banks profitability of the bank.

Mobile/SMS banking, telephone banking, electronic financial transfers, point-of-sale banking, automated teller machines, interactive television, and branchless banking are a few examples of common digital banking implementations. One of the most popular digital services in Kenya, for instance, is M-Shwari, which is provided by Commercial Bank of Africa in cooperation with Safaricom Kenya Limited (CBK, 2012). The cost of providing financial services has been significantly reduced because to digitally based financial services. It is increasingly important for clients to receive value for their arduous deposits as the banking community expands into the retail sector of the market (Market intelligence, 2015). In order to fulfill their clients' aspirations and foster healthy competition, the Kenyan banking sector has been embracing new technology. The new banking landscape emphasizes varying banking products, more options, security, and accessibility. The key to performance, relevance, and ultimately bank solvency will be a financial institution's capacity to supply goods and services in the most effective and efficient way possible. To improve service delivery to their consumers, the majority of banks in Kenya have implemented ATMs, internet banking, credit cards, and mobile banking. According to Kumar (2009), there are several obvious benefits to using these methods of transmission, which is why banks are increasingly using digitization to control their service delivery networks.

1.1.2 Profitability of Commercial Banks

Financial institutions are governed by regulations that compel them to have a minimum profitability index; this term is understood as the ability to face their obligations in possible events of enforceability, contributing their assets to this end. That is, that the latter is able to cover the debts of the entity when required. This means that the more solid an entity is, the more capitalized will be, which in turn guarantees the stability of the economy, and makes it dependent on the standing of credit institutions. Banks are required to maintain levels of profitability for not only meeting the requirements of supervisor but for their sustainability. Commercial banks profitability has been measured by the ability of the bank to earn a profit from its operations (Niresh & Velnampy, 2014). This profit is usually evaluated in terms of earning before tax and earning after interest and tax. A firm's profitability is evaluated using statement of financial position, statement of comprehensive income, statement of cash flows and certain market data of the firms.

With increased pressures of globalization and competition from nonbanking, commercial banks must find new ways of improving their service delivery by adopting strategies that will enhance their performance. Understating a firm's profitability and striving for it requires substantial research efforts. Most studies in the financial sector have focused mainly on understanding financial performance which basically does not address operational details. Customers in both developed and developing economies seems to consider technological s as key to service delivery and improvement of a firm's profitability. The expansion in the banking products has been made possible through digitalization of the services. Nowadays, banking isn't just thought of as a business that deals with money transactions; it also deals with business-related information about

financial transactions (Padwal, 2015). Customer satisfaction levels are changing as digital banking becomes more common. Information technology, namely the digitalization of banking services, is crucial in delivering better services for less money. Numerous cutting-edge IT-based services, including ATMs, internet banking, credit cards, mobile banking, phone banking and anywhere-anytime banking, have offered a variety of practical services to the customer, increasing the likelihood of customer satisfaction as service quality rises. The need for this study is to assess the extent to a selected number of these digital innovations i.e., internet banking, mobile banking, Automated Teller Machines (ATMs) and Credit cards contribute to the profitability of the Kenya Commercial Bank.

According to CBK (2019), there are 43 banks in Kenya's banking sector. Financial service providers in Kenya, particularly commercial banks, are divided into three groups based on a composite average that takes operational capital, client deposits, and other performing assets into account. Any commercial bank with a weighted average of five or higher is considered superior, followed by those with averages of one to five and finally those with weighted averages of less than one which are known as tiny banks.

The Banking industry in Kenya is governed by the Companies Act (2020) the Banking Act (2010) the Central Bank of Kenya Act (2012) and the various prudential guidelines issued by the Central Bank of Kenya (CBK). The banking sector was liberalized in 1995 and exchange controls lifted. The CBK is responsible for formulating and implementing monetary policy and fostering the liquidity, solvency and proper functioning of the financial system. The banks have come together under the Kenya Bankers Association (KBA), which serves as a lobby for the banking sector’s interests. The KBA serves as a forum to address issues affecting members (Price Waterhouse Coopers, 2012).

These innovations need to be appraised to ascertain their impact on performance of commercial banks in Kenya. Kenya has introduced many cutting-edge financial solutions over the past ten years that are changing the country's financial, economic, and social landscape. A number of stakeholders as well as the general public are monitoring how well commercial banks are performing. Stakeholders and the general public use their performance to make important decisions and provide clues about the status of the economy. Commercial banks have adopted digital financial services as a means of enhancing their performance in an effort to boost the stakeholders' investment confidence, company reputation, and value to investors (CBK, 2016).

1.2 Statement of the Problem

With the rapid development of digital financial services in Kenya, banking has become more efficient. With the evolution of technology, digital financial services are slowly disrupting the traditional banking services. This efficiency in banking is increased through loan personalization modules and elimination of middlemen hence lowering the cost of transactions significantly (CBK, 2016). The relationship between financial technologies and banks is mostly complementary, with banks investing heavily in financial technologies infrastructure. To enhance profitability commercial banks today transact their businesses through technologies such as internet banking, mobile banking, ATMs and credit cards thereby reducing the transaction cost and ultimately increasing profitability. However, despite the adoption of technology by commercial banks in Kenya, commercial banks are still experiencing financial difficulties. Commercial banks have to balance between efficiency and profitability in order to manage their sustainability.

Therefore, the overall objective of this study was to establish the effect of digital financial services on profitability of Kenya Commercial Bank.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective of the study was to establish the effect of digital financial services on profitability of commercial banks in Kenya: A Case of Kenya Commercial Bank.

1.3.2 Specific Objectives

The study sought to address the following objectives;

i. To determine the extent to which Internet banking affects profitability of Kenya Commercial Bank.
ii. To establish the effect of automated teller machines on profitability of Kenya Commercial Bank.
iii. To find out the effect of mobile banking on profitability of Kenya Commercial Bank.
iv. To investigate the effect of Credit cards on profitability of Kenya Commercial Bank.

1.4 Research Hypotheses

The study sought to address the following hypotheses,

H_{o1}: Internet banking has no significant effect on profitability of Kenya Commercial Bank.

H_{o2}: Automated teller machines have no significant effect on profitability of Kenya Commercial Bank.

H_{o3}: Mobile banking has no significant effect on profitability of Kenya Commercial Bank.

H_{o4}: Credit cards have no significant effect on profitability of Kenya Commercial Bank.

1.5 Significance of the Study

The results of this study will help financial institutions assess their financial performance as well as the consequences of innovation in order to increase profits. Financial institutions, particularly commercial ones are learning more about the value of financial innovation at this time as this study gives rise to learning about the relationship between innovation and bank performance. Additionally, the global and regional financial sectors will learn from this Kenya study and comprehend the advancements that they can imitate in their organizations with the aim of enhancing their performance. The examination findings will also demonstrate how innovations improve financial performance, increase cost effectiveness in financial institutions, and benefit the economy as a whole.

The findings of the study will be significant to the government, decision-makers, shareholders, and players in general. By demonstrating that financial innovation has a significant impact on organizational recital and results, the policy makers are forced to further examine their tactics. The study's findings will also serve as a reference point for legislators as they draft strong, comprehensive, and fair laws and regulations that will lay the groundwork for financial innovation. The rules and regulations will improve the nation's ability to compete on a global scale, as well as its economy's resiliency and achievement of important national goals. According to the industry participants, the policies created will improve the baking sector’s stability, growth and performance. The financial innovation theory will benefit from this research. In terms of the body of

information that has been advised and that has indicated the numerous techniques of enhancing financial growth and performance by leveraging on innovations, this research study will be a source of value additions for the academics. Therefore, this study serves as a jumping off point for more recent research on financial development in other organizations such as microfinance institutions and SACCOs.

1.6 Scope of the Study

This study focused on the Kenya Commercial Bank. Kenya Commercial Bank was selected because during the period 2016 to 2020 it was the largest commercial bank in asset base and also had the highest technological advancement (CBK, 2020). The study used secondary data. Although there are many types of digital financial services this study only focused on four commonly used services in the financial markets in Kenya (Internet banking, ATMs, Mobile banking and Credit cards). The study used secondary data in order to establish the extent of use and the level of profitability to the banking entity.

1.7 Limitations of the Study

The limitation of this study is that the study was only carried on Kenya Commercial Bank other commercial banks in Kenya were not included. Thus, for future research, the researchers should try to include other commercial banks in Kenya. The study also faced a time constraint because it was an academic project that needed to be finished in a set time, which made the research challenging.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of relevant literature based on the four objectives of the study. It is organized as follows; the theoretical framework, the conceptual review, empirical review and summary and gaps in the literature.

2.2 Theoretical Framework

This study was underpinned by three theories. These are the theory of financial innovations, technology acceptance model and diffusion innovation theory.

2.2.1 Theory of Financial Innovations

The proponent of this theory was Silber (1983) and it was based on the notion that money can be increased if the drivers of expanding the money can be increased. According to (Li & Zeng, 2010) this theory demonstrates the new innovations in the finance sector that are aimed at filling the gaps in the money related business sector which include the expenses and the exchange costs. Błach (2011) noted that the theory of financial innovation has brought about new way of doing business and this has helped to meet the customer needs and hence enhancing the firms' level of liquidity as well as expanding quantity new applicants, due to their qualifications on the situation. The theory emphasizes that financial innovation is a critical motivating force of the financial systems that aims at bringing better economic competence and enhancing competitiveness in the finance sector.

Sekhar (2013) noted that financial innovations have redefined financial developments by coming up with new ways of production, technological solutions, creating better return

rates hence boosting Kenya's economy in general. The theory posits that the innovativeness improves the firms' competitive edge of a corporate and generates more earnings to the investors. Innovation is a tool used to solve, manage and transfer the entire extra burden. The application of innovations promotes growth of financial entities through improved allocation, efficiency and a reduction of financial and administration costs (Sekhar, 2013). The weakness of this theory is, this theory requires the banks to adopt a high technological framework which is a costly affaire to most of the banks. Another weakness is, the theory assumes that all the targeted customers have the capability of using the technology available to increase their operations. The theory also assumes that all those seeking financial services have the required digital knowledge to enhance their utilization of the technology.

Despite the above weaknesses, the theory of financial innovations will enable the researcher to access the digital innovations (internet Banking, Mobile Banking, ATMs and Credit Cards) to the extent to which they contribute to profitability of commercial banks in terms of revenue. This theory therefore calls for an understanding of what is expected to ensure that the targeted customers have the ability to apply the required technology for service delivery. The theory was applicable to this study as it provided a good basis for understanding how different innovations have improved the financial sector in Kenya. By understanding these innovations, it was possible to give recommendations on which innovations were suitable in enhancing profitability of the commercial banks.

2.2.2 Technology Acceptance Model

The proponent of this model was Davis (1986) who sought to explain the driving force behind technological knowhow by firms in financial sector.

According to Monyoncho (2015) this model deals with perceptions and not systems real usage and argues when new technological advancement is introduced to the customers. The level of confidence that users put on a system is very important as it affects the user's perception of the new technology and how beneficial it is to support both short and long-run objectives of the firm. Further, the level by which an individual considers a system will boost performance in the short and long-run is the PU (Mojtahed, Nunes & Peng, 2011).

This model affirms that the systems real utilization is established by each user's understanding, knowhow, behavioral intention for usage, trial ability, and individual's perception to the system. The theory also explains that the perception towards new technology has a direct relation to its functionality as well as the simplicity of the system (Lim & Ting, 2012). Technology Acceptance Model considers that acceptance of technology and functionality is influenced by consumer's intentions that establish the customer's perception towards system (Mojtahed, Nunes & Peng, 2011). The theory also supports that the recognitions or suspicions about the advancement are instrumental in the improvement of states of mind that will in the long run result in system usage conduct (Lim & Ting, 2012).

The weakness of Technology Acceptance Model (TAM) is, customers adapt to technology at different rates and the banks must be ready to accommodate all these customers so that they do not lose some along the way. Another weakness is, the cost of installation and implementation is high and therefore banks might not be able to feel the effect of technology in the short run. Despite the above weaknesses, TAM will enable the researcher to be able to access the level of which digital financial services (Internet Banking, Mobile Banking, ATMs and Credit Cards) have been accepted.

The innovation is very important in the sense that it gives details and clarifies the reasons why clients acknowledge, accept the technology. The theory was applicable to this study in the sense that it explained the digital financial services which could be applied in clarifying the existence of variations in consumer perception of digital financial services and how they are applicable to their daily operations. (Lim & Ting, 2012). The understanding of this theory therefore provided a good basis for investigating the effect of digital finance on firm's profitability.

2.2.3 Diffusion of Innovation Theory

This theory was proposed by Rogers (1995). The theory sought to explain the approach through which innovation can be passed over a certain period of time among different users (Sarker & Sahay, 2004). The theory seeks to explain the rate new ideas and technology spread. The theory explores different ways in which innovative ideas are passed from one generation to the other. The diffusion of innovations theory explains that innovationists apply normal distribution curve which can be partitioned into five segments to categorize users in terms of innovativeness. Diffusion theory explains that the crucial aspect in establishing implementation of innovation is: absolute advantage, companionable, simplicity, trial ability as well as ease to be detected (Monyoncho, 2015).

This theory classifies the innovation users into various categories which tend to give the impression that different groups of people can use innovations in different ways. The weakness of these innovation is, despite the fact that the firms assume all customers are versed with the technology as well as a certain system for enhancing their financial satisfaction, this theory depends on the rate of speed on spread, when the rate of spread is low, then definitely the spread will be low and therefore people will not be able to use it

because they don’t know it. Another weakness is the diffusion of innovation theory places people into five categories innovators, early adopters, early majority, late majority and laggards therefore if one category fails to understand technology then it will affect the use of technology among different users (Dias & McKee, 2010).

Despite the weaknesses, this theory will enable the researcher to be able to put people in different groups and study them according to how they have understood technology on financial services (Internet Banking, Mobile Banking, ATMs and Credit cards) This theory is applicable to this study in the sense that it helps to explain the role of innovations in enhancing the performance of the financial services. The theory is also applicable to this study in the sense that it provides appropriate guidelines in regard to how a new technology influences performance of a firm (Dias & McKee, 2010).

2.3 Conceptual Framework

This study was conceptualized in terms of independent variables (Internet banking, Mobile banking, ATMs and Credit cards) as the parameters that influenced commercial banks profitability. Figure 2.1 is the summary of the conceptual framework in a diagrammatic form.

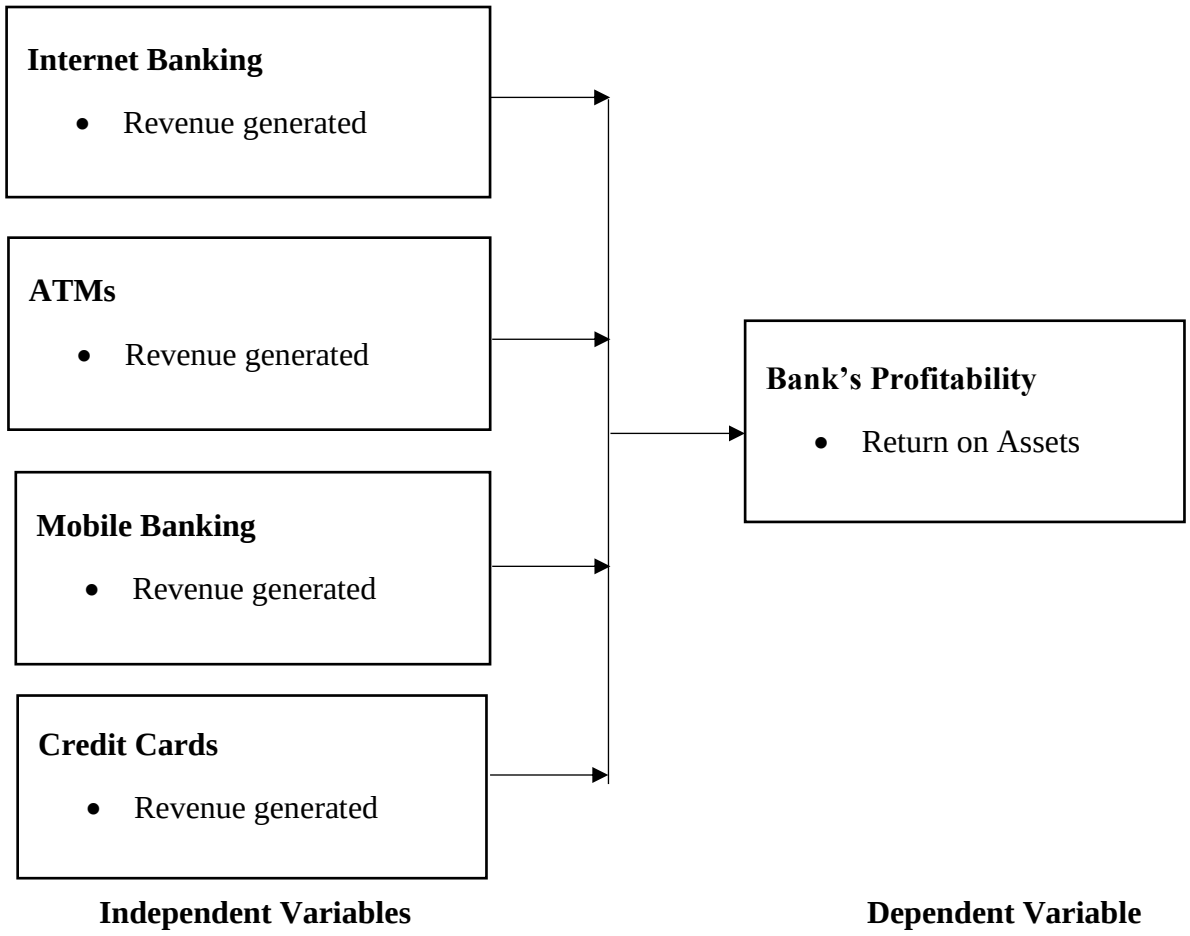

Figure 2.1: Conceptual Framework

2.3.1 Internet Banking and Profitability

Dias and Mckees (2010) argue that the rate of internet banking is impacted by five characteristics. The characteristics are relative advantage, compatibility, complexity, trial ability and observability. Internet banking is measured by cost of cash transactions and revenue generated (Bello, 2005). Cost of transaction is the amount charged by a bank when a transaction is done, this is an income to the bank. This is attributed to the fact that with increased transaction the cost is minimized and hence the bank is able to save more revenue which translates into profitability. Internet banking is generally cheaper in terms of transferring money and providing other services to clients hence there is a likelihood that

there will be more savings on the part of the bank which improves the profitability of the bank. All this is made possible as many consumers, are able to access financial services on a 24-hour bases through various cash points.

2.3.2 Automated Teller Machines and Profitability

An ATM is a machine that supports debit card. debit card is a payment card that deducts money directly from a consumer's account when it is used (Fontinelle, 2021). A person can shop anywhere, anytime with a debit card provided the debit card has some money in it. According to Rodgers (2015) ATM impact is measured by cost of transactions and revenue generated. through ATMs there is increased volume of cash transfers hence improves on efficiency, many customers are now beginning to adapt to this technological innovation because of its convenience in offering financial services. Banks are now able to reduce their operational costs at the branch as they only deal with limited and crucial transactions that cannot be done through the debit card (Sanchez, 2009).

2.3.3 Mobile Banking and Profitability

Mobile banking (m-banking) is defined as using the mobile phone to transact on banking services such as account-based savings or transactions products offered by banks Laukkanen (2007). Mobile banking impact is measured by cost of mobile loans advanced, cost of transactions and revenue generated. Millions of people in developing nations with access to cell phones but no access to traditional financial services may find a solution in mobile banking. By lowering travel time and distance to the closest retail bank branches as well as the bank's own overhead and transaction-related costs, mobile banking can increase access to fundamental financial services (Paul, 2010).

2.3.4 Credit Cards and Profitability

Bloomental (2021) defined credit card as a thin rectangular piece of plastic or metal issued by a bank or financial services company, that allows cardholders to borrow funds with which to pay for goods and services with merchants that accept cards for payment. Credit card profitability is measured using cost of transactions, interest on credit and revenue generated. Credit cards impose the condition that cardholders pay back the borrowed money plus any applicable interest.

2.3.5 Profitability of Commercial Banks

Bank profitability is the measure of a bank's financial performance (Brigham, 2005). Banks make a profit by earning or generating more money than what they are paying in expenses. The main part of the profit of a bank comes from the service fees, charged for its services and the earned interests from its assets. According to Wayiera (2017) bank's internal stakeholders should ensure minimal bank capitalization as well as maximize bank size (total net assets) to achieve maximum bank profitability.

2.4 Empirical Review

This section discuses literature on digital financial services and its empirical findings. The chapter reviews the various studies that are relevant to digital financial services on profitability of Kenya commercial banks. It also presents the relevant theories that explain the plastic money on financial performance of commercial banks in Kenya.

Maiyo (2013) conducted a study the study sought to establish the effect of electronic banking on financial performance of commercial banks in Kenya. The study adopted descriptive research design the specific objectives were to determine the extent of e-

banking and the effect of this on financial performance of commercial banks in Kenya. The sample size used was all 43 commercial banks in Kenya. Primary data was collected using a questionnaire that was developed and sent to the respondents of commercial banks. The primary data was also augmented with secondary materials extracted from published financial statements of the respective commercial banks and central bank of Kenya supervision reports. Appropriate frequency tables and charts were used, a multiple regression analysis was also used to explain the relationship between the variables and present the findings. The study revealed that commercial banks did not expand their electronic services in a planned and well-articulated strategy and hence the need of this study.

Kyalo (2014) looked into how credit card use affected the performance of commercial banks in Kenya, specifically whether it would improve or decrease their profitability. The study used an informal research approach. Between 2009 and 2013, secondary data for seven commercial banks were used. The information was taken from the Central Bank of Kenya's and commercial banks' publicly available annual reports. For each variable, descriptive statistics including means, frequencies, and percentages were generated. Multiple regressions of the study's variables, which are the financial performance measured by return on assets, were used in the analysis. Number of credit cards made available throughout the study period, number of transactions made by customers using credit cards, dollar amount of transactions made by customers using credit cards, bank leverage ratio, and age of banks. Inferential tests, such as the Pearson Product-Moment Correlation Coefficient and regression analysis, were carried out using the OLS regression approach.

The outcome demonstrated a 0.612 coefficient of determination (R=0.612) between credit card use and commercial banks' financial health. According to the study, commercial banks should change the interest rate they charge for credit cards. There is no proof that commercial banks have changed their interest rates to increase profits, which is why my study is necessary.

Mwangangi (2017) carried a study on the influence of digitalization on the performance of digitalized commercial banks in Kenya. The general objective of the study was to investigate the influence of digitalization on the performance of digitalized commercial banks in Kenya. The study was guided by the following specific objective; to identify the main platforms used in digitalization in commercial banks in Kenya, to assess the challenges of digitalization on the digitalized commercial banks in Kenya and to assess the effects of digitalization on the performance of commercial banks in Kenya. The research design which was adopted for the study was descriptive. The target population of this study comprised of 623 senior employees. Stratified random sampling was used in the selection of 83 respondents. Questionnaires were used and administered to each member of the sample. The study administered the questionnaires individually to all respondents of the study. Quantitative data collected was analyzed by the use of descriptive statistics using SPSS and presented through percentages, means, standard deviations and frequencies. The study conducted a multiple regression analysis. The study revealed that there was a relationship between platforms and performance. It was also established that a unit increase in main platforms used in digitalization would lead to an increase in performance of commercial banks. The researcher also established that digitalization would lead to an increase in performance of commercial banks.

The study did not investigate the effect of Online banking, Debit cards, Mobile banking and Credit cards on profitability of commercial banks in Kenya which will be the focus of my study.

In order to determine whether the use of plastic money promotes or decreases the profitability of commercial banks in Kenya, Wafula (2015) conducted a study to examine the impact of plastic money on the financial performance of Kenyan commercial banks. The study's findings were meant to help the banking sector gauge how well the original intent behind the introduction of plastic money had been realized. They were also meant to provide information for future strategy development and enhancement of competitive advantage. The research design used in the study was a descriptive survey. Secondary information from the CBK annual supervision reports from all Kenya commercial banks from 2010 to 2014 was used along with reports from prior investigations in the same subject that have been published. For each variable, descriptive statistics like the mean score were produced. The analysis involved multiple regression of the variables under study, which are the financial performance represented by net profit, the quantity of plastic cards issued by the banks, the number of A.T.M. system installations, the quantity of point-of-sale machines, and the transaction value of plastic cards issued by the banks. The report suggests that commercial banks change the commission fees assessed for using plastic cards. This ultimately encourages consumers to use plastic cards more frequently. More research needs to be done whether credits cards will increase profits to commercial banks when charges are reduced, hence the need of my study.

In a study carried by Chepkemoi (2015) On the effect of mobile banking on financial performance of commercial banks in Kenya, the objective of the study was to determine the effect of mobile banking on the financial performance of commercial banks in Kenya. Data were gathered from 43 Kenyan commercial banks. Secondary data from the audited and released Financial Statements of the licensed commercial banks was used in the study. The information gathered relates to the number of transactions handled by mobile banking technology, the total assets' natural logarithm, the percentage of GDP growth, and the number of users enrolled in the commercial banks' mobile banking networks. The association between mobile banking and the financial performance of Kenya's commercial banks was examined using multiple regression and inferential statistics in the Statistical Package for Social Sciences (SPSS) version 21 data analysis program. The study did not give a clear connection of how mobile banking have enhanced the profitability of the banking sector hence the need of this study.

Arnaboldi and Claeys (2014) carried out a study to compare the performance of online banking models in four countries Finland, Spain, Italy and the UK between the years 1995 to 2004. The objective of the study was to investigate the performance of online banking in Finland, Spain, Italy and UK. The sample used was all banks that use online banking in those four countries. The researcher used descriptive design and he established that internet banks were performing better in terms of average returns to assets or equity, and do not seem to run higher operational costs for the little income they generate. It was also noted that the performance of banks measured by selected bank specific variables and the countries macroeconomic indicators and information technology related ratios. It was further noted that focusing mostly on bank deposits, the banks cannot gain benefits from

more rewarding banking activities. It was also noted that those clients interested in value added products will still prefer interaction with a physical branch and therefore internet banks need to reach a minimum dimension in order to become profitable. This study was conducted in developed country which have very advanced systems of technology in the finance sector. The study also considered the obvious digital methods widely adopted leaving out Debit cards and Credit cards. These are important digital finance methods that this study seeks to address, to add value to the existing studies.

A study by Malhotra (2014) conducted in India among commercial banks sought to assess the power of internet banking on profitability of commercial banks. The aim of the study was to assess the power of internet banking on banks profitability. The study used a survey of 85 commercial banks where the data for the year 2013 was collected and analyzed. It was established that 57% of commercial banks that participated were using internet banking services. The univariate analysis indicates that Internet banks are larger banks and have better working effectual ratios and profitability unlike non-Internet banks. Internet banks rely more heavily on core deposits for funding than non-Internet banks do. This study did not investigate the effect of Mobile banking, Debit cards and Credit cards to the extent to which they affect profitability which will be the focus of my study.

Ngalyuka (2013) who conducted a study to determine the relationship between ICT utilization and fraud losses in commercial banks in Kenya. The objective of the study was to investigate the relationship of ICT utilization and fraud losses in commercial banks, Secondary data was collected from reports at central bank, Banking Fraud Investigation Unit and audited financial reports of the 43 commercial banks in Kenya. Data was analyzed using SPSS through correlation analysis and regression analysis.

The findings were presented in tables and graphs. The study established that, commercial banks recoded great increases in both ICT utilization and fraud losses between 2008 to 2012. The study did not highlight the positive effects on ICT on the performance of the commercial banks in Kenya hence the need for this study.

Another study by Ngugi (2013) who sought to establish the effect of online banking on financial performance of commercial banks in Kenya. The objectives of the study were to investigate the effect of agency banking on the financial performance of Kenyan commercial banks in 2014. The study also sought to establish the effect of accessibility of banking services, low cost of service and increased customer transactions through agency banking. All the 43 commercial banks were used in the study from which the data was collected. It was established that internet banking was cost effective and banks were able to save. Chase bank was used as a case study. This study used a descriptive research design. The target population of this study was 174 staff working at the headquarters of Chase Bank. This study applied stratified random sampling to select 50% of the target population and hence the sample size of this study was 87 respondents. Semi structured questionnaires were used in research study to collect primary data. Both descriptive and inferential analysis were conducted. The study only studied on agency banking hence the need to study other digital financial services.

Mutua (2012) carried a study on the effect of mobile banking on the financial performance of commercial banks in Kenya. The study's goal was to determine how much mobile banking impacts Kenya's commercial banks' financial performance. The research design used in the study was descriptive. The target population included 43 commercial banks operating in Kenya as of December 2012 and six mobile phone service providers that offer

mobile phone services. The amount of mobile banking users was regressed against bank performance as determined by return on assets using the aggregate amounts moved via mobile for the previous five years. The Kenya National Bureau of Statistics, mobile phone companies and the Central Bank of Kenya provided secondary data for the study. The study did not consider the use of Online banking, Debit cards and Credit cards hence the need of my study.

In another study by Zimmerman (2010) On the effects of internet banking on operational performance of commercial banks in Nakuru County. The objective of the study was to investigate the extent to which internet banking affects operational performance of commercial banks in Nakuru County. The study employed the following theories namely: Bank-Focused Theory and The Technology Acceptance Model (TAM). This study adopted a cross-sectional research design. The study population comprised of 56 employees of the commercial banks. Since the banks are few, the study adopted a census survey. Data was collected using structured questionnaires. Data was analyzed using correlation and regression analysis. The study established that internet banking has a positive significant effect on operational performance of the commercial banks. The study established that mobile banking supports the delivery of mobile banking services in an economy. The study was only carried in Nakuru County hence the need to carry the study in commercial banks in Kenya.

Bonface and Ambrose (2015) in their study on Mobile Banking and Financial Performance of Commercial Banks in Kenya. The objectives of the study were; to determine the influence of m-banking services on financial performance of commercial banks, effect of m-banking on system security, establishing the relationship between speed of m-banking

service, and finding out the influence of skills required to use m-banking services on financial performance of commercial banks in Kenya. All the 43 commercial banks were considered for the study and data was collected using a questionnaire that was administered to the management. The study used a descriptive survey design, the data was analyzed both descriptively and inferentially and it was noted that the prices of M-banking services had a high positive influence on the financial performance of commercial banks in Kenya. The researcher only studied mobile banking hence more research is needed to be done whether Online banking, Debit cards and Credit cards affects profitability of commercial banks.

A study by Njoroge (2016) on determinants of profitability of Kenyan commercial banks, the objective of the study was to investigate the determinants of profitability in Kenyan commercial banks. The research examined how factors such as bank size, capital sufficiency, liquidity, credit risk, and operational effectiveness affected banks' profitability. The study's use of a descriptive approach made it possible to identify the variables that affect the Kenyan commercial banks' profitability. The study analyzed secondary data from 43 commercial banks that were registered as of December 31, 2015, spanning the years 2011 to 2015. The statistical packages for social studies were used to edit, sort and analyze the data. The results showed a significant negative relationship between capital adequacy, credit risk and banks' profitability as well as a significant negative relationship between bank size, operational efficiency and profitability. The effects of digital financial services (Online banking, Debit cards, Mobile banking and Credit cards) on commercial banks profitability in the above study were not studied hence the need of my study.

Hurindu (2017) carried out a study to examine the effect of bank specific factors of profitability in Sri Lankan domestic commercial banks. The objective of the study was to establish the extent of bank specific factors of profitability on commercial banks in Sri Lanka. This study used a full panel of data and a sample frame of annual reports from Sri Lankan domestic commercial banks. A substantially balanced panel data set with 60 observations from 12 domestic commercial banks in Sri Lanka from 2011 to 2015 formed the foundation for a regression analysis. Profitability is the dependent variable, and the independent variables are bank size, capital, deposits, and liquidity. Return on assets, the logarithm of total assets' size, equity ratio, capital, deposit ratio, and liquidity ratio were all employed in this study to determine profitability. With the help of the STATA Statistical Software Package, regression models were examined. Online banking, mobile banking, Debit cards and Credit cards were not mentioned hence the need to research more on the extent to which they affect profitability.

Mishkin (2009) conducted a study in Albania to assess the factors affecting banks profitability. The objective of the study was to establish the factors that affect banks profitability. The researcher used descriptive research design; secondary data was used. In this way a basic measure of bank profitability is the return on asset (ROA) which corrects for the size of the bank. It is true that ROA provides useful and necessary information on bank profitability but this is not on the major interest of the bank's owners (equity holders). They are more concerned about how much the bank is earning on their equity investment, an amount that is measured by the return on equity (ROE), the net income per currency of equity capital. The banking industry's profitability is impacted by a variety of factors. These variables are often divided into macroeconomic variables, industry variables, and bank

variables. such as bank size, capital ratio, deposit ratio, liquidity ratio, and overhead expense management are bank-specific characteristics. These are factors that affect a bank's profitability internally. macroeconomic variables including market capitalization, GDP, and inflation. Numerous academics from various nations have looked into what factors affect bank profitability. They have identified a number of elements that affect bank profitability; therefore, additional research is required to identify additional aspects that affect bank profitability.

Olweny (2011) noted that the overall profitability of the banking sector in Kenya has improved tremendously over the last 10 years. However, despite the overall good picture a critical analysis indicates that, not all banks are profitable. For example, the commercial banking sector posted a profit before tax of Ksh 49.01 billion according to the (CBK, 2009) report. The huge profitability enjoyed by the large bank's vis-a-vis the small and a medium bank indicates that there are some significant factors that influence the profitability of commercial banks. Flaminietal (2009) and other several studies have shown that bank profitability is influenced by bank-specific factors and industry specific factors. However, these studies were based on data from other countries and their findings may not be applied to the local banking sector, hence the need of my study.

According to Olweny (2011) The review of literature has revealed that bank profitability can be influenced by bank-specific factors and external factors. Bank-specific factors are those factors within the direct control of managers and can be best explained by the CAMEL framework, while external factors include industry-specific and macroeconomic factors. This study focuses only on industry-specific factors as external factors.

The review of literature also revealed that the multiple linear regressions method is the most used in modeling the relationship between bank profitability and its factors. The relevant interrelationships among bank-specific factors and market specific factors and their impact on bank profitability, as revealed by the reviewed of literature, are depicted in the conceptual framework (Figure 2.1). Finally, it is clear from the reviewed literature that few local studies have been dedicated on this particular area of bank performance and that studies that have attempted to do so have tended to study each factor of performance to the exclusion of other factors.

According to Olweny (2011) the review of literature has revealed that bank profitability can be influenced by bank-specific factors and external factors. Bank-specific factors are those factors within the direct control of managers and can be best explained by the CAMEL framework, while external factors include industry-specific and macroeconomic factors. This study focuses only on the effect of digital financial services on the profitability of commercial banks in Kenya. Olweny (2011) conducted a study to assess the profitability of commercial banks. The objective of this study was to determine and evaluate the effects of bank-specific factors; Capital adequacy, Asset quality, liquidity, operational cost efficiency and income diversification on the profitability of commercial banks in Kenya. The second objective was to determine and evaluate the effects of market structure factors; foreign ownership and market concentration, on the profitability of commercial banks in Kenya. This study adopted an explanatory approach by using panel data research design to fulfill the above objectives. Annual financial statements of 38 Kenyan commercial banks from 2002 to 2008 were obtained from the CBK and Banking Survey 2009.

The data was analyzed using multiple linear regressions method. The analysis showed that all the bank specific factors had a statistically significant impact on profitability, while none of the market factors had a significant impact. Based on the findings the study recommends policies that would encourage revenue diversification, reduce operational costs, minimize credit risk and encourage banks to minimize their liquidity holdings. The overall profitability of the banking sector in Kenya has improved tremendously over the last 10 years. However, despite the overall good picture a critical analysis indicates that, not all banks are profitable. For example, the small and medium financial institutions which constitute about 57 % of the banking sector posted a combined loss before tax, of Ksh 0.09 billion in 2009 compared to a profit before tax of Ksh 49.01 billion posted by the big financial institutions (CBK, 2009). The huge profitability enjoyed by the large bank's vis-a-avis the small and a medium bank indicates that there are some significant factors that influence the profitability of commercial banks. Flamini et al. (2009) and other several studies have shown that bank profitability is influenced by bank-specific factors and industry specific factors. However, these studies were based on data from other countries and their findings may not be applied to the local banking sector.

2.5 Summary of Review and Research Gaps

The reviewed studies have focused on specific digital financing services which form the digitalization umbrella. These specific digital platforms which have been given a lot of focus in past studies are internet banking and mobile phone technology. However, the commercial banks in Kenya have not limited themselves to using one type of digital platform. The banks use a variety of the digital platforms. To the researcher's knowledge, at the time of the study, there remains only limited studies both internationally and locally

that have focused on the digitalization concept in the commercial banks in Kenya especially in regard to ATMs and Credit cards use and how the technology influences the profitability of Kenya Commercial Bank. Bearing these facts in mind, this study seeks to fill this existing gap by conducting an investigation into digitalization in the Kenya Commercial Bank. Literature on Internet Banking has indicated that the service has given the customers and banks greater access advantage because it gives great advantages to the customer and the bank. This is as a result of the speed, convenience, and cost advantage. People can now have more control over their finances in a very simple method that they like and find comforting thanks to internet banking. But it also carries its own risks and obligations. Thought and caution are needed, but it is possible.

Numerous studies' conclusions indicate that digitalized banking has evolved into a crucial survival tool and is radically altering the global financial sector. Bank customers can now access services at significantly lower prices with just a few mouse clicks, and they have never-before-seen freedom to choose the providers of their financial services. Given the globalized and competitive character of the economy, no nation today has a choice regarding the implementation of digitalized banking. To be competitive, banks must modernize and continually come up with new, creative customized products and services. The results demonstrate that Kenyan commercial banks do not invest in digitalized banking with the primary intention of reaping large financial rewards. In Kenya, digitalized banking is mostly utilized to complement other service delivery channels and to make consumers' lives easier. In order to compete and primarily draw in business clients, internet banking is being employed as a competitive advantage technique. In view of the review this study seeks to answer the following research questions, whether digital financing has an effect

on the Kenya Commercial Bank's profitability in terms of financial measures which include return on investments. This literature gap is addressed by this comprehensive study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The methodology that was employed to carry out the research is presented in this chapter. It provides information about the research design, the target population, the sample size and sampling method, the tools and process for collecting data, and the analysis, presentation, and interpretation of the findings.

3.2 Research Design

The research utilized descriptive research design. Descriptive research design involves gathering data that describes events, organizes, tabulates, depicts and describes the data (Kothari, 2014; Babbie, 2012). Descriptive studies portray the variables by answering the who, what, when and how questions. According to Cooper and Schindler (2000) descriptive statistics discover and measure cause and effect relationships among variables. On the other hand, Case study design seeks to analyze data from a single firm over a given period of time (Kothari, 2004). This study sought to establish the effects of digital financial services on profitability of commercial banks in Kenya: a case of Kenya Commercial Bank.

3.3 Target Population

In statistics, the target population is the specific population about which information is desired. Ngechu (2004) defines population as a well-defined or set of people, services, elements, events, group of things or households that are being investigated. The population of the study consisted of all the 43 commercial banks licensed by the Central Bank of Kenya (CBK) as at 31st December 2020 (see Appendix I).

3.4 Sample Size and Sampling Technique

The study used purposive sampling to pick Kenya Commercial Bank. Purposive sampling is a sampling technique that allows the researcher to pick cases of interest from a population (Cresell & Miller, 1997). Kenya Commercial Bank was selected from a list provided by the Central Bank of Kenya (CBK) that comprised 43 commercial banks licensed by the CBK as at 31st December 2020 (see Appendix I). KCB was selected because with a Market share of 14.14% and a net asset base of 555,630 million it was the best and largest commercial bank in asset base and also had the highest technological advancement (CBK, 2017).

3.5 Data Type and Source

The study used secondary data. In order to achieve the objective of this study, the researcher used data derived from CBK banks annual supervision reports and from the Kenya Commercial Bank financial reports. A total of 5 financial years (2016 – 2020) was used. The duration was considered appropriate since there was a great increase in the usage of internet banking, ATMs, Mobile banking and Credit cards hence it was prudent to find out how this had affected the profitability of commercial banks.

3.6 Data Collection Instruments

This refers to the instruments that the researcher uses in collecting data. In this case the instrument that was used is the data collection worksheet. A copy of the instrument is attached as appendix II.

3.7 Validity and Reliability of the Instrument

Cooper and Schindler (2006) classified three methods of testing reliability and Validity of data collected using any type of instrument. These are objectivity, reliability and validity tests. The objectivity test is concerned with the relationships that exist between the result and the criteria used in the study. Acceptable and reliable tests must provide at list 90% of the same or similar results, even when the instrument was used by a different scholar, at a different time and environment (Sounders, 2008). The instrument that was used in this research has already been used by many scholars in different environments for example Abubakar et al (2014), Obere (2009) and Anthony (2006) and the outcome of the research proved the validity and the reliability of the instrument in an objective manner.

Again, the reliability of the instrument depends on the consistency obtained in the results. The cases of Abubakar et al (2014), Obere (2009) and Anthony (2006) also proved the reliability of the instrument at various points and time in the research environments. Similarly, the objectivity of the instrument is to prove the correctness of the result beyond any reasonable doubt which Saunders (2008) emphasizes in his research book. Therefore, this research is not exceptional since the bases of the data that was used is secondary in nature and the instrument is recognized as one of the most suitable for collecting the data, thus, the instrument was said to be valid, reliable and acceptable.

3.8 Data Analysis Procedure

This section describes the data analysis process. After the data was extracted from semi-annual financial statements it was edited and cleaned. The data was further subjected to descriptive and inferential statistics so as to establish patterns, trends and to assess the effect of the independent variables on the dependent variable.

Correlation analysis is a statistical tool used to measure the degree of linear relationship between two variables (Senthilnathan, 2019). Ordinary Least Square assumes that there is always a linear relationship between each of the independent variable and the dependent variable. The study checked the existence of a linear relationship between each of the independent variables and the dependent variable, using Pearson's moment correlation coefficient (equation 3.1). The test for existence of a linear relationship was carried out at 95% level of confidence.

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x^2 - \left(\sum x\right)^2} \times \sqrt{n\sum y^2 - \left(\sum y\right)^2}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.1$$

In order to develop the research model and assess the magnitude of the effect of the independent variables on the dependent variable, multiple linear regression analysis (equation 3.2) was tested. Multiple linear Regression model has been used previously by other researchers to test the relationship between variables. Aduda (2011); Ngugi, Johnsen, & Erdélyi (2010) and Njeru (2016) both used regression analysis to test the relationship between study variables in the area of finance in Kenya. Regression helped test how well the model fits the data. The R value represents the correlation between the variables while R square represents the magnitude of the effect of the independent variable on the dependent variable.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.2$$

Where:

Y = Profitability

β_0 = The Y intercept

βi (i = 1,2,3,4) Is the regression coefficient

X_1 = Internet banking;

X_2 = Automated teller machines;

X_3 = Mobile banking;

X_4 = Credit cards

e = the error term

The significance and degree of the difference between the regression mean and the error mean were examined using the Fischer distribution test, or F-test. This test was conducted with a 95 percent level of confidence at a significance level of 5%. Analyzing the analysis of variance (ANOVA) test was used to achieve this. Similar to this, the t-test statistic was employed to evaluate the model's propensity to forecast study statistical significance. For this test, the criteria were that the link is not significant if the t statistic is between -2 and +2, hence the study's null hypothesis was accepted as being true. On the other hand, the null hypothesis was disproved if the t value was more than +2 or less than -2. The model was deemed to be insignificant and unable to account for fluctuations in the dependent variable if the p-value was higher than 0.05. The results were presented using tables and line graphs.

3.9 Diagnostic Tests Results for Multiple Linear Regression

These tests are run on the data variables to confirm compliance with the multiple regression technique's requirements and to guarantee more reliable and valid findings.

3.9.1 Multi Collinearity

Multi-Collinearity happens when 2 or more variables are highly correlated, when 2 variables are highly correlated it makes it difficult to interpret results and creates an over fitting problem. Multi-Collinearity was tested and gave results in Table 3.1.

Table 3.1: Correlations Coefficients and VIFs

	IBR	ATMR	MBR	CCR	VIFs
IBR	1				1.354
ATMR	-0.2979	1			1.110
MBR	-0.4267	0.0384	1		1.238
CCR	-0.2032	-0.4077	-0.6299	1	0.000

Source (Author, 2021)

Table 3.1 demonstrates that there was no multicollinearity because all VIFs were less than 5 and correlation coefficients between variables were less than 0.8 (in absolute form) (Gujarati, 2003). This is confirmation that the regression coefficients were steady, supporting the validity of the Cooper and Schindler's significance tests (2006). The correlation coefficients were calculated to find those explanatory variables that may have been strongly related but whose significance was mitigated by their interactions with the other variables.

3.9.2 Serial (Auto Correlation) Correlation

Serial correlation was used to test the strength of the relationship of the variables and the results are shown in Table 3.2.

Table 3.2: Wooldridge Test for Autocorrelation

Dependent variable	F (1, 56)	Prob>F
ROA	12.063	0.001

Source (Author, 2021)

As shown in Table 3.2, F statistics for the model was 12.063 with ROA as the response variable. The ROA's p value was 0.001. Because first order serial correlation was present in the data, the serial correlation test was significant at the 5% level of significance. Therefore, the feasible generalized least squares (FGLS) method was employed to address the issue of first order serial correlation. Additionally, this approach ensures that the estimators are effective and reliable for legitimate significance tests. Since the true values of the variances and covariances for the disturbance factors utilized by the GLS estimate are unknown in reality and the GLS estimator is not a feasible estimator, FGLS is preferred to general least square (GLS) (Wooldridge, 2002). The FGLS procedure by Wooldridge (2002) is as follows:

(i) Regress Y on X_t and obtain the residuals U_t

(ii) Regress the residuals against lagged residuals, U_{t-1} to obtain the coefficients (p) of U_{t-1}

(iii) Use OLS equation on the following equation $y_t = \beta_0 X_{to} + \beta_1 X_{t1} + \beta_2 X_{t2} + \ldots + \beta_k E\ X_{tk}$ it + et where

$X_{to} = (1-p)$ for $t \geq 2$ and X1o = (1-p2)1/2

The resulting slopes (β_j) are consistent and efficient.

3.9.3 Normality

The regression model's Shapiro-Wilk results were w=0.861 with a p value of 0.000. This therefore implied that the residuals were not normally distributed and that the null hypothesis was rejected at the 5% level of significance. Instead of using the normal standard errors, robust standard errors were employed to address the issue of residuals that were not normally distributed that could affect the results of the significance tests (Gujarati, 2003). In general, robust standard errors increase the effectiveness of the estimators (Green, 2008).

3.9.4 Heteroscedasticity

Heteroscedasticity was tested to determine the variance of residuals over a range of measured values which gave the results in table 3.3

Table 3.3: Heteroscedasticity Test Statistics

Response Variable	Chi Square	Degree of freedom	*p*
ROA	342.45	54	0.0000

Source (Author, 2021)

The model's null hypothesis lacks heteroscedasticity, i.e., the residuals do not have equal values throughout a range of measured values. As indicated in Table 3.3, the test for the regression model produced a chi-square value of 342.45 with a p-value of 0.000. The null hypothesis was rejected since the chi-square value was statistically significant at the 5% level of significance, indicating the existence of heteroscedasticity. The FGLS method was employed to get over the issue of heteroscedasticity in order to make the standard errors

impartial, resulting to valid test statistics and subsequently significance tests as recommended by Wooldridge (2002).

3.10 Assumptions of Multiple Linear Regression

A statistical method known as multiple linear regression employs two or more independent variables to forecast the results of a dependent variable. Analysts can use the technique to calculate the model's variation as well as the relative contributions of each independent variable to the overall variance. The following presumptions underlie multiple linear regression:

3.10.1 Linear Relationship Between Dependent and Independent Variables

The dependent variable and each of the independent variables must have a linear connection in order for multiple linear regression to work. Making scatterplots and then visually inspecting them for linearity is the best technique to verify the linear correlations. The analyst will need to perform a non-linear regression or convert the data using statistical software, such as SPSS, if the relationship seen in the scatterplot is not linear.

3.10.2 Independent Variables not Highly Correlated with Each Other

Multicollinearity, which happens when the independent variables (explanatory variables) are highly connected, shouldn't be present in the data. Finding the specific variable that contributes to the variance in the dependent variable will be challenging when independent variables exhibit multicollinearity. The Variance Inflation Factor approach is the most effective way to verify the assumption.

3.10.3 Variance of Residuals is Constant

The assumption behind multiple linear regression is that each point along the linear model experiences roughly the same amount of residual error. Homoscedasticity is the situation in question. When analyzing the data, the analyst should compare the predicted values to the standardized residuals to see if the points are evenly spaced over all values of the independent variables. The data can be plotted on a scatterplot to test the hypothesis, or statistical software can be used to generate a scatterplot that incorporates the complete model.

3.10.4 Independence of Observation

The observations should be independent of one another, according to the model. In other words, the model implies that the residual values are independent. We employ the Durbin Watson statistic to verify this supposition. The test will provide values between 0 and 4, with values between 0 and 2 indicating positive autocorrelation and values between 2 and 4 indicating negative autocorrelation. A value of 2 for the midpoint indicates that there is no autocorrelation.

3.10.5 Multivariate Normality

When residuals have a normal distribution, multivariate normality obtains. You examine the distribution of residual value to verify this presumption.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study on the effect of digital financial services on the profitability of Kenya Commercial Bank. The analysis for each objective starts with a presentation of descriptive statistics and concludes with the test of hypothesis.

4.2 Effect of Internet Banking on Profitability of Kenya Commercial Bank

The first objective of the study sought to establish the extent to which Internet banking affect profitability of Kenya Commercial Bank. The main focus of this objective was to determine the amount of revenue generated from internet banking on a semi-annual basis for the financial period from January 2016 to December 2020. This was compared with the profitability of KCB which was measured using semi-annual ROA. The financial report value in Kenya shilling were extracted from the KCB published financial statements for the financial period from January 2016 to December 2020. This were presented in Table 4.1 and Figure 4.1.

Table 4.1: Internet Banking Revenue and ROA

Period	Internet Banking Revenue Ksh (million)	ROA
Jun-16	1.564	1.172
Dec-16	2.346	1.758
Jun-17	4.152	1.184
Dec-17	6.228	1.776
Jun-18	4.256	1.34
Dec-18	6.384	2.01
Jun-19	6.78	1.368
Dec-19	7.376	1.48
Jun-20	10.17	2.052
Dec-20	11.064	2.22
Total	**60.32**	**16.36**
Mean	**12.064**	**3.272**

Source (KCB Financial Statements)

The results in Table 4.1 show that December 2020 had the highest revenue (Ksh11.064million) generated from internet banking while June 2016 had the least revenue (Ksh1.564 million) generated from internet banking. The total revenue generated from internet banking for the five years under study was Ksh60.32 million and the mean was Ksh12.064 million. The highest ROA (2.22) was reported in December 2020 while the lowest ROA (1.172) was reported in June 2016. The average ROA for the five years under study was (3.272). To summarize the values in Table 4.1 in graphical form the values were plotted and Figure 4.1 was obtained.

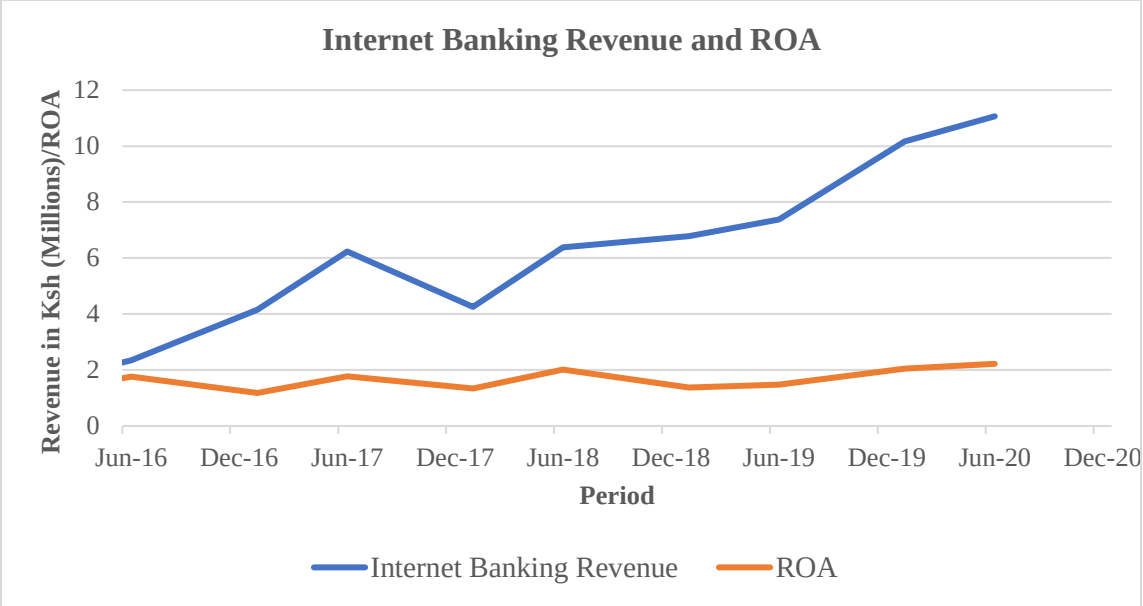

Figure 4.1: Internet Banking Revenue and ROA for the Period June 2016 to Dec 2020

Source (Author, 2021)

The results in Figure 4.1 show that over the five years under study there was a general upward trend for the revenue generated from internet banking. Similarly, though at a lower rate of Ksh1.564 million there was a general upward trend in ROA for the five years under study. The results show that there was an increase in revenue generated from internet banking for the five years under study and this could have contributed to the increase in ROA. The ROA is calculated as total net income divided by the value of total assets. Since revenue generated from internet banking represents a small percentage of a bank's total income, this could explain why there was a relatively lower rate of change in ROA for the five years under study. This is consistent with Zimmerman (2010) who noted that internet banking contributed positively to the financial performance of commercial banks in Kenya. This could be attributed to the fact that internet banking allows 24 hours service provision to a bank client thus 24 hours revenue generation. Furthermore, the study is consistent with

Ngugi (2013) who established that internet banking was cost effective and banks were able to save thus improving their financial performance of commercial banks.

The data was then further examined using Pearson's correlation to determine the relationship between internet banking revenue and ROA. Table 4.2 presents the findings.

Table 4.2: Pearson's Correlation Analysis Between Internet Banking Revenues and ROA

		ROA
Internet Banking Revenue	Pearson Correlation	0.706*
	Sig. (2-tailed)	0.022
	N	10

*. Correlation is significant at the 0.05 level (2-tailed).

The results in Table 4.2 show that there is a high positive statistically significant correlation ($r = 0.706$, $p < 0.005$) between internet banking revenues and ROA of KCB. This means that revenues generated from internet banking have influence on ROA of KCB. This is in agreement with Zimmerman (2010) who established a positive significant correlation between internet banking and financial performance of commercial banks.

The study further sought to test the null Hypothesis which was stated as:

> **H_{o1}:** *Internet Banking has no significant effect on profitability of Kenya Commercial Bank.*

The analysis was done using simple linear regression and the results are presented in Table 4.3.

Table 4.3: Regression Model Summary for Internet Banking Revenues on Profitability

Model	R	R^2	$_{Adj}R^2$	SE
1	0.706[a]	0.499	0.436	.284565

Source (Author, 2021)

From Table 4.3 it is noted that the goodness of fit for the regression between revenues from internet banking and ROA of KCB was satisfactory. An R^2 =0.499 indicates that 49.9% of the profitability of KCB is explained by the revenues generated from internet banking.

To determine the significance and magnitude of the difference between the regression mean and the error mean, an ANOVA was done using the F-test. This was done with a 95% confidence level and a 5% level of significance. To obtain the data shown in Table 4.4, this was done.

Table 4.4: ANOVA for Internet Banking Revenues on Profitability

Model		SS	*Df*	MS	*F*	*p*
1	Regression	0.644	1	0.644	7.953	0.022[b]
	Residual	0.648	8	0.081		
	Total	1.292	9			

Source (Author, 2021)

From Table 4.4 F= 7.953, p< 0.05 indicates that revenues generated from internet banking play a significant role in influencing the profitability of KCB.

In Table 4.5 we are testing whether the model will predict the level of significance in the study using the t-values. The t value should be greater than the critical value.

Table 4.5: Coefficients of Regressing Internet Banking Revenues on Profitability

Model				t	*P*
		B	SE		
1	(Constant)	1.112	0.207	5.381	0.001
	Internet Banking Revenue	0.087	0.031	2.820	0.022

Source (Author, 2021)

From Table 4.5 The results indicate that there is a significant relationship between Internet Banking and profitability (β=0.087, t= 2.820, $p< 0.05$) led to the rejection of the null hypothesis that Internet banking has no significant effect on profitability of Kenya Commercial Bank. The study thus, concluded that revenues generated from internet banking were a significant factor affecting profitability of KCB. This is in agreement with the findings of Zimmerman (2010) who established that internet banking has a positive significant effect on operational performance of the commercial banks. Furthermore, the study is in agreement with the findings of Ngalyuka (2013) who noted a significant effect of internet banking of performance of commercial banks in Kenya. This implies that commercial banks that seek to enhance their financial performance should embrace internet banking as it enhances service delivery by providing 24 hours services to clients.

4.3 Effect of Automated Teller Machines on Profitability of Kenya Commercial Bank

The second objective of the study sought to establish the effect of Automated Teller Machines on profitability of the Kenya Commercial Bank. The main focus of this objective was the amount of revenue generated from ATMs on a semi-annual basis for the financial period running form January 2016 to December 2020. This was compared with the

profitability of KCB which was measured using semi-annual ROA for the financial period from January 2016 to December 2020. The financial report value in Kenya shilling were extracted from the KCB published financial statements for the financial period from January 2016 to December 2020 and presented in Table 4.6 and Figure 4.2.

Table 4.6: ATM Revenues and ROA

Period	ATM Revenues Ksh (Millions)	ROA
Jun-16	16.236	1.172
Dec-16	24.356	1.758
Jun-17	9.244	1.184
Dec-17	13.866	1.776
Jun-18	26.964	1.34
Dec-18	40.446	2.01
Jun-19	29.632	1.368
Dec-19	34.64	1.48
Jun-20	44.448	2.052
Dec-20	51.96	2.22
Total	**291.792**	**16.36**
Mean	**58.3584**	**3.272**

Source (KCB Financial Statements)

The results in Table 4.6 show that December 2020 had the highest revenue (Ksh51.96 millions) generated from ATMs while June 2017 had the least revenue (Ksh9.244 millions) generated from ATMs. The total revenue generated from ATMs for the five years under study was Ksh291.792 million and the mean was Ksh58.3584 million.

The highest ROA (2.22) was reported in December 2020 while the lowest ROA (1.172) was reported in June 2016. The average ROA for the five years under study was (3.272). To summarize the values in Table 4.6 in graphical form the values were plotted and Figure 4.2 was obtained.

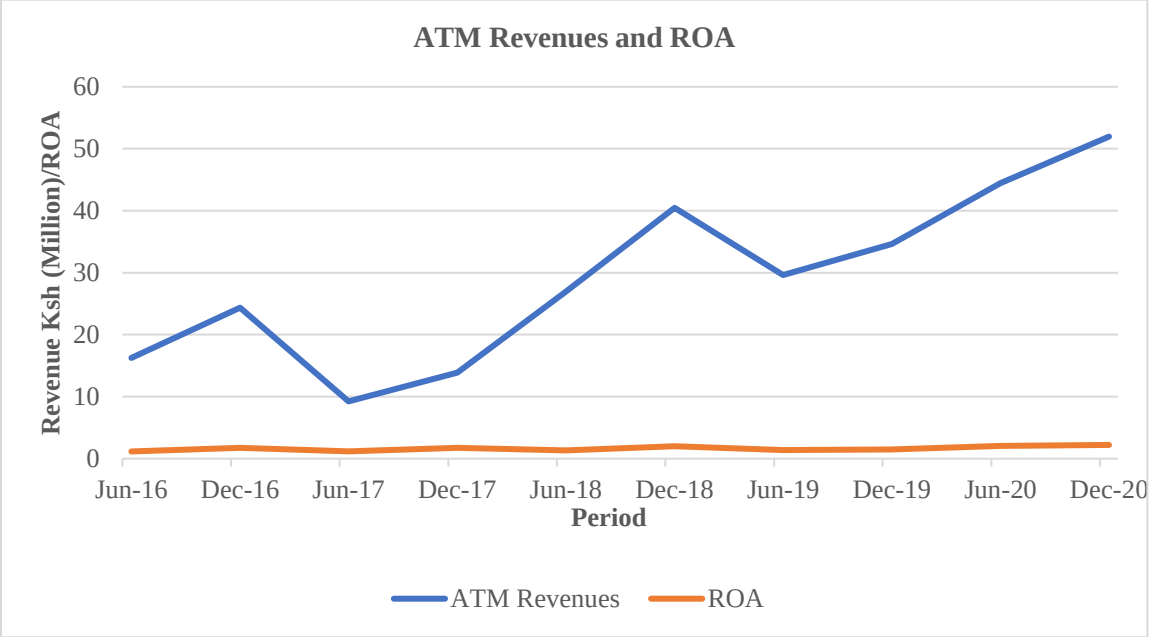

Figure 4.2: ATM Revenue and ROA for the Period June 2016 to Dec 2020

The results in Figure 4.2 show that for the five years under study there was a general upward trend for the revenue generated from ATMs. Similarly, though at a very low rate there was an upward trend in ROA for the five years under study. The results show that there was an improvement in revenue generated from ATMs for the five years under study and this could have contributed to the upward trend in ROA. The ROA is calculated as total net income divided by the value of total assets. Since revenue generated form ATMs represents a small share of a bank's total income this could explain why there was a relative lower rate of change in ROA for the five years under study. This is consistent with Mwangangi (2017) who established that embracing digitalization would lead to an increase

in performance of commercial banks. This could be attributed to the fact that ATMs enhance service delivery by increasing the avenues for service delivery. Furthermore, the study is in agreement with the findings of Wafula (2015) who noted that ATMs plays a significant role on the financial performance of commercial banks by reducing the cost to service delivery.

The data was to further analyzed using Pearson's correlation so as to establish the relationship that exists between revenue generated from in ATM and ROA. The results are presented in Table 4.7.

Table 4.7: Pearson's Correlation Analysis Between ATM Revenues and ROA

		ROA
ATM Revenues	Pearson Correlation	0.757*
	Sig. (2-tailed)	0.011
	N	10

*. Correlation is significant at the 0.05 level (2-tailed).

The results in Table 4.7 show that there is a high positive statistically significant correlation ($r = 0.757$, $p < 0.005$) between ATM revenue and ROA of KCB. This means that revenue generated from ATMs have influence on ROA of KCB. This is in agreement with the study of Mwangangi (2017) who established a positive significant correlation between digitization and financial performance of commercial banks.

The study further sought to test the null Hypothesis which was stated as:

> **H_{o2}:** *Automated Teller Machines have no significant effect on profitability of Kenya Commercial Bank*

The analysis was done using simple linear regression and the results are presented in Table 4.8.

Table 4.8: Regression Model Summary for ATM Revenues on Profitability

Model	R	R^2	$_{Adj}R^2$	SE
1	0.757[a]	0.572	0.519	.262767

From Table 4.8 it is noted that the goodness of fit for the regression between revenues from ATMs and ROA of KCB was satisfactory. An R^2 of 0.572 indicates that 57.2% of the profitability of KCB is explained by the revenues generated from ATMs.

To determine the significance and magnitude of the difference between the regression mean and the error mean, an ANOVA was done using the F-test. This was done with a 95% confidence level and a 5% level of significance. To obtain the data shown in Table 4.9, this was done.

Table 4.9: ANOVA for ATM Revenue on Profitability

Model		SS	*df*	MS	*F*	*p*
1	Regression	0.739	1	0.739	10.710	0.011[b]
	Residual	0.552	8	0.069		
	Total	1.292	9			

From Table 4.9 F=10.710, p< 0.05 indicates that revenues generated from ATMs play a significant role in influencing the profitability of KCB.

In Table 4.10 we are testing whether the model will predict the level of significance in the study using the t-values. The t-value should be greater than the critical value.

Table 4.10: Coefficients of Regressing ATM Revenues on Profitability

Model				T	p
		β	SE		
1	(Constant)	1.034	.202	5.121	0.001
	ATM Revenues	0.021	.006	3.273	0.011

From Table 4.10 The results indicate that there is a significant relationship between Automatic Teller Machine and profitability (β=0.021, t= 3.273, p< 0.05). This led to the rejection of the null hypothesis that automated teller machines have no significant effect on profitability of Kenya Commercial Bank. The study thus, concluded that revenues generated from ATMs were a significant factor affecting profitability of KCB. This is in agreement with Mwangangi (2017) who established that embracing digitalization would lead to an increase in performance of commercial banks. This could be attributed to the fact that ATMs enhances service delivery by increasing the avenues for service delivery. This is consistent with Wafula (2015) who established that ATMs plays a significant role on the financial performance of commercial banks by reducing the cost to service delivery. The study concluded that commercial banks should embrace ATMs as they help in improving the quality-of-service delivery by increasing the hours clients access services. ATMs also enable commercial banks to deliver services at low cost.

4.4 Effect of Mobile Banking on Profitability of Kenya Commercial Bank

The third objective of the study sought to find out the effect of mobile banking on profitability of Kenya Commercial Bank. The main focus of this objective was the amount of revenue generated from mobile banking on a semi-annual basis for the financial period

running form January 2016 to December 2020. This was compared with the profitability of KCB which was measured using semi-annual ROA for the financial period from January 2016 to December 2020. The financial report value in Kenya shilling were extracted from the KCB published financial statements for the financial period from January 2016 to December 2020 and presented in Table 4.11 and Figure 4.3.

Table 4.11: Mobile Banking Revenue and ROA

Period	Mobile Banking Revenue Ksh (Millions)	ROA
Jun-16	0.128	1.172
Dec-16	0.192	1.758
Jun-17	2.516	1.184
Dec-17	3.774	1.776
Jun-18	2.364	1.34
Dec-18	3.546	2.01
Jun-19	3.748	1.368
Dec-19	4.592	1.48
Jun-20	5.622	2.052
Dec-20	6.888	2.22
Total	**33.37**	**16.36**
Mean	**6.674**	**3.272**

Source (KCB Financial Statements)

The results in Table 4.11 show that December 2020 had the highest revenue (Ksh6.888 million) generated from mobile banking while June 2016 had the least revenue (Ksh0.128 million) generated from ATMs.

The total revenue generated from mobile banking for the five years under study was Ksh33.37 million and the mean was Ksh6.674 million. The highest ROA (2.22) was reported in December 2020 while the lowest ROA (1.172) was reported in June 2016. The average ROA for the five years under study was (3.272). To summarize the values in Table 4.11 in graphical form the values were plotted and Figure 4.3 was obtained.

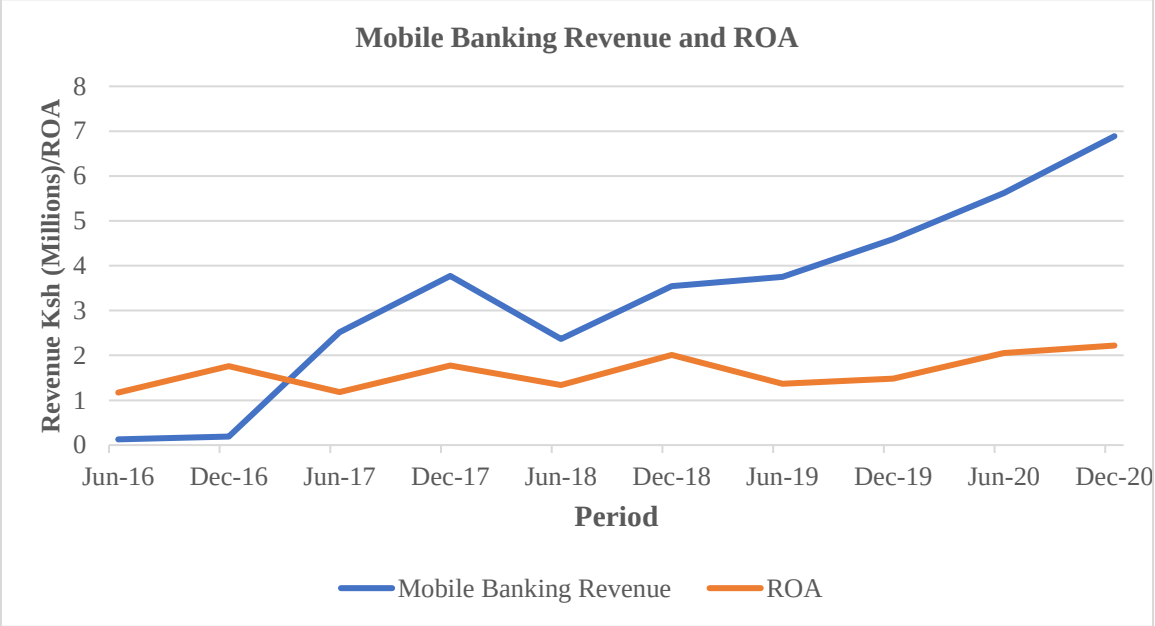

Figure 4.3: Mobile Banking Revenue and ROA for the Period June 2016 to Dec 2020

The results in Figure 4.3 show that for the five years under study there was a general upward trend for the revenue generated from mobile banking. Similarly, though at a lower rate there was a general upward trend in ROA for the five years under study. The results show that there was an improvement in revenue generated from mobile banking for the five years under study and this could have contributed to the upward trend in ROA. The ROA is calculated as total net income divided by the value of total assets. Since revenues generated form mobile banking represents a small component of a bank's total income this could explain why there was a relative lower rate of change in ROA for the five years under

study. This is consistent with Bonface and Ambrose (2015) who established that mobile banking positively contributed to the financial performance of commercial banks in Kenya. This could be attributed to the fact that mobile banking enhances service delivery by increasing the number of hours of accessing financial services.

The data was to further analyzed using Pearson's moment correlation so as to establish the relationship that exists between revenues generated from mobile banking and ROA. The results are presented in Table 4.12.

Table 4.12: Pearson's Correlation Analysis Between Mobile Banking Revenue and ROA

		ROA
Mobile Banking Revenue	Pearson Correlation	0.630*
	Sig. (2-tailed)	0.021
	N	10

*. Correlation is significant at the 0.05 level (2-tailed).

The results in Table 4.12 show that there is a high positive statistically significant correlation ($r = 0.630$, $p < 0.05$) between mobile banking revenue and ROA of KCB. This means that revenues generated from mobile banking have an influence on ROA of KCB. This is in agreement with Mutua (2012) who noted a positive significant correlation between mobile banking and financial performance of commercial banks.

The study further sought to test the null Hypothesis 3 which was stated as:

> ***H_{03}:*** *Mobile Banking has no significant effect on profitability of Kenya Commercial Bank*

The analysis was done using simple linear regression and the results are presented in Table 4.13.

Table 4.13: Regression Model Summary for Mobile Banking Revenue on Profitability

Model	R	R^2	$_{Adj}R^2$	SE
1	0.630[a]	0.397	0.322	.311953

Source (Author, 2021)

From Table 4.13 It is noted that the goodness of fit for the regression between revenues from mobile banking and ROA of KCB was satisfactory. An R^2 of 0.397 indicates that 39.7% of the profitability of KCB is explained by the revenues generated from mobile banking.

To determine the significance and magnitude of the difference between the regression mean and the error mean, an ANOVA was done using the F-test. This was done with a 95% confidence level and a 5% level of significance. To obtain the data shown in Table 4.14, this was done.

Table 4.14: ANOVA for Mobile Banking Revenues on Profitability

Model		SS	*df*	MS	*F*	*p*
1	Regression	0.513	1	0.513	5.275	0.021[b]
	Residual	0.779	8	0.097		
	Total	1.292	9			

Source (Author, 2021)

From Table 4.14 F= 5.275, p< 0.05 indicates that revenues generated from mobile banking play a significant role in influencing the profitability of KCB.

In Table 4.15 we are testing whether the model will predict the level of significance in the study using the t-values. The t value should be greater than the critical value.

Table 4.15: Coefficients of Regressing Mobile Banking Revenues on Profitability

Model				t	p
		B	SE		
1	(Constant)	1.265	.189	6.691	0.000
	Mobile Banking Revenue	0.111	.048	2.297	0.021

Source (Author, 2021)

From Table 4.15 The results indicate that there is a significant relationship between Mobile Banking and profitability (β=0.111, t= 2.297, p< 0.05) led to the rejection of the null hypothesis that mobile banking has no significant effect on profitability of Kenya Commercial Bank. The study thus, concluded that revenues generated from mobile banking were a significant factor affecting profitability of KCB. This supports the findings of Bonface and Ambrose (2015) who established a significant effect of mobile banking of performance of commercial banks in Kenya. The study thus concludes commercial banks that seek to enhance their financial performance should embrace mobile banking as it enhances service delivery by providing 24 hours services to clients.

4.5 Effect of Credit Cards on Profitability of Kenya Commercial Bank

The fourth objective of the study sought to investigate the effect of Credit Cards on profitability of Kenya Commercial Bank. The main focus of this objective was the amount of revenue generated from credit cards on a semi-annual basis for the financial period running form January 2016 to December 2020. This was compared with the profitability of KCB which was measured using semi-annual ROA for the financial period from January 2016 to December 2020. The financial report value in Kenya shilling were extracted from the KCB published financial statements for the financial period from January 2016 to December 2020 and presented in Table 4.16 and Figure 4.4.

Table 4.16: Credit Cards Revenue and ROA

Period	Credit Cards Revenue Ksh (Millions)	ROA
Jun-16	0.436	1.172
Dec-16	0.654	1.758
Jun-17	1.416	1.184
Dec-17	2.124	1.776
Jun-18	2.144	1.34
Dec-18	3.216	2.01
Jun-19	3.156	1.368
Dec-19	4.224	1.48
Jun-20	4.734	2.052
Dec-20	6.336	2.22
Total	**28.44**	**16.36**
Mean	**5.688**	**3.272**

The results in Table 4.16 show that December 2020 had the highest revenue (Ksh6.336 million) generated from credit cards while June 2016 had the least revenue (Ksh0.436 million) generated from Credit Cards. The total revenue generated from credit cards for the five years under study was Ksh28.44 million and the mean was Ksh5.688 million. The highest ROA (2.22) was reported in December 2020 while the lowest ROA (1.172) was reported in June 2016. The average ROA for the five years under study was (3.272). To summarize the values in Table 4.16 in graphical form the values were plotted and Figure 4.4 was obtained.

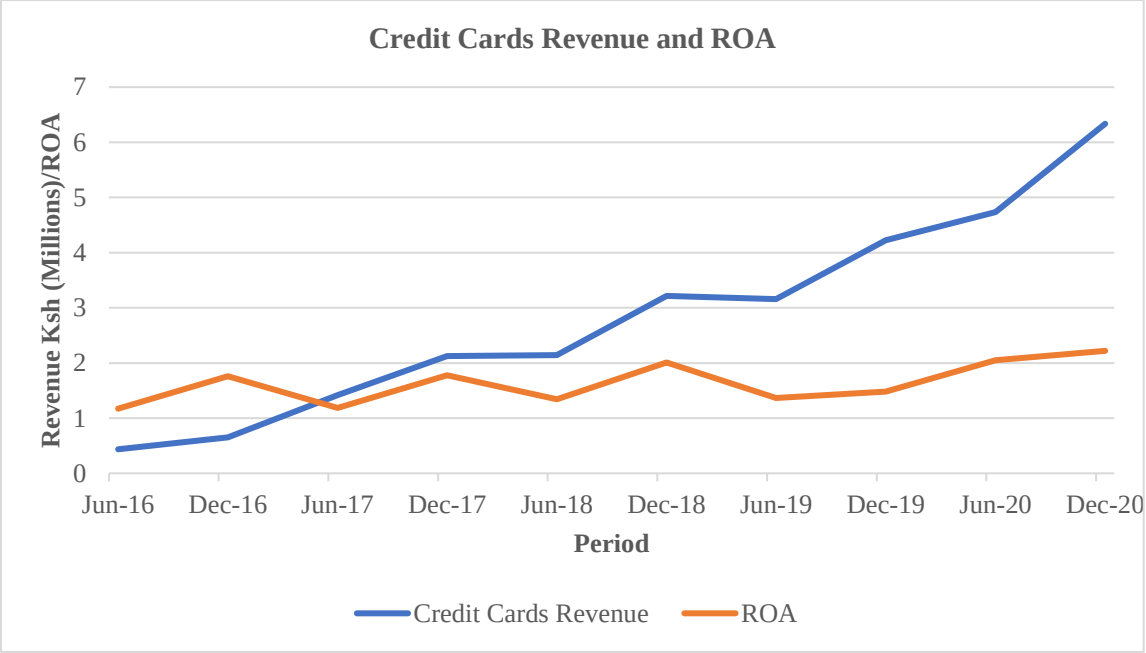

Figure 4.4: Credit Cards Revenue and ROA for the Period June 2016 to Dec 2020

The results in Figure 4.4 show that for the five years under study there was a general upward trend for the revenue generated from credit cards. Similarly, though at a lower rate there was a general upward trend in ROA for the five years under study. The results show that there was an improvement in revenue generated from Credit Cards for the five years

under study and this could have contributed to the upward trend in ROA. Since revenue generated form credit cards represents a small component of a bank's total income this could explain why there was a relative lower rate of change in ROA for the five years under study. This is consistent with Wafula (2015) who established that plastic money contributed positively to the financial performance of commercial banks in Kenya. Furthermore, the study is in agreement with Kyalo (2014) who established that credit cards with fair interest rates influenced financial performance of commercial banks. This could be attributed to the fact that fair interest rates attracted many subscribers of credit cards which in turn led to more revenues being generated from credit cards and hence enhancing financial performance.

The results were subjected to additional analysis using Pearson's correlation to determine the association between ROA and credit card revenue. Table 4.17 presents the findings.

Table 4.17: Pearson's Correlation Analysis Between Credit Cards Revenue and ROA

		ROA
Credit Cards Revenue	Pearson Correlation	0.669*
	Sig. (2-tailed)	0.035
	N	10

*. Correlation is significant at the 0.05 level (2-tailed).

The results in Table 4.17 show that there is a high positive statistically significant correlation (r = 0.669, $p < 0.05$) between Credit Cards revenue and ROA of KCB. This means that revenue generated from credit cards have an influence on ROA of KCB.

This is in agreement with Hurindu (2017) who established a positive statistically significant correlation between plastic money and performance of commercial banks in India.

The study further sought to test the null Hypothesis which was stated as:

> **H_{04}:** *Credit Cards have no significant effect on profitability of Kenya Commercial Bank*

The analysis was done using simple linear regression and the results are presented in Table 4.18.

Table 4.18: Regression Model Summary for Credit Cards Revenues on Profitability

Model	R	R^2	$_{Adj}R^2$	SE
1	0.669[a]	0.447	0.378	.298855

Source (Author, 2021)

From Table 4.18 it is noted that the goodness of fit for the regression between revenues from Credit Cards and ROA of KCB was satisfactory because the coefficient of correlation (R) is positive. An R^2 of 0.447 indicates that 44.7% of the profitability of KCB is explained by the revenues generated from credit cards.

The significance and degree of the difference between the regression mean and the error mean were determined using the F test, which was applied to an ANOVA. This was done with a 95% confidence level and a 5% level of significance. To obtain the results shown on table 4.19, this was done.

Table 4.19: ANOVA for Credit Cards Revenues on Profitability

Model		SS	*df*	MS	*F*	*p*
1	Regression	0.577	1	0.577	6.464	0.035[b]
	Residual	0.715	8	0.089		
	Total	1.292	9			

Source (Author, 2021)

From Table 4.19 F=6.464, $p < 0.05$ indicates that revenues generated from credit cards play a significant role in influencing the profitability of KCB.

In Table 4.20 we are testing whether the model will predict the level of significance in the study using the t-values. The results are presented in Table 4.20**.**

Table 4.20: Coefficients of Regressing Credit Cards Revenue on Profitability

Model				t	*p*
		β	SE		
1	(Constant)	1.251	.178	7.014	0.000
	Credit Cards Revenue	0.135	.053	2.542	0.035

Source (Author, 2021)

From Table 4.20 The results indicate that there is a significant relationship between Credit Cards and profitability (β= 0.135, t= 2.542, $p < 0.05$) led to the rejection of the null hypothesis that Credit Cards have no significant effect on profitability of Kenya Commercial Bank. The study thus, concluded that revenue generated from credit cards were a significant factor affecting profitability of KCB.

This supports the findings of Wafula (2015) who established that plastic money contributed positively to the financial performance of commercial banks in Kenya. The study also agreed with Kyalo (2014) who found a 0.612 coefficient of determination (R=0.612) between the use of credit cards and the financial performance of commercial banks and came to the conclusion that credit cards with reasonable interest rates influenced those institutions' financial success. This could be attributed to the fact that fair interest rates attracted many subscribers of credit cards which in turn led to more revenues being generated from credit cards and hence enhancing financial performance. The study thus concludes that commercial banks that seek to enhance financial performance should adopt credit cards usage.

4.6 Multiple Linear Regression Analysis

Multiple linear regression was tested to ascertain whether the four variables (internet banking, ATMs, mobile banking and credit cards) are significant and correlated which gave the results presented in Table 4.21.

Table 4.21: Multiple Linear Regression Model Summary on Profitability

Model	R	R^2	$_{Adj}R^2$	SE
1	0.876[a]	0.767	0.581	.245129

Source (Author, 2021)

From Table 4.21 it is noted that the goodness of fit for the regression between revenues from all the four variables (internet banking, ATMs, mobile banking and credit cards) and ROA of KCB was satisfactory. An R^2 of 0.767 indicates that 76.7% of the profitability of KCB is explained by the revenues generated from all the four variables (internet banking, ATMs, mobile banking and credit cards).

ANOVA was done using F-test to test the significance and level of difference between regression mean and the error mean on the four variables. This was done at 5% level of significance implying to 95% level of confidence. This was done to get results presented in Table 4.22.

Table 4.22: ANOVA for the Overall Model on Profitability

Model		SS	*df*	MS	*F*	*p*
1	Regression	0.991	4	0.248	7.125	0.026
	Residual	0.300	5	0.060		
	Total	1.292	9			

Source (Author, 2021)

From Table 4.22 the F= 7.125, p< 0.05 indicates that revenues generated from all the four variables (internet banking, ATMs, mobile banking and credit cards) play a significant role in influencing the profitability of KCB.

In Table 4.23 we are testing whether the model will predict the general level of significance of (Internet Banking, ATMs, Mobile Banking and Credit Cards) in the study using the t-values. The results are presented in Table 4.23.

Table 4.23: Overall General Effect of Digital Financial Services on Profitability of Kenya Commercial Bank Multiple Linear Regression Coefficients

Model					t	p
		β	SE	β		
1	(Constant)	0.548	.310		2.765	0.038
	Internet Banking Revenue	0.112	.234	0.913	0.480	0.032
	ATM Revenues	0.044	.027	1.617	1.619	0.036
	Mobile Banking Revenue	0.276	.471	1.565	0.585	0.044
	Credit Cards Revenue	0.632	.425	3.122	1.485	0.043

From Table 4.23 the model regression equation 4.1 was obtained.

$Y = 0.548 + 0.112X_1 + 0.044X_2 + 0.276X_3 + 0.632X_4$ …….……...4.1

From the regression equation 4.1 it is established that by holding all independent variables (Internet Banking, ATMs, Mobile Banking and Credit Cards) constant the ROA of KCB will be 0.548 units. Profitability was predicted by (β= 0.632, t= 1.485, p< 0.05) The regression equation 4.1 also shows that there is a positive significant relationship between credit cards and profitability of KCB, this is supported by a coefficient of 0.632, $p< 0.05$. This shows that a unit increase in credit cards revenue would lead to a 0.632 improvement in profitability of KCB. There is a positive and significant relationship between ATMs and profitability of KCB as shown by a coefficient of 0.044, $p< 0.05$.

Profitability was predicted by (β= 0.044, t= 1.619, p< 0.05) This indicates that a unit increase in revenues generated from ATMs would lead to a 0.044 improvement in the profitability of KCB. Furthermore, the findings show that there is a positive significant relationship between mobile banking and profitability of KCB as shown by a coefficient of 0.276, p< 0.05. Profitability was predicted by (β= 0.276, t= 0.585, p< 0.05) A unit increase in revenues generated from mobile banking would lead to a 0.276 improvement in the profitability of KCB. The findings further show that there is a positive significant relationship between internet banking and profitability of KCB as shown by a coefficient of 0.112, p< 0.05. Profitability was predicted by (β= 0.112, t= 0.480, p< 0.05) A unit increase in revenues generated from Internet banking would lead to a 0.112 improvement in the profitability of KCB. This infers that internet banking influences profitability of KCB most followed by mobile banking, credit cards and finally ATMs. The findings are consistent with Mwangangi (2017) who established that embracing digitalization would lead to an increase in performance of commercial banks. This could be attributed to the fact that digitalization enhances service delivery by increasing the avenues for service delivery. The study also agreed with Kyalo (2014) who found a 0.612 coefficient of determination (R=0.612) between the use of credit cards and the financial performance of commercial banks and came to the conclusion that credit cards with reasonable interest rates influenced those institutions' financial success.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter provides an overview of the conclusions, recommendations, and findings. The chapter concludes with areas that should be studied further.

5.2 Summary of the Findings

The study aimed at establishing the effect of digital financial services on profitability of Kenya Commercial Bank. The study used both descriptive and inferential statistics to make conclusions and generalizations. The study used a cross sectional descriptive research design. The study used purposive sampling to select Kenya Commercial Bank. The study used secondary data that was collected from semi-annual financial statements of KCB for periods ranging from June 2016 to December 2020.

5.2.1 Internet Banking and Profitability

The first objective of the study sought to determine the extent to which Internet banking affect profitability of Kenya Commercial Bank. The main focus of this objective was the amount of revenue generated from internet banking on a semi-annual basis for the financial period from January 2016 to December 2020. This was compared with the profitability of KCB which was measured using semi-annual ROA for the financial period from January 2016 to December 2020. The study established that there was a general increase in revenues generated from internet banking for the five years under study and this could have contributed to the upward trend in ROA. The study further established that there was a high positive statistically significant correlation (r= 0.706, $p< 0.05$) between internet banking

revenues and ROA of KCB. F=7.953, $p< 0.05$ indicated that revenues generated from internet banking played a significant role in influencing the profitability of KCB. Further t=2.820 > 2, $p< 0.05$ led to the rejection of the null hypothesis that Internet banking has no significant effect on profitability of Kenya commercial bank. The study thus, concluded that revenues generated from internet banking were a significant factor affecting profitability of KCB.

5.2.2 Automated Teller Machines and Profitability

The second objective of the study sought to establish the effect of automated teller machines on profitability of Kenya Commercial Bank. The main focus of this objective was the amount of revenue generated from ATMs on a semi-annual basis for the financial period from January 2016 to December 2020. This was compared with the profitability of KCB which was measured using semi-annual ROA for the financial period from January 2016 to December 2020. The study established that there was a general increase in revenues generated from ATMs for the five years under study and this could have contributed to the upward trend in ROA. The study further established that there was a high positive statistically significant correlation (r = 0.757, $p< 0.05$) between ATM revenues and ROA of KCB. F=10.710, $p< 0.05$ indicates that revenues generated from ATMs play a significant role in influencing the profitability of KCB. Further t=3.273 > 2, $p< 0.05$ led to the rejection of the null hypothesis that automated teller machines have no significant effect on profitability of Kenya Commercial Bank. The study thus, concluded that revenues generated from ATMs were a significant factor affecting profitability of KCB.

5.2.3 Mobile Banking and Profitability

The third objective of the study sought to find out the effect of mobile banking on profitability of Kenya Commercial Bank. The main focus of this objective was the amount of revenue generated from mobile banking on a semi-annual basis for the financial period from January 2016 to December 2020. This was compared with the profitability of KCB which was measured using semi-annual ROA for the financial period from January 2016 to December 2020. The study established that there was a general increase in revenues generated from mobile banking for the five years under study and this could have contributed to the upward trend in ROA. The study further established that there was a high positive statistically significant correlation (r = 0.630, $p< 0.05$) between mobile banking revenues and ROA of KCB. F=5.275, $p< 0.05$ indicates that revenues generated from mobile banking play a significant role in influencing the profitability of KCB. Further t=2.297 > 2, $p< 0.05$ led to the rejection of the null hypothesis that mobile banking has no significant effect on profitability of Kenya Commercial Bank. The study thus, concluded that revenues generated from mobile banking were a significant factor affecting profitability of KCB.

5.2.4 Credit Cards and Profitability

The fourth objective of the study sought to investigate the effect of Credit cards on profitability of Kenya Commercial Bank. The main focus of this objective was the amount of revenue generated from credit cards on a semi-annual basis for the financial period from January 2016 to December 2020. This was compared with the profitability of KCB which was measured using semi-annual ROA for the financial period from January 2016 to December 2020. The study established that there was a general increase in revenues

generated from credit cards for the five years under study and this could have contributed to the upward trend in ROA. The study further established that there is a high positive statistically significant correlation (r= 0.669, $p< 0.05$) between credit cards revenues and ROA of KCB. F=6.464, $p< 0.05$ indicates that revenues generated from credit cards play a significant role in influencing the profitability of KCB. Further t=2.542 > 2, $p< 0.05$ led to the rejection of the null hypothesis that Credit cards have no significant effect on profitability of Kenya Commercial Bank. The study thus, concluded that revenues generated from credit cards were a significant factor influencing profitability of KCB.

5.3 Conclusion

The purpose of this study was to establish the effect of digital financial services on profitability of Kenya Commercial Bank. The study concludes that profitability of KCB is influenced by the four factors that were considered for the study. That is the study concluded that internet banking has an influence on the profitability of KCB. Commercial banks that seek to enhance their profitability should internet banking. The study also concludes that ATMs have an influence on the profitability of KCB. Commercial banks that seek to enhance their profitability should incorporate ATM services in their banking services to clients. The study also concluded that mobile banking has an influence on the profitability of KCB. Based on the results it was observed that mobile banking enhanced service provision by offering 24 hours services to clients.

The study also concluded that credit cards have an influence on the profitability of KCB. The results show that credit cards carpooled with affordable interest rate attracted more clients to the service which led to more revenues being generated. Credit cards were therefore perceived to have an influence in enhancing profitability of KCB meaning that

commercial banks that need to enhance their profitability should not only embrace credit cards services but must also ensure that they have a combination of other important factors.

5.4 Recommendations

Commercial banks that seek to enhance their profitability must consider embracing internet banking because it enhances service delivery by offering 24 hours services to clients. Internet banking also allows banks to offer services at low cost. However, commercial banks should note that relying on internet banking only may not be adequate for enhancing profitability unless other digital financial services are incorporated.

The study also recommends that commercial banks embrace the use of ATMs as they are important in enhancing 24 hours service delivery and lowering the cost-of-service delivery. However, it should be noted that even with efficient ATM system in place profitability is not a guarantee because ATM revenues constitutes a small percentage of commercial banks net income. Therefore, embracing other digital financial services to compliment ATMs could be ideal for enhancing profitability.

The study further recommends that mobile banking be embraced by commercial banks if they are to enhance their profitability. The results have indicated that mobile banking has a high positive significant correlation with profitability of KCB. Therefore, commercial banks that seek to enhance profitability should embrace mobile banking.

Finally, the study recommends that credit cards be adopted by commercial banks that seek to enhance their profitability because credit cards carpooled with affordable interest rates attracts more subscribers to the service hence enhancing the revenue generating base. In

summary commercial banks should consider adopting a combination of the four factors discussed if they are to enhance their profitability.

5.5 Areas for Further Study

This study was limited to the Kenya Commercial Bank and the results should not be generalized to other financial service providers. Therefore, a similar study incorporating other financial service providers such as SACCOs should be conducted, this could add new knowledge to the body of knowledge already established.

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APPENDIX I
LIST OF LICENSED COMMERCIAL BANKS IN KENYA

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

Source (Central Bank of Kenya, 2020)

APPENDIX II

DATA COLLECTION WORKSHEET

Year Banking	Internet		ATMs		Mobile Banking		Credit Cards		Banks Profitability	
	Revenue		Revenue		Revenue			Revenue	ROA	
	Jan-June	July-Dec	Jan-June	July-Dec	Jan-June	July-Dec	Jan-June	July-Dec	Jan-Jun	July-Dec
2016										
2017										
2018										
2019										
2020										

APPENDIX III

INTRODUCTORY LETTER FROM THE UNIVERSITY

Maasai Mara University

BOARD OF POSTGRADUATE STUDIES

OFFICE OF THE DIRECTOR

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13th September, 2021

RESEARCH PERMITS SECTION
NACOSTI
UTALII HOUSE

REF: KAELO SAITOTI GEORGE (REG. NO. BM07/JP/MN/8641/2019)

We wish to confirm that the above named is a bona fide Master student at Maasai Mara University pursuing a Master of Business Administration (Finance Option) in the School of Business & Economics. His proposed research is "***Effect of Digital Financial Services Adoption on Profitability of Kenya Commercial Bank.***" He would like to apply for a research permit from NACOSTI before he can proceed for field work and data collection.

We further confirm that the candidate has adhered to all research protocol requirements of Maasai Mara University and the proposed research has been rated as having no known adverse impacts on the environment and does not pose any ethical concerns.

This is therefore to request your office to issue him with a research permit.

Faithfully yours,

MAASAI MARA UNIVERSITY
P.O Box 861 - 20500
NAROK
13 SEP 2021

Prof. Romulus Abila, PhD
Director, Board of Postgraduate Studies

BOARD OF POSTGRADUATE STUDIES

APPENDIX IV

RESEARCH PERMIT FROM NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **853637**

Date of Issue: **14/October/2021**

RESEARCH LICENSE

This is to Certify that Mr.. George Saitoti Kaelo of Maasai Mara University, has been licensed to conduct research in Nairobi, Narok on the topic: Effect of Digital Financial Services Adoption on Profitability of Kenya Commercial Bank for the period ending : 14/October/2022.

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