

**EFFECT OF FINANCIAL TECHNOLOGY ON THE FINANCIAL PERFORMANCE OF  
COMMERCIAL BANKS IN KENYA**

**BY**

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS OF DEGREE OF THE MASTER OF BUSINESS ADMINISTRATION,  
SCHOOL OF BUSINESS,  
UNIVERSITY OF NAIROBI**

**2018**

**DECLARATION**

This research project is my original work and has never been presented for any academic award in any other university or learning institution.

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

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## **ACKNOWLEDGEMENT**

My utmost gratitude is to my supervisor Dr. Winnie Nyamute for her guidance throughout this paper preparation. Her patience when I couldn't meet the timelines helped me perfect my work. Despite her busy schedule and demanding role within the university, she found time to listen to me and review my work.

I am also deeply grateful to my spouse Victor Kiplagat for his effortless support, guidance and encouragement throughout the time I worked on this document.

## **DEDICATION**

Dedicated to my mother Susan Kurui and my son Berur Netai for cheering me up as I progressed in each aspect of my life.

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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>ATM</b>	Automated Teller Machine
<b>B2C</b>	Business to Consumer
<b>CBA</b>	Commercial Bank of Africa
<b>CBK</b>	Central Bank of Kenya
<b>CRB</b>	Credit Reference Bureaus
<b>Fintech</b>	Financial Technology
<b>GDP</b>	Gross Domestic Product
<b>IT</b>	Information Technology
<b>KCB</b>	Kenya Commercial Bank
<b>MM</b>	Mobile Money
<b>M-Pesa</b>	Mobile Money (Pesa is the Kiswahili word for Money)
<b>NFC</b>	Near-Field Communication
<b>P2P</b>	Peer-to-Peer
<b>ROA</b>	Return on Assets
<b>RBV</b>	Resource Based View
<b>US</b>	United States



## **ABSTRACT**

Financial institutions like banks have embraced use of financial technology in their operations. The study endeavored to find the relationship between financial technology and financial performance of the 43 banks in Kenya. The objective of the study will be to determine the effect of financial technologies on the Financial Performance of the Commercial Banks in Kenya. The independent variables in the study were mobile banking, internet banking and agency banking. The target population of this study was the 43 banks in Kenya. The study analyzed secondary data collected from reports published annually for the years 2013 to 2016, during which adoption of financial technology was highly adopted by banks. The study used descriptive statistics analyzed using SPSS software (Statistical Package for Social Sciences), multiple regressions was also used to study the relationship between financial performance and financial technology. The study found that adoption of mobile banking, online or internet banking and agency banking impacted the financial performance of banks positively. The study concluded that banks should invest in financial technology to enhance their operational efficiency and effectiveness. The study also recommends that banks should mobilize their clients to adopt these technologies as well as channel resources to enhancement of technological infrastructure. Banks should also adopt more agency networks as this widens their client base especially in the rural areas.

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background**

Financial Technology (Fintech) has a long history. Coad and Rao (2008), traces the first use of the word Fintech to 1950s. As the years progressed, innovation has constantly assumed a key part in the money related industry in ways that the clear majority underestimate and may not ever observe. Financial Technologies have beyond reasonable doubt affected financial performance of banks. Banks have been forced to use financial technologies to increase their efficiency and effectiveness. This is done through mobile money transfers and lending, internet of things and agency banking. Banks have been able to process customer requests, information leading to reduction of queues in the banking hall, reduction of staff costs and idle time. Mobile banking applications and internet banking platforms, which have been enabled by Financial Technologies and have encouraged efficiency of banking transactions across the globe (Coad & Rao, 2008). This means the customer can transact remotely without necessarily visiting the banking hall. There has since been a financial technology revolution in the banking sector which has affected performance in a great way.

Scholars have come up with various theories that can define financial technology with relation to financial performance. The two theories that shall guide this study are; Financial Intermediation Theory and Technology Adoption Model (TAM). Financial Intermediation Theory is to be studied because for banks to be able to connect depositors who have surplus funds, with borrowers who have deficits, they will have to use financial technology platforms. Efficient intermediation role by the banks has a great impact on financial performance as turnaround times and transaction costs are reduced, with utilization of financial technology platforms. TAM on the

other hand explains the factors a bank will consider before taking up a financial technology solution. The banks will evaluate on the positive effects on financial performance that will be brought about by financial technology adoption, vis a vis the cost implications incurred on acquisition of the said technology, then come up with a decision as to whether to adopt or not.

Utilization of technological advancement started in 1950s with the birth of credit cards. By then it seemed the biggest breakthrough in banking sector until 1960s when ATMs came to supplement tellers and branches. It was evident by then that more was to come. 1970s saw the start of electronic stock exchange, while 1980s came the ascent of bank centralized servers and more refined information and record-keeping frameworks. Internet and web based business plans of action emerged strongly in 1990s. This in turn led to emergence of stock brokerage platforms and websites that replaced phone driven brokerage. The term Financial Technology (Fintech) is authored matching with the production of the Financial Services Technology Consortium, set up by Citicorp in 1993. Five years later, in 1998, the first bank in the United States of America set up the principal value-based sites for Internet banking, which was immediately replicated by the other banks across the globe (Coad, & Rao, 2008). In Kenya banks have gone ahead and used financial technologies to improve their services as well as generate more revenue for themselves.

### **1.1.1 Financial Technology**

Financial Technology comes from two words; finance and technology. It is defined as new technologies that support financial services. In future banks are predicted to offer social network platforms with which customers can use their mobile phones to take advantage of investment opportunities courtesy of financial technology (Drew, Andrew & Neil, 2017). Financial

technologies are also defined as any technological innovation that is impacting the financial sector and its operations. They could also be referred to as companies that do a combination of financial services and modern technologies and in turn offer internet based and application oriented services that are user friendly, automated, transparent and efficient (European Banking Federation, 2015).

Financial Technologies are offering a host of technological solutions geared towards achieving convenience, faster turnaround times and operation efficiency. Though several scholars have pointed out that payments space is the most advance segment among the financial technology (Douglas & Janos, 2015). Financial Technologies have been able to impact various stakeholders in the financial sector. It has led to improvement of asset management services through offering wealth management services to retail customers through simplified systems, propositions of algorithms to support the decision making process and artificial intelligence management of portfolios through robots. It has also impacted the banking sector through monitoring savings, credit scores, spending, tax liability, provision of banking services beyond traditional banking, faster transactions through distribution ledger technology, mobile transfers, use of crypto currencies and also mobile lending to individuals , Small Market Enterprises using data analytics (KPMG, 2017).

To measure the extent to which banks have adopted financial technologies we should be able to explore how much of data analytics which involves using personal and sensitive data to evaluate a customer is used by the banks. The use of data analytics is key when it comes to lending. For example, selected companies can now access top rated customer MPESA data from Safaricom at

a fee so long as customer opts in to the service (Safaricom, 2016). This is transforming below the line approaches of marketing. Secondly is how automated payments are in terms of security, efficiency and convenience to the customer as well as how their demands are met. It could also be measured by how big a bank's agency network is. Lastly how much of digital currencies are used by the banks, these includes cross currency instruments like bit coins.

### **1.1.2 Financial Performance**

Any given firm has four measures of performance, these include customer oriented performance, organizational effectiveness, human resource performance and financial performance. Financial performance is defined as one of the mathematical measures to determine if a firm is making profit (Farlex Financial Dictionary, 2012). It also defined as a measurement of how well an organization is generating value for its stakeholders. This is through analysis of combination of financial ratios of the banks in the banking industry(Ahmad & Hassan, 2007).Financial performance is the process of evaluation the operating and financial characteristics of an organization from its financial statements in order to determine the performance and efficiency of the organization's management with reference to its financial reports and records (Amalend, 2012)

Among the major objectives of banks, one is to make profit. Financial performance is key in banks as it shows a bank's ability to generate income, maintain stability as well as generate profit. Secondly financial performance through return on asset ratio demonstrates a bank's ability to generate income through its fixed assets. This then shows the efficiency of the bank in using assets to generate income. Return on Asset ratio also shows how the bank's management is able to generate income by utilizing available assets (Khrawish, 2011).

Financial performance is measured through analysis of financial ratios. These ratios include profit after tax, return on equity, return on asset, earning per share as well as any other market valuation used. Profit after tax has in the past been widely used to measure financial performance of banking institutions. Other ratios that have been used are financial interrelation ratio, total loans to total deposits, bank portfolio composition, per capita Gross Domestic Product, customer satisfaction and market size (Athanasoglou et al, 2008). The financial performance of banks is usually expressed in terms of external determinants which include legal and economic environment in which the banks operate and internal factors which are derived from the statement of financial position and statement of comprehensive income. This study will explore the relationship between financial technology and banks financial performance as well as determine if the two variables are related.

### **1.1.3 Financial Technology and Financial Performance of Banks**

Schumpeter argues that any change that has economic impact revolves around entrepreneurial activities, power of markets and innovation. Theories around Finetch revolution arise from this argument. He further argues that innovation creates monopoly temporarily after which imitators come and rival and do away with the monopoly. Hence if banks are to take advantage of financial technology and ensure they create a hedge over other banks by use of innovative products and services hence a competitive, they will surely impact their financial performance.

The frenetic pace at which the industry is evolving, and the amount of infringement and disruption unleashed upon it by the financial technologies, there is a clear recognition by

industry players that only those who understand what the future looks like and are prepared for it are going to play a winning hand and rise to the top (Venkatesh & Davis, 2000). Some of the key considerations are that banks will need to embrace full digital services, classic banking activities such as deposits and withdrawals, transfers and payments, loans (both borrowing and repayment), account and funds management, account opening, and customer onboarding are now all possible in customer self-service mode via electronic channels. Due to the trust of customers in their digital gadgets, this has become the preferred mode of accessing bank services for many customers.

The wave of banking anytime anywhere has caught on and any bank is in peril whose customers cannot pull money out of their accounts via their gadgets like a magician pulls rabbits out of a hat .Secondly, banks will need to converge everything on the cellphone, since industry boundaries are getting more blurred by the day, driven by more customer centric service offerings where the consumer is no longer very aware and doesn't give much regard to what industry player is giving a financial service provided the service is fulfilled satisfactorily. Driven by digital tools, enabling regulation, and the need to bundle complex financial services for simplicity and optimal pricing, the border between previously separate industries of telecommunications, insurance and banking among others is getting erased by the day (Frame & White, 2014).

In Kenya today, for example, we have a telecommunication company, Safaricom, offering financial services to a customer base bigger than any bank, and Equity Bank providing telecommunication services as a platform to extend the reach of their financial services to

millions of their customers. Banks will also need direct Interface with the customers, a newly established layer of financial technology is becoming the direct customer interface through which customers are now accessing some of their financial services. A look at the payments and digital lending space in Kenya will reveal a huge volume of business that has been taken away from traditional banking by financial technologies. With the emergence of more customer centric regulation, and the evolution of the classic banking customer into a more empowered and informed individual, barriers that allowed banks to lock in their customers have been broken down, as evidenced very clearly in the multi banked nature of many bank customers today. The future is going to involve very high customer mobility between banks and other financial service providers. There is also a greater level of sharing of customer data between financial institutions through the Credit Reference Bureaus, for example. Fourthly, banks will need customer facing technology; wholesome digital customer experience should be designed, which cuts across different electronic channels with consistency.

Banks now need to plan for a migration from the current silo-based channel solutions scenario to Omni channel digital banking platforms, which provide capability for seamless transition between channels for the customer without a break in the experience or service or any data inconsistencies. These platforms also enable stronger branding via uniform look and feel across channels. The platforms are capable to provide seamless internet, mobile wallet, customer onboarding and agency banking channels from one backend engine also making new product rollout quick and efficient (Broadbent, 2016). Lastly, banks will need to invest on internal technology, It is imperative that banks invest in the operation of world class core banking systems, and keep them up to date on the latest versions to take advantage of system evolution and stability improvements. Banks must also build the supporting tech around the core banking,



especially in the areas of risk management, data management and analytics, as well as integration for straight through and real time processing. A profound advantage is to be gained by the bank that can leverage all the data available to them to know the customer behavior and analyze business performance.

Consequently once the banking industry adopts the above they will be able to increase their financial performance due to; improved customer centered approach, informed and accurate decisions due to accurate data analytics, enhanced trust from the clients due to accuracy, reliability and transparency and operational effectiveness and efficiency.

#### **1.1.4 Banking Sector In Kenya**

In the recent past the banking sector has had drastic changes. There are banks that have either shut down operations, been put under receivership or undergone mergers. This is due to irregularities and financial crises. Banks in Kenya are statutorily monitored and regulated. The Acts that govern the banking sector in Kenya are; The Central Bank of Kenya Act , Banking Act and Companies Act as well as policies and guideline frameworks issued by the Central Bank. In 1995 controls were removed after the collapse of banks in 1994. All banking operations including digitalized operations which include, mobile applications that enable transfer, withdrawals and deposits are regulated by the Central Bank of Kenya, and content licensing by the Government of Kenya agencies.

As per the Bank Supervision Annual Report 2016, as at 31st December 2016, the Kenyan banking sector includes the Central Bank of Kenya, being the regulatory authority, Forty Three

banking institutions of which forty are owned by private entities (twenty five owned by locals domiciled in Kenya while the other fifteen are owned by foreigners), and the other three are owned by the government.

The banking sector in Kenya has embraced financial technologies greatly. This is evident through the use of mobile banking platforms. According to the KCB report of 2017, KCB lent over 30 billion on their mobile platform with an unprecedented repayment rate of over 95% and there are plans to continue investing in financial technologies to stay ahead of the pack. Equity bank in 2017 through their mobile money platform they were able to lend 38.5 billion which represented 86% of the total loans lent by the banks. Equitel roll out was a major success leading to full digitalization of banking services for both individual clients and corporates. Banks in Kenya have gone ahead and invested in financial technologies with examples of Housing Finance Group launching its new mobile application called Whizzapp, Kenya Commercial Bank partnering with Huawei to aim at ensuring at least eight percent (80%) of new transactions on their mobile platform in the near future and Equity bank launching a new financial technologies arm of the company, Finserve Africa which will play a key role in digitalizing the banks' financial services. It is without any doubt that financial technologies will shape the future of banking, not only in Kenya but also globally.

## **1.2 Research Problem.**

There has been a great increase in the utilization of financial technology by the banking sector globally. This has increased efficiency in the banking sector operations such as; securities trading, product innovations, internet and electronic payment among others, this has led to tremendous cost savings. This has in turn improved the quality of services offered by the banks globally (Berger, 2003).

The failure of 3 Kenyan banks in the past year (2016) and a disruptive moment driven by mobile platforms has attracted attention to the Banking sector in Kenya. As reported in the 2016 Equity Bank Financial reports, Equity Bank did three times more mobile banking transactions than agency transactions representing one hundred and fifty one million transactions verses fifty one million transactions respectively and received almost four times more loan applications from phones than physical branches. Kenya Commercial Bank (KCB) reported a similar phenomenon with seventy percent of transactions driven by mobile channels. For small banks, afraid of being left behind, the answer is: Technology. Today, technology has made it possible to run a bank for a million people with a hundred people. Mobile phones provide customers with convenience and reduce operating costs. Facebook, MPESA and SIM cards enable identity verification and call and short messages (SMS) logs allow for risk underwriting. The Android marketplace has made acquiring customers cheaper and faster.

Kenya has forty two banks for serving a population of forty four million. With the growing financial technologies influence, these banks will have to evolve to the new financial technology-like banking, or many will still fall on the roadside as time goes by. Innovators have new tools

to leverage: mobile money, social networks, app stores and data science. And the mantle of innovation has been picked up by startups. Unlike fifteen years ago, there are lots of interesting financial technology startups in East Africa doing lending including: Tala, Mshwari, Branch, Saida etc. Kenya is enjoying a startup renaissance birthed by the distribution and digitization that cheap mobile connectivity and ubiquitous mobile money provide. Though small by comparison, many of these startups have grown their customer bases at a faster clip than local banks because of the speed and ease of use offered by MPESA and Android. But while growth is enabled by mobile platforms, differentiation and profitability will come from a fuller suite of products and lower costs of capital.

Financial Technology is slowly disrupting traditional banking services with evolved technologies leading to enhanced efficiency as well as effective quality services offered to the banks' customers. This efficiency is increased through loan personalization modules, elimination of middlemen hence lowering the cost of transactions significantly (KPMG, 2016). In addition to this technologies like block chain also enhance efficiency due to availability of data ((Peters & Panayi, 2015, Wood & Buchanen, 2015). Lastly the quality of financial services will increase due increase in data accuracy too. The relationship between financial technologies and banks is mostly complementary, with banks investing heavily in financial technologies infrastructure. The digitalization of banking services is likely to lead to increase of non-physical distribution channels of banking services (Global Financial Report, 2017/2018) Banks and financial institutions are not downplaying the importance of financial technologies, instead they are using them as a roadmap to chart the future of banking, if this relationship is nurtured it is foreseen that

in future there shall be partnerships that enable financial inclusion of both the banked and unbanked (Allyse, 2017).

Nairobi is said to be a financial technologies hub among the various markets, through M-Pesa (Deloitte, 2017). These services include loan platforms, merchant payment services as well as a platform where users can transact using their mobile money accounts (Central Bank of Kenya & FSD Kenya, 2016). Financial Technology companies have also come up with services around M-Pesa (Adongo, 2015). According to the Kenya Fintech report 2017, innovative solutions in financial services have led to banks continuously focusing on strategies that capitalize on financial technologies models to meet the customers ever growing expectations in their given markets. This is because the increases in innovative solutions have led to adoption of these Financial technologies by financial services hence increasing their presence in the unbanked population. Various scholars have studied the impact of technology and internet banking, but research on impact of financial technologies on the Kenyan banking industry has not been done. This study goes out to answer the questions, what is the effect of financial technologies on the financial performance of banks in Kenya? Is it a threat or an opportunity for banks to thrive?

### **1.3 Research Objective**

The objective of the study will be to determine the effect of Financial technologies on the Financial Performance of the Commercial Banks in Kenya.

#### **1.4 Value of the Study**

The study would be of importance to banking sector in Kenya and stakeholders in understanding the effects of Finetch, thus enhancing implementation process so as to enhance performance of the banks and service delivery hence maintain customer loyalty, attract more customers, enhance satisfaction and most importantly increase revenue. The management would have the ability to make informed decisions regarding adoption of disruptive technologies.

The government and policy makers would gain valuable information on effects of Finetch on banking sector revenue. The study would be useful to the government in policymaking regarding disruptive technologies. Policy makers would as well learn the challenges and loopholes in their current regulatory framework and how it is affecting the operations of the banking sector.

To the researchers and academicians, this study's findings will lead to contribution of the professional extension of existing knowledge on the effects of Finetch on banking sector revenue. Future researchers and scholars will benefit from this study as it would act as a reference material besides suggesting areas for further research that they can further knowledge on in the area of disruptive technologies with respect to Finetch.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter has reviewed literature, theories, and concepts related to the study from a selection of exiting literature. It is divided into two sections: Empirical review which reviews previous literature, data and statistics by other researchers and analyses its relationship with the topic under discussion in this paper and the Theoretical review which analyses the theories that are relevant to the topic under discussion.

### **2.2 Theoretical Review**

Scholars have come up with various theories, this study will be guided two theories that shall guide this study are; Financial Intermediation Theory and Technology Adoption Model (TAM).

For the last three decades, banks have hired researchers to consider this, understand, predict and explain how they can utilize these technologies for its competitive advantage (Abbasi et al, 2015).

Financial technologies mainly use technology to ease the delivery of financial services to their customers. They primary utilize Information Technology as their core resource (Broadbent Ben, 2016). And this is where they have managed to edge out the banks who couldn't cope with the change.

#### **2.2.1 Financial Intermediation Theory**

Financial Intermediation Theory was established by Gurley and Shaw in 1960. It is based on agency theory and information asymmetry. This theory explains the importance of financial intermediaries in the economy. Financial Intermediation in the banking industry is defined as the process where banks takes depositors money from those with surplus and lend them out to

borrowers with deficits (Scholtens & Wensveen, 2003).Scholtens and Wensveen (2003) argue that a well-functioning intermediary is necessary for creation of financial of goods and services. Intermediary presence is key in pricing and covering of all direct and indirect costs.

Market imperfections such as information asymmetry, regulations, high transaction costs, and transport costs necessitate the existence of intermediaries. Entrepreneurs have information on the projects they want financed, however banks don't have full information on the same. The transferability of market information is hampered by moral hazards existing in the market.

This theory is relevant to this study as financial technology facilitate service delivery and operations of banks. Banks utilize financial technology in enhancing efficiency in its operations. Financial technologies eliminate information asymmetry by providing data analytics software. They have also led to increase in trust and confidence by both the banks and its clients due to transparency and free flow of information. This has also enhanced reduction of costs, customer retention and given banks a competitive edge.

### **2.2.2 Technology Adoption Model (TAM)**

Technology investment globally has grown rapidly over the years, this has necessitated organizations to accept and utilize the benefits derived from its acceptance. Technology Adoption Model (TAM) was developed in 1989 by Davis and has been widely used to study the acceptance of technology by various organizations.

TAM is a theory that models how various users accept to use a presented technology. It goes ahead to explain that when users are presented with a given technology they consider a number



of factors before they can accept to use this technology (Ajzen&Fishbein, 1980; Fishbein&Ajzen, 1975). TAM states that the user considers two elements before adopting any given technology; perceived usefulness (PU) and perceived ease of use (PEOU) (Davis, 1989).The PU is the degree in which the user believes using that particular system will enhance the job performance of what they are doing while PEOU is whereby the user believes that system will be free from effort.

With reference to TAM, banks would evaluate the cost of technology, if it's acceptable they would beyond reasonable doubt adopt them. This will enhance their data analytics, credit scoring, innovation and hence increase efficiency and effectiveness and eventually have a positive impact on financial performance.

### **2.3 Determinants of Financial Performance**

This section demonstrates the determinants of banks financial performance with reference to how external factors, (Finetch included) impacts on firms performance hence affecting the output of banks services to consumers.

Financial technologies are the main determinants of financial performance in this study. Other determinants of financial performance are; capital adequacy, size of the bank, the type of clients, Return on Equity(ROE), Return on Assets(ROA), Profit Earning Ratio(PER) and Management Efficiency.

### **2.3.1 Capital Adequacy**

Capital adequacy in the banking industry is measured by ; loan to assets, total assets, overhead expenses to total assets, non-interest income to total assets total cash available for lending and available funds for expansion of strategy.

There is a positive link between financial performance and capital adequacy of EU banks (Staikouras and Wood,2003). Abreu and Mendes (2001) also argue that there is a positive impact on the financial performance of that bank by the equity level of a commercial bank.

### **2.3.2 Size of the Bank**

Hughes and Mester (2011), argue that the size of the bank impacts on the financial performance of banks. Banks are able to leverage on the size to enjoy economies of scale. This is through varying of product mix hence attracting more customers. This also leads to reduction of risks which in turn significantly affects financial performance (Nzioka, 2013)

The larger the bank the easier it is to strike financial deals. This way they are able to find cheaper sources of financial resources which in turn lead to growth and expansion. This in turn impacts financial performance. (Mathur & Kenyon, 1998)

### **2.3.3 The Type of Clients**

Retail banks deal with individual clients while wholesale banks deal with corporates and government institutions. Wholesale banking makes the banks have a huge asset base hence they are able to diversify their investments as they have a huge asset base.

Operating cost to income ratio is high in retail banking as opposed to wholesale banking. Retail banking has high operating costs which in turn affect the financial performance.(Hawaladar, Lokesh & Biso, 2016).

#### **2.3.4 Management Efficiency**

This refers to the qualitative aspect of the managerial styles, policies and systems in place as well as discipline, quality and competence of staff, which in turn affects how a firm deploys its available resources to maximize return and meet set goals (Ikpefan, 2013). In commercial banks, management of assets and liabilities is the most vital factor that affects banks' performance Anjichi (2014).

Management efficiency is measured through analysis of bank's operating costs , majorly the fixed costs that the management prefers to incur and how it affects the bank's financial performance be it negatively or positively (Ikpefan, 2013).

#### **2.3.5 Macroeconomic Variables**

External factors do affect the performance of banks (Olweny & Shipho, 2011).

The factors such as inflation, political environment, government regulations, interest rates as well as market concentration, industry size and ownership affect the financial performance of the banks (Said, 2011).

### **2.4 Empirical Review**

Empirical studies on the impact of financial performance of banks that have embraced technology exist.

DeYoung, Lang and Nolle (2007), analyzed internet only banking and its effects on banks performance. This study entailed studying of the United States traditional banks without websites versus internet only banks over a three year period. The study was conducted using analysis of historical data from FDIC for the years 1999-2001 and a regression model was used to analyse the data. The findings of this study were that there was increase in revenues, which improved the bank's profitability for banks that used internet banking, which in turn affected the banks financial performance positively. I agree with this conclusion because it is evident that internet banking increases the number of clients reached within a given time.

Mohammad and Saad (2011) studied the impact of electronic banking Jordanian banks' performance. The study was done over the period of 2010-2011, through analysis of financial reports of fifteen banks and the Central Bank of Jordan annual reports. The data was then analyzed using the pooled ordinary least of squares regression method. It was concluded that electronic banking impacted negatively on performance as it increased the risk exposure of the said banks. I disagree with this conclusion, because first a two year period is too short to conclude the negative impact caused by electronic banking.

Hernando and Nieto (2005) in Spain studied the impact of adoption of transactional website on the financial performance of the seventy two banks. The study was carried out over the period 1994-2002. It analyzed half yearly annualized data from the first half of the year 1994 all the way to 2002. It analyzed data of all the seventy two banks using multivariate regression analysis which explored the impact of adoption of internet as a business model. The study concluded that there was a significant impact on profitability of banks that had implemented the internet

banking as opposed to the traditional banks. I agree with this study as it emphasizes on the significance of internet banking in the present banking industry.

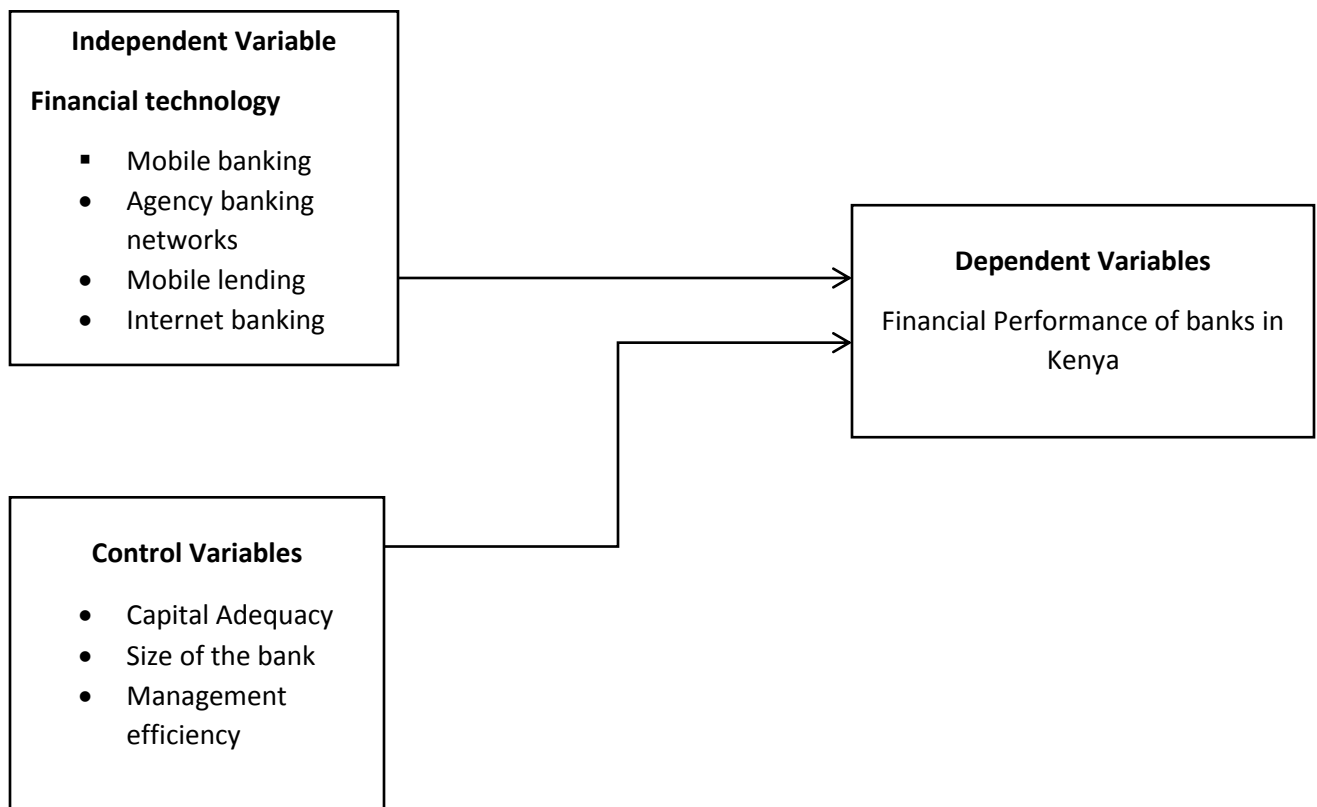
Coming closer home various studies have been carried out around the impact of technology on banks' performance. Cheruyiot (2010) studied the impact of internet banking on the financial performance of banks in Kenya. The data was collected through use of open and close ended structured questionnaires. The data was analyzed using univariate and multiple regression and analysis. The study opined that banks that have embraced internet banking are banks with large asset base and have as well posted huge profit margins. However from his study, the multiple regression model showed that there is no significant relationship between internet banking and banks performance. I agree with this conclusion as at the time of his study, internet banking was still at its growth stages and significant correlation could not be seen as at that period.

Kariuki (2005), in his research paper, established that the impact on financial performance is felt over a long term period as opposed to short term because of the initial costs that come about from infrastructural investments in technology. This study was done by way of questionnaires to the managers of the ICT department and operations of all the forty three commercial banks, however there were twenty seven respondents (63% of the population). The study also used secondary data by analyzing annual reports for the year 2006-2010. The data was analysed using a regression analysis. The findings of the study was that internet banking will lead to diversification of products and services, market growth, tailor made products and eventually satisfied clients. He further argues that in Kenya the impact of new product development by

Kenyan commercial banks in terms of technology is positive, however it is not as significant, I agree with this study.

## 2.5 Conceptual Model

A conceptual framework is key to develop as it will show the relationship between two concepts of a study. This research aims to show the effect of financial technology on financial performance of the Kenyan banks. The relationship is shown as below;



**Figure 1: Conceptual Model**

**Source: (Author, 2018)**

## **2.6 Summary of the Literature Review**

From the empirical review it can be noted that a lot of studies have been done around the impact of technology and internet banking on banks' financial performance, however no study has been done on the impact of financial technologies on the financial performance of banks in Kenya, banks are faced with even larger Kenyan giants like Mshwari, Safaricom's expanding portfolio of financial services and arch rival Equity Bank's product Equitel. Resource-constrained small Kenyan banks should look to financial technologies startups to maintain relevance as African banking quickly evolves.

Banks still can mutate basing on their advantage of substantially lower costs of capital than startups and can offer more regulated products like savings and insurance. They also have brands and the ability to cross sell products to their existing customer bases at scale. That means they can invest, acquire or partner with these new tech startups, many of whom are hungry for debt and equity, and some of whom are attracting substantial capital from US investors while local banks look the other way. This study seeks to explain as to if banks should actually align its strategies around Finetch to impact its financial performance positively or otherwise be edged out of the market.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter sets out the research methodology that is to be used by the study. It will identify the various techniques and procedures and that will be applied in data collection and analysis. The study shall include the following subsections; research design, sampling method, target population, data collection and measurement and lastly data analysis and its presentation.

### **3.2 Research Design**

The study used a descriptive design. A descriptive research design entails finding out the; who, what, where, when and how much (Cooper and Schindler, 2000). The design is deemed appropriate simply because the main interest was to determine the effects of Finetch on the banking sector's financial performance in Kenya and describe how the factors support matters under investigation. Descriptive research design seeks to collect data and provides a snapshot of the population at a single point in time. This research design had been adopted due to its ability to provide further insight into research problem by describing the variables of interest. The research design used secondary sources of data derived from reports, official records, financial statements and authentic archives. The data obtained was compared with central banks' regulatory reports to ascertain validity and authenticity.

### **3.3 Population and sample**

Mugenda and Mugenda (2003) define population as an entire group of individuals, events or objects having a common observable characteristic. It is the total number of subjects of



interest to the researcher (Oso & Onnen, 2008). The target population studied is the banking industry in Kenya.

The target population comprises of all the Forty three banks in Kenya as per the Central Bank of Kenya directory of licensed commercial banks 2017, hence there was no sampling, however the study used only 38 banks for banks whose data was consistent throughout the period. Bank of Baroda and Bank of India were reported in Indian language, hence a language barrier, while Imperial Bank, and Charter house did not have consistent data.

### **3.4 Data Collection**

The study used secondary data obtained from the audited published financial statements at the Nairobi Securities Exchange. The study also used data published from the Central Bank annual reports by financial performance data. The study period was a period of 5 years (2013-2017).

The data collected was both qualitative and quantitative data. The qualitative data included the type of clientele, the management efficiency and macroeconomic variables while quantitative data included the Return to Asset ratio, Capital adequacy and the size of the firm.

### **3.5 Data Analysis**

The study classified the variables to dependent and independent variables. The independent variable being the financial technology while the dependent variable being

the financial performance of the 43 commercial banks after analysis of the return on assets for the 5year period.

The relationships of the variables were analyzed using SPSS (V. 21.0) and MS Excel. The findings were presented using frequencies, percentages, tables and charts, tabulations, means and other measures of central tendency. Tables were then used to facilitate further comparison and analysis by summarizing responses. This generated quantitative reports for this study.

Furthermore, a multivariate regression model was used to determine the relative impact of each of the six independent and dependent variables with respect to outputs of the measures of financial performance. Regression analysis showed how the dependent variable (financial performance) changes when any one of the independent variables (return on assets) is varied, while the other independent variables are held fixed (Babbie, 2011). Consequently, having this in mind, the multiple regression analysis was used as the most convenient approach to analyze the collected data.

The variables shall be measured as below;

<b>Variables</b>	<b>Measurement</b>
Financial Performance	Return on Assets
Mobile banking	Total number of mobile banking clients registered in the year
Internet banking	Total transactions per year
Financial Technology	Total amount invested in financial technology per annum
Mobile lending	Total amount lent out per year
Capital adequacy	Total amount invested in financial technology by the bank

### 3.5.1 Regression Model

The regression model is as below;

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

Where;

Y- Financial Performance (Return on Asset which is net income divided by the average total assets) of the bank for year  $1 \dots n$

X<sub>1</sub>- Total number of users of mobile banking per annum

X<sub>2</sub>- Total amount of mobile lending per annum

X<sub>3</sub>- Total amount of cash transacted on internet banking per annum

X<sub>4</sub>- Total value for capital adequacy rate

X<sub>5</sub>- Total amount invested in financial technology by the bank

$\varepsilon$ - Random term or error, normally distributed about a mean of 0 and for computation purposes, it is assumed to be 0.

$\beta_1 - \beta_5$  -Regression coefficients the amount by which Y is changed for every unit the dependent variable is changed.,

$\beta_0$ - Constants, defined as the long term interest rates without including the independent variables or Y intercept.

### 3.5.2 Test of Significance

The study used coefficient of determination ( $R^2$ ) to evaluate the level to which variation of financial technology (independent variable) explains the variances in financial performance. A multivariate regression model was used to determine the value of  $\beta_0$  and

$\beta_n$ . This clarifies the relationship between the dependent and independent variables. ANOVA table was used to test for the reliability of the individual variable beta, while the results from the ANOVA table tested the suitability of the model statistically. F test was used to check the significance of R, which significantly also tests  $R^2$ .

The level of significance will be at 95% level of significance where anything below 0.05 means that the hypothesis is significant and above 0.05 show that the hypothesis is statistically insignificant.

## **CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSIONS**

### **4.1 Introduction**

This chapter focuses on data analysis, presentation and discussion of the research findings. The chapter is divided into sections basing on the objective concepts. The research was mainly to examine the effect of financial technology on the financial performance of commercial banks in Kenya.

The study was based on analyzing secondary data obtained from reports published by the Central Bank of Kenya as the banks' regulator. The dependent variable was financial performance measured by using Return on Asset as it is the most reliable way of measuring financial performance. The independent variables were mobile banking, online banking and agency banking. In addition to that statistical representation, explanations and interpretation are provided. The study period for this analysis was 5years, 2013 to 2017.

### **4.2 Descriptive Statistics**

#### **4.2.1 Return on Asset**

Return on Asset is the measure used to evaluate the efficiency of an investment or investments. It is computed by dividing the net income by the average total assets. It's a measure used in financial performance analysis, which shows the amount of income generated and how stable a bank can sustain itself at the mark. From the study, it was found that most banks return on asset was cumulative. The performance was categorized into three: where between 5%-9% shows that bank we exemplary doing well. This implied that these banks are getting a lot of profits or returns on the assets they have invested in. Between 1%-4.9% the banks were doing well but need to improve. For such banks, chances are high for them to start making losses. This further implies that the profits made are not enough to sustain the banks in the long run. Finally, below

1% implied that such banks were only recovering the cost invested on the assets with a very small margin of returns. Such banks need to strategies on investment either to reduce the investment of the assets or find other ways of making profits from the asset. The return on assets further explains the influence of technology on the performance of specific banks

The highest ROA was in 2017 of a percentage mean of 3.9080, while the lowest was in 2013 with a mean of 3.1179, the highest standard deviation was 2.0558 in 2015 due to negative ROA of Imperial Bank.

**Table 4.1 Financial Performance**

	<b>N</b>	<b>Mean (%)</b>	<b>Std Dev</b>
2013	39	3.1179	1.8948
2014	39	3.2480	1.8922
2015	39	3.0380	2.0558
2016	39	3.2574	1.8642
2017	39	3.9080	2.0206

#### **4.2.2 Mobile Banking**

It was found that banks that were using mobile banking services were making a lot of profits though not on the assets but other services like mobile loans, deposits and withdrawal of money using the mobile phones, money transfer and payment of bill using the mobile phone. Since most banks have mobile banking services, the researcher had to categories the type of services that would be used for comparison to be able to compare the relationship. Short message services, mobile loan, withdrawal and deposit of money to/from the bank, money transfer and payment of bills, using the mobile applications available to the bank were the categories that the researcher had to use. From the 39 banks, it was found that only 32 banks were offering all the services and 10 banks, though they have mobile banking, they only used the platform for alert messages. This

gave a percentage of 82% of the banks that benefit from such services. 18% of these banks, though they have the mobile banking service, the services provided were not enough to be categorized as mobile banking services. It can also be noted that in 2013 the total amount transacted on mobile banking was 1.9trillion, while in 2017 the transactions totaled to 3.9trillion, this shows there is a steady upward trend with regard to mobile banking usage.

### **4.2.3 Online Banking**

On the other hand, online banking had an impact too to the performance of the bank. The research found out that not all the banks were offering this service. A total of 32 banks were offering this service and this gave a percentage of 82%. The services offered included online deposit and withdrawal, money transfer, statement checking and loan application, among other services. However, the 18% of the banks though online banking service are available, it was only meant for statement checking, withdrawal and deposits, but other services were not provided. It was found that those banks that were fully offering the services were making a lot of profits due to the flexibility they offer to their clients.

### **4.3 Correlation Analysis**

A spearman's correlation analysis is undertaken in order to determine the correlation between the dependent variable and the independent variables. The Spearman's Correlation ranges from a value of +1 to -1. A value that is close to +1 shows that the Spearman's Correlation is strong and positively correlated while a score close or near -1 shows a strong but negative correlations. A score of zero or close to zero shows weak correlation between the variables.

The Correlation of Mobile banking to financial performance is 0.16. It shows that it is positive but weak correlation. The other variables including total loans distributed to mobile banking customers shows a positive strong Spearman's correlation.

**Table 4.2: Spearman's Correlation Table.**

	<i>Y = ROA</i>	<i>X1 = Mobile Banking</i>	<i>X2 = Total loans</i>	<i>X3 = Internet Banking</i>	<i>X4 = Capital Adequacy</i>	<i>X5 = financial technology</i>
<i>Y = ROA</i>	1					
<i>X1 = Mobile Banking</i>	0.164666442	1				
<i>X2 = Total loans</i>	0.566945445	-0.322506731	1			
<i>X3 = Internet Banking</i>	0.283169958	-0.675135422	0.750989154	1		
<i>X4 = Capital Adequacy</i>	0.069567148	0.371089299	-0.446758919	0.489144905	1	
<i>X5 = financial technology</i>	0.177663833	0.031507588	-0.077630574	0.052246044	0.071426621	1

Source: Author, 2018

The number of transactions undertaken through internet banking shows a positive but weak correlation of 0.28. Financial technology is also positively correlated at 0.17 while capital adequacy ratio is negatively correlated to financial performance.

#### **4.4 Regression Analysis**

This analysis uses a linear regression model to define the relationship between the independent variables and the dependent variable. The analysis will be by use of tables and discussions from those tables



#### 4.4.1 Diagnostic Tests

The regression model makes various assumptions that provides conditions that should be met before undertaking a linear regression analysis. In order to test whether data complies with these conditions we undertake a diagnostic tests. These tests include test of normality to understand whether data for each variable is normally distributed. Normality test are undertaken by Shakiro-Wilk test or by use of Skewness and kurtosis. In this study we shall use Skewness and Kurtosis with values for either Kurtosis or Skewness going beyond the range of +3 and -3 shows that the variable is not normal.

**Table 4.3: Normality Test Table**

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Y = ROA	-.929	.184	1.371	.365
X1 = Mobile Banking	.827	.184	-.314	.365
X2 = Total loans	.171	.184	-.909	.365
X3 = Internet Banking	.419	.184	-.510	.365
X4 = Capital Adequacy	1.363	.184	2.764	.365
X5 = financial technology	.267	.184	-1.373	.365
Valid N (listwise)				

Source : Author, 2018.

The values for all variables as per the table 4.1 are within the range of +3 and -3. Therefore data for all the variables is considered normal.

The other condition set by regression analysis model is there should be no multicollinearity within the variables. Multicollinearity test is undertaken by looking at the VIF (Variable Inflation

Factor). A VIF score value of 10 and above means the variable contains multicollinearity, and the variable is thus dropped from the model.

**Table 4.4: Multi Collinearity Test Table**

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
1 X1 = Mobile Banking	.459	2.181
X2 = Total loans	.361	2.770
X3 = Internet Banking	.224	4.462
X4 = Capital Adequacy	.733	1.364
X5 = financial technology	.992	1.008

Source: Author, 2018

Table 4.3 shows that all VIF variables for all the variables are below 10 and therefore shows absence of Multi collinearity.

The Autocorrelation test is undertaken by Durbin Watson score. A score of less than 4 shows that the model does not have autocorrelations while a score of 4 and above shows presence of autocorrelations in the model. The study Durbin- Watson Score was 1.662 as shown in table 4.5. This is interpreted as lack of autocorrelations in the model.

#### **4.4.2 Regression Analysis Model Summary**

The model summary shows the coefficient of determination that explains how the model is able to predict changes by the dependent variable.

**Table 4.5: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.720 <sup>a</sup>	.519	.504	1.9248577	1.662

Source: Author, 2018

The coefficient of determination, R squared is 0.519 which shows that the model can be able to predict 51.9% of the dependent variable. This is a relatively strong model that can be used to predict the dependent variable.

#### 4.4.3 F Test Statistic

The F test statistic helps us to determine the significance level and whether or not to reject the null hypothesis. The null hypothesis in this study is that there is no effect of financial technology on financial performance of commercial banks in Kenya.

The null hypothesis is rejected if the F critical level is less than the F calculated level. F test also looks shows whether the effect is significant or not. We compare the alpha value with the p value (calculated significance value). A p value less than the alpha value shows significance effect and the vice versa.

**Table 4.6: ANOVA Table**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	674.537	5	134.907	36.411	.000 <sup>b</sup>
	Residual	626.158	169	3.705		
	Total	1300.695	174			

Source: Author, 2018

The F statistic is measured by the ANOVA table. The F calculated value according to the table is 36.4111, on the other hand the critical F value at an alpha of 0.05 and 5 and 169 degrees of freedom according to the F distribution table is 2.25. The F calculated is therefore greater than F critical which shows that we will reject the null hypothesis and conclude that there is an effect of financial technology on financial performance of commercial banks in Kenya.

In order to determine the significance of the model we compare the p value which according to the table is 0.00, with the alpha value of 0.05. The p value is less than the alpha value which shows that the model is significant. We therefore conclude that the effect of financial technology on financial performance of commercial banks in Kenya is statistically significant.

#### 4.4.4 Regression Coefficient

**Table 4.7: Coefficients Table**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-17.260	1.744		-9.898	.000
X1 = Mobile Banking	34.583	6.554	.416	5.277	.000
X2 = Total loans	1.407	.184	.678	7.638	.000
1 X3 = Internet Banking	.145	.128	.127	1.130	.260
X4 = Capital Adequacy	.041	.020	.126	2.024	.045
X5 = financial technology	.022	.005	.215	4.009	.000

Source: Author, 2018

The regression model is a strong predicting model. The coefficients table thus enables to place the coefficients of various variables in order to obtain the predicting model. The regression model  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$

Therefore becomes

$$Y = -17.26 + 34.58 X_1 + 1.407 X_2 + 0.145 X_3 + .041 X_4 + 0.022 X_5 + 1.744$$

#### **4.5 Summary of Result Findings and Discussions**

The study aimed at looking at the effect of financial technology on financial performance of commercial banks in Kenya. Financial performance of the commercial banks was measured by return on assets. Financial technology was measured by the use of mobile banking transactions conducted by each bank over total transactions conducted by the bank. The other control variables included total lending issued to mobile banking customers, internet banking transactions undertaken, and capital adequacy.

The results of the study show that there is a significant positive effect of financial technology on financial performance of commercial banks in Kenya. The significance was concluded on the basis of the p value being less than the alpha value, while the study also rejected the null hypothesis by the fact that the calculated F value was greater than the critical F value. The study therefore concluded that there is statistically significant effect of financial technology on financial performance of commercial banks in Kenya.

The results of this study were consistent with empirical results for other empirical studies that were undertaken previously. Hernando & Nieto (2005) undertook a study to identify the impact of adoption of transactional websites on financial performance of 72 banks in Spain. The study found that there was a significant impact of adoption of transactions that are conducted through

banks websites on financial performance. Closer home, a study conducted by Kariuki (2015) on the impact of technology on financial performance of commercial banks in Kenya, showed that the impact is felt in the long run since in the short run the commercial banks are still recuperating from the major investments in acquiring new technology.

On the contrary, some empirical studies contradicted with the findings of this study. Mohammad & Saad (2011) determined the impact of electronic banking on performance for banks in Jordan. They found a negative impact between electronic banking and financial performance. They attribute the relationship to increased risk exposure from electronic banking. Cheruiyot (2010) conducted a similar study but did not find a significant relationship of mobile banking and financial performance.

## **CHAPTER FIVE: RESEARCH FINDINGS AND DISCUSSIONS**

### **5.1 Introduction**

This chapter focuses on the findings, conclusions of the findings and the recommendation based on the findings of the research and the relationship between financial technology and financial performance of commercial banks in Kenya.

### **5.2 Summary of Findings**

From the analysis, it's also evident that integrated mobile banking services are the way to go for banks. Today bank clients are looking for services that are flexible and convenient for them. Among the 35 banks, three major commercial banks (KCB, Equity and Cooperative bank) are making a lot of profits because of flexible and convenient services as it allows its clients to access a lot of services through their mobile phone including paying of school fees, having pay bill numbers for school, supermarkets, petrol stations and hospitals among other institutions. This has seen many people opening account with the bank has increasing the income generated for the bank. With the insecurity, no one is ready to neither carry cash nor transact using cash. A few banks however have the provision of making payments with your ATM card instead of cash. This is what most clients are looking for.

From the analysis we can conclude that the Return on Asset which is a measure of financial performance cumulatively the highest for the period under review for Kenya Commercial Bank, Equity Bank and Cooperative Bank , the common denominator for this banks is they all have mobile banking, online banking and agency banking platforms. The F test statistic helps us to conclude that there is statistically significant effect of financial technology on financial performance of commercial banks in Kenya.

In order to determine the significance of the relationship between financial technology and financial performance, a multiple linear regression was undertaken. The regression analysis makes several assumptions in which data collected must observe these conditions. The study therefore undertook diagnostic tests to look whether the data had observed these assumptions. The test of normality was undertaken by the use of Skewness and Kurtosis. The data collected passed this test as all the variables had both Skewness and Kurtosis scores within the relevant range of +3 and -3. Data also passed multicollinearity test since the VIF values were all below 10 that showed absence of collinearity in the data. Durbin Watson score was also observed to be below 4 and therefore the study concluded that the data was good enough to be analysed by the use of regression analysis.

The study was conducted at 95% degrees of freedom which means that the alpha value was 0.05. The calculated p value on the other hand according to the ANOVA table was 0.000 which was less than alpha value that showed that the effect was significant. The F calculated value was seen to be greater than the F critical value which led to reject the null hypothesis and conclude that the effect of financial technology on financial performance of commercial banks in Kenya was statistically significant.

### **5.3 Conclusion**

In conclusion, it's evident that the return on assets is largely affected by the financial services offered through the mobile banking, online and agency banking with a mean of 4.23, as compared to the asset acquisition. However acquisition of assets or size of the company in term of assets is not highly influenced by the financial services but depends on other factor like normal loans across the counter, numbers of client, amount deposited and withdrawn over the counter for a period of time for its growth



From the findings, the researcher was unable to categorise the type of clients a bank has. This made it difficult for the researcher to use this as a measure of performance. Also there was no clear information was provided on the number of mobile and online banking registered clients and transactions in a year. However, only their influence is seen on those banks that use the service. Banks with the services were recording high returns on assets as compared to those that were not using the services. The research was only able to conclude that there was a positive impact on the performance of the banks but to show the rate of the influence was not possible

On the other hand, banks have a provision on research and development but the amount invested in it is not provided. The researcher found out that as much as they are using the financial services and have experienced the benefits of the services, no effort is put on improving the technology and no clear amount is put aside for research and development. This puts banks at high risk as the other mobile service companies that do not take deposits are coming up very fast, and are investing so much in technology. This will make the banks lose their clientele and profits which will directly impact on their performance.

The final conclusion is that commercial banks can improve their financial performance by improving their financial technology and increase users of mobile banking. This is because the study found out that financial technology was positively correlated with financial performance. The effect of financial technology was also significant meaning that improving financial technology leads to increase in financial performance.

#### **5.4 Recommendation**

The findings of this study recommend that banks should invest in financial technology. The banks should outline a strategy on the how they can channel funds towards technological advancements as this will increase their operational efficiencies.

Commercial banks should also come up with clear reports on their agency networks, outlining the impact of each agency on financial performance. They should also have clear reports on mobile banking and internet banking, stating out the portfolio numerically and with precision. This will improve the decision making process as to further invest in financial technology or not.

The study also recommends commercial banks to increase investment in mobile banking users, and the entire mobile banking technology. This is because the study found out that increase in mobile banking increases financial performance of commercial banks in Kenya.

Capital adequacy had a negative correlation with financial performance. This is because increase in capital adequacy means that the shareholders have to increase their capital that is held as a safeguard against deposits. It therefore implies that increasing this level, decreases the cash available to undertake investments on projects with positive NPV. The government and the regulator should therefore assess the risks involved in reducing the capital adequacy ratio requirements, with the intention of helping the commercial banks improve on their performance.

The study would also recommend to the management of commercial banks to increase the total loans disbursed to mobile banking customers. This is due to the reason that the loans or the lending advanced to the mobile banking clients have positive significant relationship with financial performance. It therefore means that increasing these total loans leads to increase in financial performance of the commercial bank.

### **5.5 Limitation of the Study**

The main objective of the research has been achieved, however there were a few challenges, first there were financial statements in foreign Language (Indian) hence a language barrier. Secondly we found that some financial statements were scattered hence we did not find financial

statements for each year. There was also limited information on online client information, and limited information on total amount lent out on mobile lending applications and total amount invested specifically on financial technology.

The study consumed so much time and resources in data collection, undertaking data validity and ensuring that the analysis is undertaken. There was however limited time available to the researcher and therefore the researcher relied on secondary data that was received from the commercial banks' websites and from the website of CBK.

Use of secondary data acts also as a limitation since the authenticity of the information may not be guaranteed. The source data was annual financial reports which have been posted in the bank's website. It therefore follows that there would have been errors in the data during posting or during preparation of the financials. The researcher did not have a way of authenticating the data used and how genuine the data was.

The study used multiple linear regression to undertake the study. This limits the results to the extent of the limitations of a linear regression. The limitations of the model also applied in limiting the findings and the results obtained by the study. Lastly the study findings are applicable to Kenyan Commercial banks within the period of study and we are not certain if the results are applicable globally.

## **5.6 Suggestions for Further Research**

The study makes various suggestions on areas for further research. First a similar study should be undertaken in another developing country and results of the study compared to the results of this study. A study can also be done in a developed country and the differences on the results

findings noted. The challenges in a developing country may not be similar to challenges for commercial banks in developed nations.

Enough time should be accorded a similar study, so that the study collects both authenticated secondary data and primary data. This would ensure that the data collected is authentic enough and recommendations of such a study would not be curbed with similar limitations as limitations in this particular study.

A study should be undertaken on similar subject but use a different model such as the ordinal least square regression model, student t distribution model among other models for statistical analysis. This would help in comparing with the results of this study and make conclusive recommendations regarding financial technology and its impact on financial performance of commercial banks.

The study also recommends that similar study be undertaken and considerable time provide in undertaking the study. This would ensure that complete tests are undertaken, data collection is done effectively and authenticated, and analysis of the data undertaken by use of different models to see whether there will be consistency of the results and findings.

The study also recommends that further studies should be done on the non-banking benefits derived from financial technologies that commercial banks have adopted.

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## **APPENDIX I: COMMERCIAL BANKS IN KENYA**

1. African Banking Corporation Ltd.
2. Chase Bank (K) Ltd
3. Commercial Bank of Africa Ltd
4. Consolidated Bank of Kenya Ltd
5. Co-operative Bank of Kenya Ltd
6. Credit Bank Ltd
7. Development Bank of Kenya Ltd
8. Diamond Trust Bank Kenya Ltd
9. Equatorial Commercial Bank Ltd
10. Equity Bank Ltd
11. Family Bank Limited
12. Fidelity Commercial Bank Ltd
13. Fina Bank Ltd
14. First community Bank Limited
15. Giro Commercial Bank Ltd
16. Guardian Bank Ltd
17. I & M Bank Ltd
18. Jamii Bora Bank Limited
19. Kenya Commercial Bank Ltd
20. K-Rep Bank Ltd
21. National Bank of Kenya Ltd
22. NIC Bank Ltd
23. Oriental Commercial Bank Ltd
24. Paramount Universal Bank Ltd
25. Prime Bank Ltd
26. Victoria Commercial Bank Ltd
27. Trans-National Bank Ltd
28. Imperial Bank Ltd

29. Bank of Africa Kenya Ltd
30. Bank of Baroda (K) Ltd
31. Bank of India
32. Barclays Bank of Kenya Ltd
33. CFC Stanbic Bank Ltd
34. Charter House bank Ltd (Under Statutory Management)
35. Citibank N.A Kenya
36. Dubai Bank Kenya Ltd
37. Ecobank Kenya Ltd
38. Gulf African Bank Limited
39. Habib Bank A.G Zurich
40. Habib Bank Ltd
41. Middle East Bank (K) Ltd
42. Standard Chartered Bank Kenya Ltd
43. UBA Kenya Bank Limited

**Source: Central Bank of Kenya (2017)**

**APPENDIX II: RETURN ON ASSETS FOR COMMERCIAL BANKS IN KENYA**

	2013	2014	2015	2016	2017
ABC Bank	2.5	3.1	4.2	2.5	4.3
Bank of Africa	2	3	3.6	4	4.2
Barclaysbank	0.9	1.2	2.1	5.6	5.8
Chase Bank Kenya	7.4	7.5	8	0	0
Citibank	4.3	4.5	4.8	5	5.3
Commercial Bank of Africa	2.7	3	3.7	4	4.5
Consolidated Bank of Kenya	2	2.5	3	3.2	3.5
Cooperative Bank of Kenya	7	6.2	6.52	5.15	7.1
Credit Bank	3.2	2.8	1.78	2.5	2.9
Development Bank of Kenya	2	2.5	2.8	3	3.5
Diamond Trust Bank	6.7	6.2	4.5	4.59	4.9
Dubai Islamic Bank	1.7	2.3	2.5	3.9	4.3
Ecobank Kenya	4.7	4.6	0.6	6	5.6
Equity Bank	5.3	5	5.5	6	6.5
Family Bank	2.8	2.9	3	3.4	3.8
First Community Bank	1.2	2	2.5	3	4
Guaranty Trust Bank Kenya	1.3	1.6	2	2.3	2.5
Guardian Bank	5.7	3.2	1.7	2.15	3.11
Gulf African Bank	5.7	4	3.7	3.7	1.6
Habib Bank AG Zurich	3.4	2.4	2.9	3	3.5
Housing Finance Company	1	4.6	5	5.5	5.8
I&M Bank	4.2	4.9	3.8	5	5.5
Imperial Bank Kenya	3.6	4	-4.3	0	0
Jamii Bora Bank	2.2	4.5	5.4	5.8	6
Kenya Commercial Bank	7.1	5.93	5.01	5.64	5.7
Mayfair Bank	0	0	0	0	9.8
Middle East Bank Kenya	1.2	0.8	1.7	-1.84	1.62
National Bank of Kenya	1.9	3	3.2	3.5	4
NIC Bank	2.7	2.8	2.7	2.5	3
Oriental Commercial Bank	1	1	1.5	2.2	3
Paramount Universal Bank	1.2	1.4	1.5	2	2.5
Prime Bank (Kenya)	3.6	3.5	2.1	4	5.1
Sidian Bank	2.8	3.3	4	4.5	4.8
Spire Bank	0.4	1.9	2	2.5	2.6
Stanbic Bank Kenya	4.5	4.04	5	3.5	3.9
Standard Chartered Kenya	5.1	5.1	4.8	5.2	5.4

Trans National Bank Kenya	1.6	1.2	1.6	1.1	0.4
United Bank for Africa	1.8	1.5	0.5	0.35	0.28
Victoria Commercial Bank	3.2	2.7	3.6	2.6	2.1
	3.12	3.25	3.04	3.26	3.91