EFFECT OF INNOVATION IN INFORMATION AND COMMUNICATION TECHNOLOGY ON THE PERFORMANCE OF COMMERCIAL BANKS IN KENYA

BY

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DECLARATION

This is my original work and has not been the presented in any other University.

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This research has been submitted for presentation with my consent as the appointed University Supervisor.

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DEDICATION

I dedicate this research paper to my beloved parents Mr. Lawrence Ndii and Mrs.Euriter Njeru, my sibling Doreen Kawira, my fiancée James Kamau for their love,care and moral support throughout the entire research paper as they enabled me to attain my targets and objectives.

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DEFINITION OF KEY TERMS

Innovation –it is the usage of better game plans that meet new requirements, in verbalized needs, or existing business area needs. This is developed through progressively effective things, frames, organizations, advances, or considerations that are expeditiously open to business and society .It can also be defined as creating and promoting new financial products and services, coming up with new processes to facilitate financial activities, to interact with customers and to design new structures for financial institutions. (Boston Consulting Group, 2009).

Automated teller machine- it is an electronic communicated interchange device that gives the clients of cash related association with access to budgetary trades in an open space without the prerequisite for a representative, human operator or bank worker. Automated Teller Machines require debit and credit cards which are useful in making deposits and also withdrawals (De Young, 2015)

Credit card- It is described as a thin plastic slab which is usually issued by the financial Bank to the Bank members to let them be able to borrow funds. It is also any card that may be used more than once to get money or buy things and organizations utilizing an advance. A Visa offers the card holder turning credit that can be paid month to month with as small as the required least portion. (Francesca and Claeys, 2010).

Debit card – it is a card which empowers customers to get to their advantages rapidly and electronically. Not in the least like a Mastercard, a platinum card does not allow any credit facilities. (Francesca and Claeys, 2010).

Mobile banking –it is the use of cellular devices or smartphones to execute online banking roles while the holder is away from their home computers .It also refers to performing banking trades such as bill payments, checking of mini-statements, sending of funds to and fro between accounts through a mobile phone, for instance, a PDA or Personal Digital

Assistant. It involves use of both mobile texts and mobile web. Mobile texts refer to the simplest mode of mobile banking that allows the user to transfer funds or access their account information through simple text messages. Mobile web on the other hand is similar to mobile texts though it operates on its own independent website, For both of them registration and verification of the phone numbers with their Bank accounts should be done. (Boston Consulting Group, 2009).

Internet banking- it is also known as web banking. It is a system which empowers individuals to perform banking practices by methods for the web. It allows the users to carry out financial transactions using the internet. It offers the clientele diversified services that were traditionally only existent through local branches. It requires several components for it to be effective. One of the components is a computer, a reliable internet connection, a bank or debit card. The end users require to register an account and create a password to activate the service. Online banking does not permit the purchase of traveler's checks, bank drafts, certain wire transfers, or the completion of certain credit applications like mortgages. These transactions still need to take place face-to-face with a bank representative. (Atanassov, Nanda, and Seru, 2011).

Electronic funds transfer -is a course of action of moving money beginning with one monetary parity genuinely then onto the following with no paper money developing hands. It also includes direct-debit transactions that involve wireless transfers, deposits made directly to the bank account, ATM deposits and withdrawals and utility pay bill services. The transactions are processed through the Automated Clearing House (ACH) network, the secure transfer system of the Federal Reserve that connects all U.S. banks, credit unions and other financial institutions (Barnes, 2013).

Real time gross settlement (RTGS)-it is a system for settlement of huge worth trades among banks and other budgetary associations. They are a unique specialist funds transfer system

that involve movement of money from one bank account to another on a real time basis. Settlement in real time refers to effecting of a payment transaction without any delays. Gross settlement on the other hand refers to a transaction that is settled on one-to-one basis without any netting off with any other transaction or bundling it with any other transaction. It is mostly used to settle urgent payments (Boston Consulting Group, 2009).

Financial performance-it is an extent of how well a firm can use assets from its basic strategy for business and produce salaries. This term is furthermore used as a general extent of a firms overall financial health for a given period of time. Analysts and investors use financial performance to compare similar firms across the same industry or to compare industries or sectors in aggregate. (Business Dictionary, 2011).

Income is revenue for a specific period regularly for one year (Dew, 2010). Benefit before duty is a gainfulness measure that takes a gander at an organization's benefits before arrangement of corporate personal expense. Benefit before assessment is the net equalization in the wake of deducting all costs from income. It can result to a misfortune before assessment if costs are higher than incomes (Cicea & Hincu, 2009).

ABSTRACT

The banking segment in Kenya has undergone drastic change over the years. In their effort to reduce organizational and administrative expenditures, these banks have embraced many advanced models of technology, whereby customers have access to their accounts from the comfort of their personal computers. The objective of this study was to ascertain the effect of innovation in Information and Communication Technology on the performance of the Commercial Banks in Kenya. The study used theoretical studies such as Technology Acceptance model, Theory of reasoned action, Innovation Diffusion theory and Agency Theory. The study applied descriptive research strategy and the target population included 15 out of the 43 licensed Commercial banks. Panel data analysis was used for a period of 5 years between years 2014 to 2018. Besides using descriptive type of analysis, the study used secondary data. The study also used regression analysis to examine the statistical importance of the various independent variables (mobile banking, internet banking and agency banking) on the dependent variables (the performance of commercial banks in Kenya). The study used STATA to help in quantitative investigation in this examination. Diagnostic tests were carried out during data analysis. From the model summary, between 2014 and 2018 there was variation of 62.31% on financial performance. It was revealed that holding mobile banking, internet banking and agency banking to a constant zero between 2014 and 2015, return on assets of commercial banks in Kenya would be at 0.97361. From the regression equation, mobile banking displayed a positive regression coefficient against ROA; internet banking displayed a positive significant coefficient against ROA of commercial banks; while agency banking displayed a significant positive regression coefficient against ROA. The study concluded that mobile banking, internet banking and agency banking affected financial performance of commercial banks in Kenya. The study recommended that commercial banks should invest in internet, agency and mobile banking as this was found to have positive influence on financial performance.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Today's business environment is very dynamic and undergoes rapid changes as a result of technological innovation, increased awareness and demands from customers. Business organizations, especially the banking industry of the 21st century operates in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. Information and Communication Technology (ICT) is at the center of this global change curve. People contend that managers cannot ignore Information Systems because they play a critical role in contemporary organization. They point out that the entire cash flow of most fortune 500 companies is linked to Information System. (Laudon and Laudon, 2011)

Information and Communication Technology (ICT) is the automation of processes, controls, and information production using computers, telecommunications, software's and other gadget that ensure smooth and efficient running of activities. It is a term that largely covers the coupling of electronic technology for the information needs of a business at all levels. ICT has surpassed the role of support services or only electronic data processing; its fields of applications are slightly global and unlimited. Its devices especially the Internet and modern computer email facilities have further strengthened early modernizations like the telephone and fax. Other ICT devices include data recognition equipment, factory automation hardware and services, tele-computing and teleconferences using real time and online system (Adeoti, (2015).

Information and Communication Technology (ICT) innovation has globally accelerated an entire change in the bank's performance and on the client benefit conveyance in managing an

account industry. With the intention to be at par with global progression, improve the nature of client benefit conveyance, and reduce exchange cost, banks have broadly accepted the improved information, communication and technology systems so as to convey a general variety of significant worth included in the items and administrations. One of the advanced gauging tools that are usually applied for ranking a cutting-edge business undertaking is its ICT infrastructural format. Banks embrace technology innovation worldwide in order to enhance the productivity of administrations offered to clients, enhance business forms and also improve basic administrative leadership and workgroup harmonized efforts. This strengthens the worldwide focus on positions in the rapidly changing/developing markets (Connoly, 2013)

Information and Communication Technology globally has also provided banking industry with the wherewithal to deal with the challenges the new economy poses. It has been the cornerstone of recent financial sector reforms aimed at increasing the speed and reliability of financial operations and of initiatives to strengthen the banking sector. The ICT revolution has set the stage for unprecedented increase in financial activity across the globe. The progress of technology and the development of worldwide networks have significantly reduced the cost of global funds transfer. (Davis, 2014). Every one of the necessities of current life carried light to the way that data for the advanced association is an asset parallel in significance to land, work and capital. It is fundamental and an invaluable asset. It is never again news that we are presently in data age that is described by regularly changing Information and Communication Technology transformation and a data superhighway on which each corporate element and calling must more, on the off chance that it is to get by in the 21st century. The division that has been most drastically influenced by the Information and Communication Technology advancements is the financial framework. ICT has turned

into a basic business asset since its nonappearance could bring about poor choices and at last business disappointment. (Delphi, 2013)

Commercial banks globally play a vital role in the economic resource allocation of countries where they channel funds from depositors to investors continuously with three of the modes of operation been agency banking, mobile banking and internet banking. World over, the three modes of banking have been adopted and may carry variant names. (Kumar et al, 2016). Most of the major banks in Colombia are using bank-based agent banking channels to deliver services and reach new clients. However, the users of these financial services are not the poorest segments of the population and the adoption of the agent model has been slower than in other countries in Latin America, most notably Brazil (CGAP, 2010). Agent networks in Peru are concentrated in urban areas. The concentration of agents in urban areas provides an indication of how banks tend to use agents in Peru. Their main role is to reduce congestion in bank branches, by moving low-value transactions away from costly branches. Therefore, many agents are located within a block or two of a branch of the same bank .Different financial institutions engage in agency banking for variant reasons. The costs of bank service distribution can be reduced, while still effectively controlling banking risks (Ignacio et al, 2010).

Advancement in information and Communication Technology in most African countries has opened up new markets, new items, new administrations and effective conveyance channels for the financial business. Online gadgets banking, portable banking and web banking are only a couple of models. It has additionally furnished the financial business with the fortitude to manage the difficulties the new economy presents. Information and Communication Technology has been the foundation of later monetary segment changes planned for expanding the speed and unwavering quality of budgetary activities and of

activities to reinforce the financial part. The ICT upset has made way for remarkable increment in monetary movement over the globe. The advancement of innovation and the improvement of overall systems have fundamentally decreased the expense of worldwide finances move. (ITA ACT, 2010)

The progressions of Information and Communication Technology in most African countries after monetary advancement and globalization process, started since 1991, have noteworthy effect on the money related establishment. Information Technology innovation is aiming at changing the manner in which financial business is done and has extensively extended the scope of items and expanded the normal requests of the clients. Budgetary division changes and banking segment changes are the vital part of financial changes, which reinforce the monetary changes. IT Act of 2000 gave new measurement to the Indian financial sector. ICT has made change in banking segment: banking structure, business process, work culture and human asset advancement. It influenced the efficiency, benefit and proficiency of the banks to an enormous degree. Fortifying the budgetary division and improving the working of money related market have been the center goal of the monetary part changes (ITA ACT, 2010)

The sector that has been most radically affected by the information and communication technology developments is the banking system. ICT has become a critical business resource because its absence could result in poor decisions and ultimately business failure. Information Technology has also provided banking industry with the wherewithal to deal with the challenges the new economy poses. Information technology has been the cornerstone of recent financial sector reforms aimed at increasing the speed and reliability of financial operations and of initiatives to strengthen the banking sector. The ICT revolution has set the stage for unprecedented increase in financial activity across the globe. The progress of

technology and the development of worldwide networks have significantly reduced the cost of global funds transfer. (Corbett, 2013)

Banking sector in the several African countries has grown over years and new ways of operating have been adopted. Commercial Banks use mainframe computers to maintain their customer accounts by dealing with transactions generated as a result of withdrawals and deposits. It also operates a network of automated teller machines or ATMs. Banks can keep their operating costs down because fewer employees are needed to work behind the counter inside branches; Customers have 24-hour access to their accounts seven days a week; There's no need to carry large amounts of cash around as the large number of ATMs means that it is readily available. (Kroeker, 2010)

Information and Communication Technology has additionally furnished financial industry with the fortitude to manage the difficulties the new economy presents. Data innovation has been the foundation of later monetary segment changes planned for expanding the speed and unwavering quality of money related tasks and of activities to fortify the financial segment. The IT upset has made way for remarkable increment in money related action over the globe. The advancement of innovation and the improvement of overall systems have essentially decreased the expense of worldwide supports move. (Yonc, 2010)

Most East African countries are naturally making a profoundly aggressive business condition in which clients become the point of meeting. These variables can change rapidly, some of the time eccentrically. In regards to this, the development of any undertaking is attached to holding steadfast clients, enhancing the efficiency, effectiveness and also reducing costs. Information, Communication and technology innovation is meaningful in empowering influence for managing these issues. Since the speed of progress and the level of vulnerability in the present focused condition is quickening structurally, the advancement of information

and technology has influenced to some extent every unavoidable truth, among them is the saving money division. (Gera & Gu, 2010).

The presentation of electronic banking system has changed the manners in which banks are working. As online banking is currently considered as the primary duty for the associations' growth and as their center of capabilities, all the banks under review are currently experiencing economic effects. The need to minimize both operational and administrative expenses in most East African countries has driven banks to the electronic world. Cost decrease is just feasible with an expansion in buyer selection. Several Banks in most East African Countries such as Ghana and Egypt have adopted the usage of internet and telecommunication systems to be able to supply a wide-ranging value-added product and also amenities to clients of the bank. (Simpson, 2012).

Internet banking involves inputting data into individual accounting software and also integrating conveying information into customized accounting software design. Several online banking platforms are flexible and enhance ease of banking activities in all commercial banks in the country. This is important as it encourages the banks in the sector to progress financially and also support account collection to assist the consumers to display their records in a single place whether they are with their fundamental bank or with different establishments (DeYoung, 2011)

Operating an account over the internet in most Kenyan banks is considered as a complimentary conveyance network for the administrations instead of employing people to work physically in those branches hence cutting costs. Innovation in Information and Communication Technology has transformed the measurements of rivalry in the retail saving money area. Following the presentation of online banking, most Kenyan banks have affected the use of ATMs and Mobile banking, which are the underlying foundations of electronic

banking. Online banking has increased overall acknowledgment as another transmission network for performing various functions such as managing account exchanges. It gives the chance to the clients to control their account exchanges whenever and however it might suit them. There are two different ways to provide cyberspace banking. First and foremost, there can be physical workplaces that are built up to offer internet and also enable clients to manage an account notwithstanding its customary conveyance channels. Secondly, a bank might be set up as a "branchless," "Web just," or "virtual" bank, (Allen, 2014).

1.1.1 Innovation in Information and Communication Technology

Innovation is defined as the introduction of a new way of doing things; a new idea, a new concept, a new method or device that introduces operational efficiency, effectiveness, or performance or a given service or product. Due to heightened competition for market performance and profitability in the banking sector, banks are turning to ICT innovations as a way of remaining competitive and sustainable. Additionally, ICT innovation is becoming more and more relevant due to three major trends in the business world: increasingly fragmented and demanding markets, intense international competitions, and diverse and rapidly changing technologies (Ajmal, Helo, & Keka, 2010). One of the gifts to humanity by technology (computer) is internet banking. This use of computers has helped in automating the banking process and has reduced backlogs and delay in bank operations. In recent times the internet has become a fast spreading service that allows customers to use their computers or any other internet enabled devices to access their accounts or specific information and possibly carry out transactions from a remote location be it their home or the workplace.

Smart cards, credit cards, debit cards, ATM cards, have all helped to ease human life. Today life without these seems to be hard. The innovative National Industrial Corporation (NIC) mobile banking platform promises a number of „firsts“ within the banking industry and

Information Technology fields. Through a partnership with the leading mobile service provider in the country Safaricom and Cellulant, Banks in Kenya have further taken its one life, one bank promise to your mobile phone bringing crucial financial services at your fingertips (Wahome, 2010). Banking agents can be pharmacies, supermarkets, convenience stores, lottery outlets, post offices, and many more. In Kenya, these agents are increasingly utilized as important distribution channels for financial institutions.

The scope of offered services may include facilities to conduct bank and stock market transactions, account transfers, balance inquiries, bill payments, and stop-payment requests (Vutsengwa & Ngugi, 2013). Banking agents are usually equipped with a combination of point of sale (POS) card reader, mobile phone, barcode scanner to scan bills for bill payment transactions The high rate of internet penetration in recent times has redefined the playground in retail banking services. The retail banks are now offering their services majorly through their internet branches. However, the effect of internet banking on the profitability of banks has remained an issue yet to be studied.

In most East African countries the commercial banking sector innovation can be viewed from different perspectives. First and foremost, the technological know-how manifested in individuals working for the bank in a tacit or implicit form. This know-how is usually manifested in banking process improvement of operations, processes and development of new products and services. The second kind of innovation is instigated through dynamic processes of continuous change to meet new challenges. As these challenges arise, banks and employees develop mechanisms and new ways of dealing with the challenges, and in the process, gain knowledge and experience that lead to innovation (Turban and Aronson, 2013).

The ultimate goal of ICT innovations in banks is to create competitive advantage in products and services provided by the banks. From operational perspective, ICT innovations do

enhance efficiency and effectiveness in coordination, planning, and execution of organizational resources to production of competitive products and services. This in turn, attracts customers, enabling the bank to reach a wider market (Zheng, Yang, and Mclean, 2010). In the banking sector, innovation is achieved if a bank manages to deliver strategic operational and market advantages with minimal investment. Thus, one of the ways to effectively measure ICT innovations in the banking sector is to evaluate how the innovations have transformed operations performance. (Gera and Gu, 2010). Some of ICT technological innovations adopted by banks include introduction of Automated Teller Machines (ATM); Mobile Banking; Electronic Banking; and E-Communications. (Abdolvand, Albadvi, and Ferdowsi, 2012).

In Kenya, ICT innovation in the banking sector started in 1989 by the introduction on the Money Link ATM services by Standard Charted Bank (Gera and Gu, 2010). This was followed by Baclays bank and other commercial banks. Over the years, ICT innovation in Kenyan banks has grown from ATMs to mobile banking, e-banking, e-communications, e-payments and transfers, and e-loans among other technological innovations. According to Ngugi, Pelowski and Ogembo (2010), Kenya banking sector has 42 commercial banks out of which two are under statutory receivership (Chase Bank and Imperial Bank). Out of the 42 banks, 3 are publicly owned banks, 25 are locally owned banks, while 14 are foreign owned banks. Commercial banks in Kenya are ranked in three categories: Tier 1, Tier 2 and Tier 3 banks based on their capitalization and market share index (CBK, 2016; Abishua, 2010). The banking sector in Kenya is governed by the Banking Act of 2015 Cap 488; The Central bank Act of 2015; The Microfinance Act of 2015; The National Payment System Act of 2011, and Kenya Deposit Insurance Act of 2012 (Giorgis, Tarus and Cheruiyot 2015).

The introduction of ICT innovation in Kenyan banking sector has seen a drastic jump in use of ATMs from 4.9 million in 2009, to 13.9 million in 2014. As such, bank deposit accounts grew from 2.4 million in 2005 to 28.4 million. The number of mobile money subscribers grew from 1.3 million to 25.6 million in 2015 (Gubbins, 2015). Mobile money agents grew from 1, 582 in 2007 to 123, 703 in 2014. The number of ATMs grew from 617 in 2006 to 2, 613 in 2014. In 2009, the amendment in the banking Act allowed commercial banks to have banking agents and as a result, banking agents grew from 5 8,809 to 35, 789 agents in 2014 representing 16 commercial banks (CBK, 2016; Gubbins, 2015). According to Ngugi et al., (2010), Kenya commercial banks overall balance sheet grew by 21.4% from Kshs. 3 trillion in June 2015 to Kshs. 3.6 trillion in February 2016. Equally, commercial banks deposits grew by 20% from Kshs. 2.1 trillion in June 2015 to 2.6 trillion in February 2016, while pre-tax profits grew by 8% from Kshs. 71 billion in June 2014 to Kshs. 76.9 billion in June 2015. The CBK (2011) financial stability report attributes the positive performance of commercial banking sector in Kenya to ICT innovation particularly introduction of innovative financial products and services, mobile banking services, e-banking and other innovative use of ICT in delivering services to customers. (CBK ,2011)

1.1.3 Performance

Financial soundness, economic soundness and operational soundness refer to a situation where depositors' funds are safe in a stable banking system. The financial, economic and operational soundness of a financial institution may be strong or unsatisfactory varying from one bank to another. External factors such as deregulation; lack of information among bank customers; homogeneity of the bank business, connections among banks do cause bank failure. Some useful measures of financial performance which is the alternative term as financial soundness are coined into what is referred to as CAMEL. (Bank of Uganda, 2012).

The acronym CAMEL refers to the five components of a banks condition that are assessed: Capital adequacy, Asset quality, Management, Earnings, and Liquidity. A sixth component, a bank's sensitivity to market risk, was added in 1997, hence the acronym was changed to CAMELS. Ratings are assigned for each component in addition to the overall rating of a banks financial condition (Jose, 2009). The ratings are assigned on a scale from 1 to 5. Capital adequacy: this ultimately determines how well financial institutions can cope with shocks to their balance sheets. The bank monitors the adequacy of its capital using ratios established by The Bank for International Settlements. Capital adequacy in commercial banks is measured in relation to the relative risk weights assigned to different category of assets held both on and off the balance sheet items (Bank of Uganda, 2012).

Firm performance can be calculated in various ways. These may include but not limited to; increase in sales rate, market expansion, productivity and profitability. Sales growth rates are a ratio that measures the rate of change in sales from time to time or a specified period of time. The utilization of historical growth rates is one of the methods of estimating future growth. Market share is the percentage of a market, which may be defined in terms of either units or revenue, accounted for by a specific entity. Market share is a key indicator of market competitiveness, that is, how well a firm is doing against its competitors. (Ichniowski et al., 2011)

Firm’s financial performance is measured in monetary terms. A firm financial performance is reflected in the amount of success as regards to its output in terms of; return on investment, return on assets, value added among others. Profit is the main objective of commercial banks. Profitability of firms is measured in various ratios which majorly include; Return on Asset (ROA), Return on Equity (ROE) and Net Interest Margin (NIM). ROE is a financial ratio that refers to how much profit a company earned compared to the total amount of shareholder

equity invested or found on the balance sheet. ROE is what the shareholders look in return for their investment. ROA is a ratio of income to its total asset (Khrawish, 2011). It measures the ability of the bank management to generate income by utilizing company assets at their disposal. ROE was used in this research to calculate the financial outcome for the firms. (Murthy & Mouritsen, 2011)

Earnings are also a measurable item in performance of the commercial banks in the Banking sector and they cite that the continued variability of a bank depends on its ability to earn an adequate return on its assets and capital. Good earnings performance enables a bank to fund its expansion, remain competitive in the market and replenish and/or increase its capital .A number of authors have argued that, banks that must survive need: Higher Return on Assets (ROA), better return on net worth/Equity (ROE), sound capital base i.e. capital Adequacy Ratio (CAR), adoption of corporate governance ensuring transparency to stakeholders that is equity holders, regulators and the public. Liquidity on the other hand which is another measurable item defines that initially solvent financial institutions may be driven toward closure by poor management of short term liquidity. Indicators should cover funding sources and capture large maturity mismatches. An unmatched position potentially enhances profitability but also increases the risk losses. (Enas and Mutaz, 2012)

Generally, literature on corporate governance comprises attributes such as financial transparency, disclosure and trust among others and it is revealed that financial transparency and disclosure enhance trust between the stakeholders and organizations like commercial banks. Capital Adequacy, Earnings and Liquidity are the key dimensions of measuring financial performance in Commercial banks. Another way of measuring the performance of the banks in terms of profitability is by the use of Return on Equity. Return on Equity (ROE) is a great overall measure of a company's profitability because it measures the efficiency with

which a company uses 6 shareholders' equity. As a rule of thumb, firms that are consistently able to post ROEs above 20% are generating solid returns on shareholders' money, which means they are likely to have economic moats. Significantly, Return on Equity can tell us more than just the efficiency of using shareholders capital.

ROE provides a direct peek into how well a firm balances - profitability, asset turnover and financial leverage - to provide decent returns on shareholders' equity. Return on Equity is simply calculated by dividing annual earnings divided by shareholders' Equity. Annual Earnings can be taken from the Consolidated Profit and Loss Statement from the firm's Annual Reports. The Shareholders Equity can be found in the Balance Sheet filed in the firm's Annual Reports. Annual Reports can usually be found at the firm's website. Shareholders Equity is simply the difference between Total Assets and Total Liabilities -the assets that the business has generated. Shareholder equity is an accounting term that represents the assets created by the retained earnings of the business and the paid-in capital of the owners. (Misati et al., 2017)

1.1.4 Commercial Banks in Kenya

The Kenyan Banking sector comprised of 43 commercial banks (CBK, 2018). Banking industry in Kenya is governed by the Companies Act, the Banking Act, the Central Bank of Kenya Act and other various prudential guidelines issued by the Central Bank of Kenya (CBK). Commercial banks branch network has grown from 530 in 1999 to 4,787 branches by end of June 2019, ATMs increased from 262 to 2,021, number of deposit accounts from approximately 1million with 16,673 staff to 12.8million with 28,846 staff over the same period (CBK, 2019).

Financial institutions in the present socio-economic environment are dependent on computer support and IT innovation, therefore, to a substantial extent, the banking industry today is

clear on what the emerging technology will be. Kenyan commercial banks have exponentially embraced the use of information and communication technologies in their service provision. They have invested huge amounts of money in implementing the self and virtual banking services with the objective of improving the quality of customer service. Some of the ICT-based products and services include the introduction of Mobile Banking, ATMs, Internet Banking, Core banking solution, Electronic clearing systems and direct debit among others. (Kihumba, 2018)

From the late 1990s to date was an era of financial innovation and emerging financial instruments. The period witnessed emergence of new products such as Islamic banking, automatic teller machines (ATMs), plastic money, mobile banking and electronic-money (e-money) amongst others within the banking sector. The development of e-banking services is expected to decongest banking halls and reduce the incidences of long queues in banking halls. Digital– based financial services have made a significant contribution in covering the cost of offering financial services. Therefore, it is important to understand the effect of such technological adoptions on performance of commercial banks. (Bohlander and Snell 2011)

In the recent wave of globalization, increased technological growth and competition there has been a lot of emphasis on performance in the Kenyan banking sector. Many scholars and researchers have used performance synonymously with productivity, efficiency, effectiveness and competitiveness. According to organizational performance comprises the actual output or results of an organization measured against its intended outputs (organizational goals and objectives). According to Barney (2010) firms that use resources and capabilities to exploit opportunities and neutralize threats will see an increase in their net revenue or a decrease in their net costs or both and vice versa. Players in this sector have experienced increased

competition over the last few years resulting from increased innovations among the players and new entrants into the market.

The banking sector has had to adopt technological change to remain competitive. In search of competitive advantages in the technological financial service industry, banks have acknowledged value of differentiate themselves from others financial institution through new service distribution channels. Banks bureaucratic process of account opening cut out many rural poor as they could not qualify to own accounts. With competition banks had to simplify the process and had 8 to come up with innovative ways of doing so. Quite a number of banks have innovatively come up with various M-banking products for example Equity bank M-kesho, KCB Mobi-bank, Family bank Pesa pap and more recently M-shwari of Commercial bank of Africa. (Daniel 1999)

1.2 Statement of the Problem

Kenyan commercial banks have continued to deploy huge investments in technology-based innovations and training of manpower to handle the new technologies. Data from Central Bank of Kenya (2011) indicate that, the number of automated teller machines grew from 166 in 2001 to 2091 in 2018, debit cards increased from 160,000 in 2001 to over 6 million cards by the end of 2010 while mobile banking transactions increased from 48,000 per annum in 2007 to over 250,000 transactions per annum in 2010. Performance of commercial banks in Kenya also grew impressively between years 2001 to 2010 where profit before tax grew from Kshs 2.7 billion in 2001 to Kshs 74 billion in 2010. During the same period, total income grew from Kshs 61billion to Kshs 178 billion while total assets grew from Kshs 425 billion to Kshs 1.7 trillion (CBK, 2011).

Aduda and Kingoo (2012) explored the relationship between electronic banking and financial performance among commercial banks in Kenya and reasoned that there exists positive

connection between e-banking and bank performance. In any case, the examination had a research gap since it didn't separate between the three classes of innovation advancement, to be specific client autonomous, client helped and Customer straightforward innovation. Batiz-Lazo (2011) and Muganda (2011) in their study on the effect of mobile and agency banking on the financial performance again induced that data and innovation had a negative impact on the bank performance. Pooja and Singh (2009), in their examinations also contemplated that innovation of data and technology had least impact on organizational performance, with the research gap being that they didn't research the impact of technological innovation on the financial performance.

It is at the center of such mixed conclusions of both positive and negative results that create and necessitate the need to carry out a study from a Kenyan context on the commercial banks in Kenya. Further, the studies have focused on other innovations other than ICT and performance. As such, this study attempts to provide evidence of the innovations in ICT by Kenyan commercial banks and the relationship to their performance.

1.3 Research objectives

1.3.1 General Objective

To establish the effect of innovation in information and communication technology on the performance of commercial banks in Kenya.

1.3.2 Specific objectives

i. To establish the effect of mobile banking on the performance of Commercial Banks in Kenya.
ii. To investigate the effect of internet banking on the performance of Commercial Banks in Kenya.

iii. To investigate the effect of agency banking on the performance of Commercial Banks in Kenya.

1.4 Research Questions

i. What effect does mobile banking have on the performance of Commercial Banks in Kenya?

ii. How does internet banking affect the performance of the Commercial Banks in Kenya?

iii. How does agency banking affect the performance of the Commercial Banks in Kenya?

1.5 Justification of the Study

Justification of this analysis depends on the benefits and faults brought by innovation in information and communication technology on the performance of the banking sector. While these advantages are plainly evident to all customers of online banking, the difficulties are not clear. Innovation in Information and Communication Technology has brought about the saving of money hence enabling the clients to get to their records from anyplace using the web or their cell phones.

The other benefit of this study is the absence of enactment and laws to administer E-saving money; the justification behind this being the way that enactment and laws can't stay aware of the rate at which new items are being produced. Presently in Kenya there are no laws for discretion in regards to versatile saving of money.

1.6 Significance of the Study

The findings of the study are imperative to various stakeholders;

This research is of assistance to the government and policy makers as it attempts to use the advancement in information and technology to develop the monetary administrations division and upgrade money related access and consideration. Through the findings of the examination, the legislature of Kenya can recognize which regions are progressing so as to assist the online banking segment by forgoing charges or offering other non-financial motivations.

The investigation findings can also aid Commercial Banks in valuing the impact of advanced information and communication technology on their implementation as far as strengthening gainfulness is concerned. Banks, particularly the Business ones, are quickly becoming more mindful of the significance of mechanical advancements in this period and this investigation includes pursuit of information and the relationship between innovation advancement and implementation.

To the researchers, the investigation is determined to bring about value addition to current variety of learning as it suggests additional channels of monetary execution by utilization of innovation developments. In any case, this investigation fills in as a chance for more updated studies about advanced information and technology

The present investigation may have suggestions in policy improvement. The discoveries from the investigation may help the controllers to make rules for business saves money with a goal to embrace mechanical advancements. For example, banking firms may require direction on the most proficient method to approach receiving developments and how to guarantee that the hazard is limited.

By and by, the examination may profit institution/banking administrators as they may utilize the discoveries of the investigation to choose the advancements (item or procedure) to receive. Such developments may carry supportability and upper hand to banking firms as aftereffects of predominant money related returns.

The exploration will help to know the advantages that are gathered to agents and will help other individuals to see the advantages and become agents. Illuminated agent's business will bring about development and extension of specialist outlets prompting better budgetary execution and business development.

1.7 Scope of the Study

The study involved the effect of innovation in information and communication technology in commercial banks in Kenya. It was carried out using data collected for the 5-year period from 2014-2018. The study involved only 15 out of the 43 licensed Commercial banks. This is because most registered commercial banks in Kenya have their Headquarters in the Capital of Kenya; Nairobi. The study used secondary data.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter analyses the current literature on the effects of the innovation in Information and Communication Technology on the performance of commercial banks in Kenya. In essence the chapter evaluates theoretical review where several theories on performance of Commercial Banks are revised, empirical review where experimental evaluation on the effect of innovation in Information and Communication Technology are reviewed, the conceptual framework and the summary of the literature review.

2.2 Theoretical Review

As explained by Aguilar (2009), a theoretical framework is a structure that guides, examines and measures what factors to gauge, and what factual connections to peruse with regards to the issues under examination. In this regard the theoretical framework enables the analyst to see undoubtedly the factors of the study; give a general system to information examination; and also assist in the determination of a pertinent research plan.

2.2.1 Technology Acceptance Model

The Technology Acceptance Model, most known as technology acceptance model (TAM), was proposed by Davis (2009). The intention of the development of the model TAM resulted from an IBM Canada contract with the Massachusetts Institute of Technology - MIT, in the 80s to evaluate the market potential to new products of the brand and to make it possible an explanation of the determinants of computers use (Davis; Bagozzi; Warshaw, 2011). Davis (2009) proposed the TAM to focus in the reason the users accept or reject the information technology and how to improve the acceptance, offering, this way, a support to foresee and

explain the acceptance. Davis (1989) conducted a survey in a group of 112 users at the Canada IBM and in 40 Master of Business Administration students of Boston University. The validation of the TAM model was based in the acceptance of a software text editor.

TAM according to Davis, (2009) adds that on this sample he found out that the perceived use had higher impact in the behavior than the perceived facility. The TAM has the advantage of being specific to information technology and has a strong theoretical base, besides the wide empiric support, as claims Davis (2009). The model TAM was designed to comprehend the causal relation between external variables of user's acceptance and the real use of computer, trying to understand the behavior of this user through the utility knowledge and use facility perceived by him (Davis, 2009). According to Davis (2009), people tend to use certain technology with the objective to improve his performance at work - perceived use. However, even if this person understands that determined technology is useful, its use may be damaged if it is too complicated, in a way that the effort is not worthwhile the use - perceived facility. This way, the TAM is based basically in two constructs: the perceived utility and the perceived facility, seeing that both measured completely the effects of external variables, such as features systems, development process, training, in the use intention.

The intention of this model is to represent the impact of external factors related to the information system, under those internals of the individual, as the attitudes and use intentions (Bagozzi; Warshaw, 2011; Dillon; Morris, 2016; Lee et al.2013). According to the model, the use of the information systems would be determined essentially by the use intention that the individual presents. This, in turn, would be determined together by the individual use attitude in relation to the real use of the system and by perceived usefulness, each one exerting a relative weight. This relation between attitude and intention suggests that people form intentions to perform actions to the ones they have a positive feeling. On the other side the

relation between perceived usefulness and use intention, is based on the idea that, inside an organizational context, the people form intentions in relation to behaviors which they believe will increase their performance at work.

The authors Davis, Bagozzi, and Warshaw (2009) presuppose that the saved effort, due to the improvement in the perceived usefulness ease may be applied in other tasks, consequently allowing that one person carry out more work with the same effort, this way having a direct effect in the perceived usefulness. Perceived usefulness use has a causal effect in perceived usefulness. The effects of external factors in the use intention are mediated by usefulness and ease

Technology Acceptance Model (TAM) is a model that clarifies how another innovation and its different elements are gotten and used by the client. In spite of the fact that numerous models have been proposed already in the field of Information Systems to depict the relationship, it is this model which has been generally accepted and used. It is a model that relates the people's social goals to how they utilize technology. It is suggested that, the honest conduct of a man is controlled by his/her social goal, which is affected by client's attitude towards the advancement in information and technology. Man’s attitude and sight value are both controlled by usability. Receiving the TAM demonstrates requires the understanding of end-client’s requirements with respect to benefit and comfort (Davis, 2014)

From this model, value and ease of use of the model adopted by a bank influence their demeanors towards any direction. (Davis, 2014) accordingly suggest that it is essential to regard a bank’s requirements in sight of apparent handiness and the simplicity of use of the advanced technology in place of other target measures. Evaluation of this model is matched to its propensity to the particular aspects of the invention being referred to overlooking

diverse factors, for instance the consumers' social behavior. Ultimately, requirements, such as, limited capacity, time, natural and ignorant inclinations will constrain the chance to act.

Wang, Wang, Lin and Tang (2013) analyzed the elements that determine reception of online banking by the Clients. As indicated by the Technology Acceptance Model (TAM),user's usability value are regarded vitalin determining the reception and application of different Information Technology (IT).

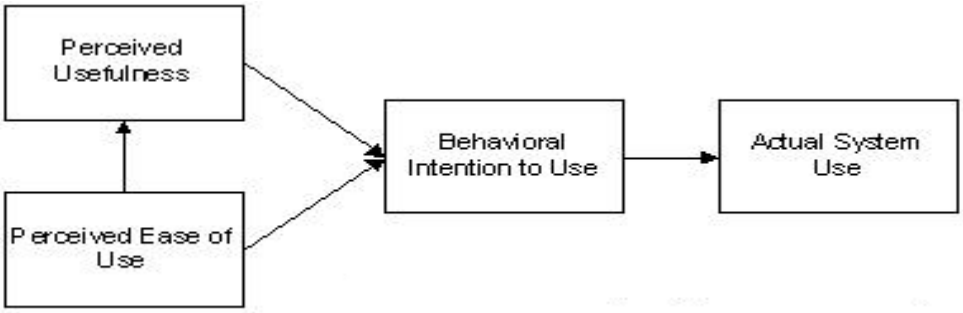


Figure 2.1: Technology Acceptance Model Diagram

Source: Davis et al (2009)

The theory of Acceptance Model (TAM) is important to the study as it is aimed at predicting and explaining what causes potential adopters to accept or reject the use of information technology. The theory guides us in understanding what influences the use of various ICT components by the commercial banks Similarly, in this theory the different Banks adopt mobile banking models that relate to the goals they have in hand and the resources they plan to utilize to effect the same as their adoption of the mobile banking model is controlled by its usability .The Commercial Banks select the mobile banking model of their choice then they identify its ease of use in terms of the processes involved in its incorporation, the time spent incorporating it ease of adaptability by the end users.

2.2.2 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen (2015) to explain and predict the people's behavior in a specific situation. TRA is a well-known model in the social psychology domain. According to TRA a person's actual behavior is driven by the intention to perform the behavior. Individual's attitude toward the behavior and subjective norms are the Toading factors' toward behavioral intention. Attitude is a person's positive or negative feeling, and tendency towards an idea, behavior. Subjective norm is defined as an individual's perception of whether people important to the individual think the behavior should be performed.

The Theory of Reasoned Action is a more general theory than Theory of Acceptance Model (TAM), and has been applied to explain behavior beyond the adoption of technology. However, when applied to adoption behavior, the model includes four general concepts - behavioral attitudes, subjective norms, intention to use and actual use. The inclusion of subjective norm represents an important addition when compared to TAM. In TRA, subjective norm is composed of the user's perception of how others think she should behave, and her motivation to comply with the expectations of these referents, Fishbein and Ajzen, (2015). TRA has been applied in its original form to explain the adoption of ICT-applications, Sindi (2017). The TRA considers that the people behave in a rational way, evaluating what they have to lose and to win with the manifestation of their attitudes. So, ideas, personal goals, values, beliefs and attitudes influence the behavior they emit at work; if they believe, for example, that to share knowledge will bring them benefits, they will tend to be favorable to the sharing (Fishbein; Ajken, 2015; Davenport; Prusak, 2018).

The theory of reasoned action has already been widely researched and showed success in the prediction and explanation of human behavior in a variety of areas .According to Davis

(2009), for being so generalized and also for integrating various theoretical perspectives of psychology, before applied in researches of acceptance of information systems, the TRA should be perfectly appropriate for the study of the determinants of the use of the computer as an specific case. There are two significant changes. Initially, Reasoned Actions includes another component during the time spent influence, social expectation. As opposed to endeavor to anticipate frames of mind, as does Information Integration hypothesis (and a few others), Reasoned Action is expressly worried about conduct.

In any case, this hypothesis additionally perceives that there are circumstances (or variables) that point of confinement the impact of mentality on conduct. For instance, if our mentality drives us to need to go out on the town however, we have no cash, our absence of cash will keep our demeanor from making us go out on the town. In this manner, Reasoned Action predicts conduct goal, a tradeoff between halting at disposition forecasts and really anticipating conduct. Since it isolates conduct goal from conduct, Reasoned Action likewise examines the components that point of confinement the impact of frames of mind (or social goal) on conduct.

Theory of Reasoned Action, (TRA) was made to discern connections among outlooks, expectations and practices (Fishbein, 2014). This is an exceptional feature amongst the most essential speculations that are utilized to clarify human practices. Social expectation to utilize innovation is clarified by individuals' attitude toward that conduct and abstract standards towards changes that are achieved by the advancement in information and technology. Intensified rivalry in the banking industry has driven the innovation of low cost and reasonable internet costs which are currently available even in distant areas of the Nation. (Cheah, 2011).

This is applicable in the banking world since the Commercial Banks before selecting the mode of internet banking to adopt, first look back at the attitude of the Banks that have already incorporated it into their system and how effective it has been for them and if it has resulted to improvement in overall Bank performance then the Bank can now choose to adopt it. Moreover, when innovation in information and Communication technology increases, and past data shows positivity in the end users attitudes so is the performance in the internet banking division influenced particularly because of development of less expensive internet costs which are broad all through the Nation and furthermore the critical decline in both the settled and variable expenses of the Internet associations in Kenya, have made it practical for the Internet to assume a more focal part in Banks' Business technique.

2.2.3 Innovation Diffusion Theory

Innovation Diffusion Theory, created by E.M. Rogers in 2015, is one of the most seasoned sociology theories. It began in correspondence to clarify how, after some time, a thought or item picks up force and diffuses (or spreads) through a particular populace or social framework. The final product of this dissemination is that individuals, as a component of a social framework, embrace another thought, conduct, or item. Reception implies that an individual accomplishes something uniquely in contrast to what they had beforehand (i.e., buy or utilize another item, secure and play out another conduct, and so forth.). The way to selection is that the individual must see the thought, conduct, or item as new or creative. It is through this that dispersion is conceivable.

This theory suggested by Roger divulges people's expectation to receive an innovation as a procedure to play out a conventional action. The elementary factors that decide the acceptance of a development at the common level are the accompanying: common preferences, familiarity, multifaceted nature, preliminary capacity and recognizability. This

concept seeks to explain how another mechanical thought, action, procedure or another application of an old one, relocates from creation to utilize. As indicated by IDT, mechanical development is conveyed through precise networks, among the persons from a social context (Roger, 2015). There are five built up adopter classes, and keeping in mind that most of the all-inclusive community will in general fall in the center classifications, it is as yet important to comprehend the attributes of the objective populace. When advancing a development, there are various techniques used to interest the distinctive adopter classes. These five established adopter categories include; innovators, early adopters, early majority, late majority and laggards.

Diffusion theory passes through: learning, influence, choice, execution (putting it to finalization); and affirmation (fortification in view of positive results from it) similarly advancement in information and technology has been improved due to digital dangers and extortion. Clients are more inclined to both broad communications and relational channels of correspondence, and have more contact with change experts. Broad communications channels are reasonably more essential at the learning stage, though relational channels are useful at the influence stage (Arnaboldi & Claeys, 2010).

Advancement choices in information technology in the banking sector might be discretional, aggregate (where a choice is come to by accord among the individuals from a framework), or specialist based (where a choice is reinforced by someone else who has specialized skill).Barnes and Corbett (2013) prompts that supervisors should have full knowledge of the capabilities of an innovation and the merits that follow from its application, and also understand related costs and constraints of applying it. He cautions the common matters to think through are the capacity and range of earnings that the innovation can attain.

A large number of banks have believed that it was cost effective to receive propelled Information and Technology in their online banking activities so as to enhance their effectiveness and before adopting any internet banking model they pass the model through the five stages listed above, eLearning, influence, choice; execution and affirmation to ensure all costs are covered. On ensuring the internet banking model is okay affirmation of the model is accomplished through improvement of further developed sites. Customers can access their records at anyplace using internet banking. Propelled internet banking firmly depends on the ICT as it is executed on the internet. Customers are able to enjoy the bank's service without physical visit to the bank.

2.2.4 Agency Theory

Agency theory was developed by Michael Jensen and management theorist William Meckling (2016), and specifically designed to capture the essence of the principal-agent relationship. Agency Theory deals with the frequent situation when one person (the agent) acts on behalf of another person (the principal), for example between managers and their subordinates, between shareholders and management, and between management and the wider public (Schaltegger & Wagner, 2010). Jensen and Meckling (2010) characterizes agency theory as an agreement wherein the chief connects some other individual called an operator to perform determined administrations for their benefit. They further noticed that the operator has some basic leadership expert appointed to him by the head.

The idea of organization by and large alludes to the relationship that exists between two gatherings, where one called the principal and the other an agent is contracted to speak to the head in exchanges with outsider. This relationship frames a business structure where the principal contracts the specialist to play out an administration for the principals' benefit. Here basic leadership expert is assigned to the agent by the Principal and there should be objective

coinciding in the organization relationship. CBK (2011) takes note of that in May 2010 CBK presented the organization banking model that enables third parties to offer explicit financial administrations to the clients for benefit business banks. Organization as characterized by the Banking Act in connection to a bank, is "the correct given to an individual by the bank to get for its benefit from its clients any applications for credits or advances, cash because of it, stores, or, encourage installments to such customers for its sake" (Hawkins, 2011).

This theory is essentially received in clarifying the affiliation or communications among specialists and principals and has been in presence for near five decades. The idea of agency was proposed in the 1960's and 1970's with an emphasis on expanding the issues encompassing danger sharing and clarification or goals of the office issue (Jensen and Meckling, 2010). The constraint of the agency proposition is that it accept oversimplified legally binding understandings of head and operator. In all actuality, there are mind boggling issues that make advanced sophisticated agency relationships. Vendor and Simons, (2016) express that agency theory neglects to consider the circumstances under which the understandings are entered. Such settings identify with political, social, social, 11 and verifiable issues that influence the way wherein head operators relate.

The theory is related with agency costs; that is observing costs, which are acquired by investors (Commercial bank) to guarantee that the administrators (Retail specialist outlets) augment riches instead of carry on without anyone else premium. In spite of the way that agency banking is a minimal effort exchange model that empowers individuals to utilize it whenever the timing is ideal and save money on time expended in the bank lines, the business banks will acquire additional expenses in guaranteeing appropriate preparing of the retail specialist worker for productivity ,appropriateness, and acceptable to the clients.

Organization issues in the business banking part, as Aduda (2012) states are winding up progressively unpredictable as partners in the financial area.

The theory is applicable in the above study since most licensed Commercial Banks before setting up an agency branch for their Bank put into consideration the additional expenses that it may incur during set up of the same. The costs involved are guaranteeing appropriate preparing of the retail specialist worker for productivity, appropriateness, and ensuring it is acceptable to the clients

2.3 Empirical Review

Various studies pursued to analyze the influences of advanced information and technology on the performance of the banking sector.

2.3.1 Mobile Banking and performance of Commercial Banks in Kenya

Ching et al (2011) examined the factors that influence Malaysians' intention to adopt mobile banking by extending the renowned framework of Technology Acceptance Model (TAM). A self-administrated questionnaire had been developed and distributed in Malaysia. Out of the 400 questionnaires, only 175 useable questionnaires were returned, yielding a response rate of 43.75 percent. Results were subsequently analyzed by using multiple regression and factor analysis. Factors such as perceived usefulness (PU), perceived ease of use (PEOU), relative advantages (RA) and personal innovativeness (PI) were found positively related with the intention to adopt mobile banking services. However, social norms (SN) were the only factor found insignificant. As expected, perceived risks (PR) was negatively associated with the mobile banking adoption. The research findings provide several important implications for banks, service developers, and software engineer with better strategic insights to design and

implement mobile banking services to yield higher consumer acceptance towards mobile banking in Malaysia.

Siam (2016) examined the effect of mobile banking in bank profitability in Jordan. The population of the study is all working banks in Jordan which have sites on the internet for the period of 2009-2014.The results from the data analysis that were gathered from study instrument (questionnaire) showed that: There is a correlation with statistical significance between the impacts of mobile banking in banks profitability as the following: A negative effect in profitability in the short run. A positive effect on profitability on the long run.

Bagudu, Khan and Abdul-Hakim (2017) did a study on the effect of mobile banking on the performance of commercial banks in Nigeria. Simple random techniques were employed in this study in selecting 22 commercial banks. To facilitate the obtaining of relevant data that was used for analysis in this study, structured questionnaire was used. Descriptive statistics involving simple graphical charts was applied in presentation and analysis of data. The study, therefore, concludes that mobile banking positively and significantly affects the financial performance of commercial banks in Nigeria.

Kingoo (2011) studied the relationship between electronic banking and financial performance of commercial banks in Kenya where he paid keen attention on the microfinance Institutions in Nairobi. He assessed the relationship between performance measured by return on assets and the independent variables: investments in e-banking, number of ATMS and mobile banking as proxy for e-banking. The study investigated 26 commercial banks in Kenya. The banks that had adopted mobile banking were found have better performance. Kigen (2010) studied the impact of mobile banking on transaction costs of microfinance institutions. The study findings indicate that mobile banking had reduced transaction costs considerably

though they were not directly felt by the banks because of the then small mobile banking customer base.

Inyangala (2014) did an assessment of the determinants of financial performance of Islamic banks and conventional banks in Kenya. This study adopted an explanatory research design. From the population of 43, a sample of 20 was selected comprising the commercial banks listed as small by the CBK bank supervision; this comprised the 2 fully Sharia compliant banks (Gulf African Bank and First Community Bank) and 18 other commercial banks. Secondary data was used for this study by reviewing both empirical and theoretical data from books, journals, dissertations, magazines and the internet. Data analysis involved multi-variate analysis using Statistical Package for Social Sciences (SPSS). The study findings indicated that mobile banking was the main determinant of financial performance of Islamic banks in Kenya.

Kathuo, Rotich and Anyango (2015) evaluated the effect of mobile banking on the financial performance of banking institutions in Kenya. The study established that the number of mobile banking transactions has tremendously increased in the last five years since the introduction of M-banking. The study thus concludes that, banks that have adopted M-banking services have to a large extent increased their customer outreach, and hence have improved their financial performance. The findings revealed that many mobile banking products are being offered by banks such as Fund Transfer between Accounts/ E-funds transfer, Bill Payment, order for cheque books and bank statements and therefore concluded that the financial performance of the banks that provide these mobile banking products has improved because they ensure efficiency of the banking services.

Kithaka (2014) evaluated the effects of mobile banking on the financial performance of commercial banks in Kenya. Cross sectional descriptive survey was employed in this case.

This informed who, how and what about the mobile banking in commercial banks in Kenya and as a one-time event. The study adopted a census method where all the commercial banks practicing mobile banking in Kenya were studied. The study found out that there were mobile banking variables influencing the financial performance of commercial banks in Kenya, which are annual amount of money moved through mobile banking, number of users of mobile banking, capital adequacy, asset quality, bank liquidity and management efficiency.

Agboola (2006) in his study on Information and Communication Technology (ICT) in Banking operations in Nigeria using the nature and degree of adoption of innovative technologies; degree of utilization of the identified technologies; and the impact of the adoption of ICT devices on banks, found out that technology was the main driving force of competition in the banking industry. During his study he witnessed increase in the adoption of ATMs, EFT, smart cards, electronic home and office banking and telephone banking. He indicates that adoption of ICT improves the banks‟ image and leads to a wider, faster and more efficient market. He asserts that it is imperative for bank management to intensify investment in ICT products to facilitate speed, convenience, and accurate services, or otherwise lose out to their competitors.

Tiwari, Buse and Herstatt (2016) studied mobile banking as business strategy, impact of mobile technologies on customer behavior and its implications for banks. The study sought to examine the opportunities for banks to generate revenues by offering value added; innovative mobile financial services while retaining and even extending their base of technology to understanding customers.

Shirley and Sushanta (2016) studied the impact of information technology on the banking industry and analyzed both theoretically and empirically how information technology related spending can affect bank profits via competition in financial services that are offered by the

banks. Using a panel of 68 US banks for a period of over 20 years to estimate the impact of IT on profitability of banks, they found out that though IT might lead to cost saving, higher IT spending can create network effects lowering bank profits.

Donner and Tellez (2010) did a study on mobile banking and economic development where they sought to link adoption, impact, and use. The study established that through offering a way to lower the costs of moving money from place to place and offering a way to bring more users into contact with formal financial systems, m-banking/m-payments systems could prove to be an important innovation for the developing world. However, the true measure of that importance required multiple studies using multiple methodologies and multiple theoretical perspectives before answering the questions about adoption and impact.

In a study done by AKI (2012) on the impact of technology in banking sector, the researcher established that new technologies cannot replace the branch network but these can support old methods of delivering the services. The author evaluated the structural change in Finnish banking sector from the period 1993 to 2002 which showed that 42 per cent of households have internet connection with banks and 90 per cent have mobile banking services. The author concluded that main goals of management of technology were to improve customer satisfaction, reduce cost and develop new methods to collect and analyze the customer information.

Durkin and Howcroft (2013), evaluated the banker-customer relationship using Technology Acceptance Model and found that, the relationship was improved through mobile, phone and internet banking. The authors found that the mobile banking has made the banks very competitive and profitable and internet has played a key role in it. Perception of bankers and customers regarding the use of internet was examined. They pointed out that as consumer usage of remote bank delivery channels increases, relationship management will become

more important. Further, the combination of traditional and new delivery channels, if followed, can help to improve their productivity and profitability by employing innovation diffusion theory and the decomposed theory of planned behavior.

Brown et al. (2013) surveyed 162 respondents and discovered that perceived advantages, the 26 opportunity to try out cell phone banking, the number of banking services required by respondents and perceived risk significantly influenced people to adopt mobile banking. Lee et al. (2003) performed eight interviews to collect transcripts from participants and concluded that relative advantages and compatibility were positive factors affecting the adoption of mobile banking, perceived risk was negative factor affecting the adoption of mobile banking, and consumer previous experience and self-efficacy generalised their beliefs (a negative or positive attitude) toward the adoption of mobile banking.

Suoranta and Mattila (2014) researched on Bass model of diffusion to separate 1253 respondents into non-users, occasional users, and regular users according to their mobile banking usage experience and density. The Bass diffusion model assumes that potential adopters of an innovation are influenced by two types of communication channels: mass media and interpersonal word-of-mouth, and the adoption rate can be described by S-shaped diffusion curves. The study empirically identified that interpersonal influence was over mass media in affecting users to adopt mobile banking. Contrasting to the study, Laforet and Li (2015) surveyed 128 respondents randomly selected in the city streets and indicated that awareness significantly influenced the adoption of online and mobile banking, while consumer awareness was effectively increased through mass media rather than word-of-mouth communications. Given that the reference group did not significantly affect the adoption of online and mobile banking, thus contended that mass media was much more

important than interpersonal word-of-mouth in affecting people to adopt mobile banking (Ceylan & Emre, 2011).

By looking at trust and resources, Luarn and Lin (2015) employed the extended technology acceptance model to explore human behavioral intention to use mobile banking. They collected 27 180 respondents in Taiwan and found that perceived self-efficacy, financial cost, credibility, easy-of- use and usefulness had positive effects on the behavioral intention to use mobile banking. Likewise, due to the parsimony and predictive power of Technology acceptance model, Amin et al. (2008) used an extended research containing five constructs - perceived usefulness, perceived ease-of-use, perceived credibility, the amount of information, and normative pressure - to explore the adoption of mobile banking. They gathered 158 valid questionnaires in Malaysia and supported that perceived ease-of-use markedly influenced perceived usefulness and credibility, and human intentions to adopt mobile banking was significantly affected by perceived usefulness, perceived ease-of-use, perceived credibility, the amount of information, and normative pressure.

A study was done by Laukkanen et al (2017) summarizing 18 factors into five barriers, namely Usage, Value, Risk, Tradition, and Image barriers. The theory of innovation resistance, adapted from the psychology and the IDT of (Rogers 2015), aims to explain why customers resist innovations even though these innovations were considered necessary and desirable. Through investigating 1525 usable respondents from a large Scandinavian bank, the study uncovered that the value and usage barriers were the most intense barriers to mobile banking adoption, while tradition barriers (such as preferring to chat with the teller and patronizing the banking office) were not an obstacle to mobile banking adoption.

Another study was carried out by Yang (2009), employed the Rasch measurement model and item response theory to survey 178 students from one of largest university in south Taiwan.

He found that the speed of transactions and special reductions in transaction fees encouraged mobile baking adoption, while factors inhibiting mobile banking adoption were safety and initial set-up 28 fees. Similar to the finding of Cruz et al (2010) surveyed 3585 online respondents in Brazil and supported that the cost of Internet access and service and perceived risk were top two barriers for adopting mobile banking services.

Puschel et al. (2010), researched on adoption of mobile banking, he studied the factors that influences individuals to use the mobile banking services. Similar studies on the effect of mobile banking were carried out by King (2012) and Mbiti and Weil, (2011). The study employed the unified theory of acceptance and use of technology (UTAUT) to investigate what impacts people to adopt mobile banking. Through sampling 441 respondents, the study empirically concluded that individual intention to adopt mobile banking was significantly influenced by social circles, perceived financial cost, performance expectancy, and perceived credibility, in their order influence strength. The behavior was considerably affected by individual intention and facilitating conditions. The study discovered that gender significantly moderated the effects of performance expectancy and perceived financial costs on behavior intention. The age considerably moderated the effects of facilitating conditions and perceived self-efficacy on actual adoption behavior.

A similar study was carried by Ndung'u (2013) who sought to determine the impact of mobile and internet-banking on performance of financial institutions in Kenya where the survey was conducted on financial institutions in Nairobi. The study also sought to identify the extent of use of mobile and internet banking in financial institutions. The study investigated 30 financial institutions. The study found that the most prevalent internet banking service is balance inquiry while the least is online bill payment. Cash withdrawal was the most

commonly used mobile banking service whereas purchasing commodities was the least commonly used.

The empirical study has bought in the following conclusion; relative advantage, trial ability, number of banking services, and risk significantly influence mobile banking usage. Secondly, Information sources (i.e., interpersonal word-of-mouth), age, and household income significantly influence mobile banking adoption. To add on this, awareness, confidential and security, past experience with computer and new technology are salient factors influencing mobile banking adoption .Moreover, perceived self-efficacy, financial costs, credibility, easy-of-use, and usefulness had remarked influence on intention to adopt mobile banking, perceived benefits (i.e., location free and efficiency) are main factors encouraging people to adopt mobile banking .

2.3.2 Internet banking and performance of Commercial Banks in Kenya

Ovidiu, Mehdian and Sargu (2015) did a study on how performance is affected by e-banking among Romanian banking sector players. The study applied DEA to compute the aggregate efficiency score for each of the 24 banks in the sample. In addition, the study utilized PCA to classify the banks into different operational strategies groups based on their relative efficiency scores. The study found out that the banking sector players experienced improved financial outcomes after internet banking.

Wabel (2011) studied the impact of internet banking on the performance of Jordanian banks. In their study, performance of banks was measured by ROE and two sets of control variables were used. Using pooled OLS regression technique they found significant negative impact of e-banking on financial performance of banks. The major limitation of this study is that authors did not look at ROE after a specific year of adoption of internet banking. Since

adoption of e-banking technology involves cost, this might take time to recover cost and experience profits.

Siddik *et al* (2017) did an empirical study on the impact of e-banking on performance of banks in Bangladesh. The study used panel data of 13 banks over the period of 2003–2013. Financial performance was measured in terms of Return on Equity, Return on Assets and Net Interest Margin. Results from pooled ordinary least square analysis showed that internet banking as a form of e-banking affected bank's financial performance positively in the first two years but turns negative in the third year of adoption.

Onay and Ozsoz (2013) examined the effects of internet banking on the financial performance of banks in Turkey. The study used panel data over the period of 1990–2008 of eighteen retail banks operating in Turkey and revealed that Internet banking adoption is positively associated with the level of profits, deposits and loans per branch. Their study also revealed that adoption of internet banking has a negative impact on bank profitability after 2 years of adoption. According to the authors, the reasons for such negative impact are internet banking increases competition and results in lower interest income.

Oyewole et al. (2013) examined the impact of internet banking on bank performance in Nigeria. Using panel data of 1999–2010 for eight commercial banks, authors found that mobile banking has significant positive impact on the banks performance measured in terms of Return on Assets (ROA) and Net Interest Margin (NIM). However, the study found no impact on ROE. Sadr (2013) conducted a cross sectional study on four banks of selected Asian countries. Controlling bank specific and macroeconomic variables, using a fully modified OLS; the study empirically found that internet banking has contributed to improve ROE with a time lag of three years while a negative impact is observed for one year lagged.

Bichanga and Ali (2014) in a study to investigate the effect of internet banking on the organizational performance of commercial Banks in Kenya also considered how cheap internet costs influenced the client developing base crosswise over Kenyan banks through internet banking. The examination looked to discover how modest internet costs influenced the clients in most Kenyan banks through upgrades in managing bank accounts, administrations and accessibility to a greater client base in Kenya. The examination called for expanded refinement through all media outlets to build trust and unwavering quality among the ventures. The findings of their investigation established that cheap internet costs don't influence the organizational performance of the commercial Banks.

Monyoncho (2015) studied how financial indicators of Kenyan banks were affected by banking technologies. The study was grounded on the resource-based theory, technology acceptance theory and the diffusion of innovations model. It was established that that e-banking influences the monetary performance among commercial banks locally. The research revealed that e-banking enhances convenience of undertaking many financial transactions at any time which suiting the customer. Under internet banking customers are able to access cash and transfer cash between accounts, pay bills and make purchases throughout the day at any day of the week. The study revealed a strong positive correlation coefficient between internet banking and financial indicators among commercial banks locally.

Okiro and Ndungu (2013) conducted a study on how performance among Kenyan financial institutions is influenced by the internet banking. This study sampled two microfinance institutions, eleven SACCOS and seventeen commercial banks. The study found out that internet banking enhances financial indicators of the banking industry players due to enhanced effectiveness, efficacy and efficiency. According to the study commercial banks had the largest usage level of online banking amid the surveyed financial firms.

Kombe (2015) studied financial performance was impacted by use online banks' services among commercial Kenyan Commercial Banks. The study adopted a case study of KCB and found out that internet banking reduced the transaction costs which in turn enhanced return on assets. The internet banking was found to support e-banking through which customers are able to access services on a 24-hour basis at their convenience thus building strategic advantage over the bank's competitors. The internet banking was found to support e-banking through which customers are able to access services on a 24-hour basis at their convenience thus building strategic advantage over the bank's competitors.

Ndebbio (2014) did an investigation on the effects of globalization on financial deepening of commercial banks; a sample of 50 banks was used, secondary sources of data were used and a multiple regression equation was applied for data analysis. The results of the analysis showed that there was a positive relationship between globalization and financial deepening among commercial banks in Italy.

A descriptive survey was conducted by Caruana (2015) on the role of technology on financial deepening among all classes of customers in 50 micro credit financial institutions in Turkey. A regression model was used for data analysis and the results for of the analysis revealed that technology highly contributed to financial deepening leading to an increase in customer deposits.

Hernando and Nieto (2016) evaluated the relationship between internet delivery channels and financial services. A survey of a sampled survey of 30 micro credit firms was carried out and secondary data was used for data analysis. The study found that internet adoption was an important tool in delivery leading to improved financial services. The study also revealed that multichannel banks presented statistically significant evidence of efficiency gains, that is,

reduction in general overheads per unit of output which enhanced financial services to customers.

A study was conducted in China by Chan and Jia (2011) on the effects of mobile banking on financial deepening of banks. A sampled survey of 50 commercial banks was used; a regression model was used for data analysis and the results of the analysis revealed a significant positive relationship between mobile banking and customer deposits.

The study by King'ori (2010) on the determinants of income velocity of money in Kenya studied financial institutions across Kenyan financial sector. Findings indicated that innovations and changes are taking over the Kenyan financial sector by storm. As a result of all these changes, the sector has become very competitive. Access to banking and financial services has improved greatly and charges are coming down. The greater circulation of money also means more businesses are coming up and helps investors feel a little bit more comfortable about investment prospects.

Nyasetia (2012) tried to establish the implications of financial deepening on savings and investments in Kenya whereby he used a causal research design. Secondary data was used to evaluate financial deepening indicators, savings and investments from 2006-2011. Regression analysis was used to conduct his studies to establish the relationship and establish a strong positive correlation between savings and investments which established that in case of proper financial deepening, the level of savings and investments in Kenya also get better. In case if interest rates are not favorable, if the stock market is not efficient, and also if deposits in banking institutions are not on the rise, then there will be slow growth and improvement in savings and investments

2.3.3 Agency Banking and performance of Commercial Banks in Kenya

De Young and Rice (2014), did a research on theoretical relation between commercial banks and agency banking in the U.S., the study revealed that the theoretical relation between commercial banks' non-interest proceeds, business strategies, market circumstance, technological transform and financial performance for U.S. Commercial banks between 1999 and 2011. They display that smartly managed commercial banks, degreed by means of a relative ROE degree, are much less engaged in non-interest revenue whilst large banks and banks that focal point more on agency banking are extra dependent on non-interest income.

Sangmi and Nazir (2010) did a study on the relationship between electronic banking and financial performance of commercial banks in Australia where he paid keen attention on the microfinance institutions in Sydney. The study found that agency banking negatively affected financial performance of the banks.

Chude and Chude (2014) did a study on the impact of agent banking on performance of deposit money banks in Nigeria. The study made use of descriptive survey in carrying out the research and content analysis in analyzing the work. It was revealed that agent banking has proved to have essential role to play in improving bank profitability.

Musau and Jagongo (2015) analyzed the utilization of agency banking on performance of selected banks in Nairobi County. The study adopted a descriptive research design. The study targeted 4 banks that offered agency banking services in Kenya. Findings of the study point to the fact that liquidity availability in the outlets affected banks performance in addition to leading to frustrated customers. The study also found out that some of the agency regulations included board of directors and executive management, accountability and quality control. The study also found out that agency infrastructure cost and security was a major influence to

banks performance. The study established a negative effect of agency banking on performance of banks.

Aduda, Kiragu and Ndwiga (2013) studied the way agency banking relates to the financial aspects of financial institutions' performance. The research was carried using descriptive design method. Data was collected for the three –year period: 2010-2012. The findings indicate that out a total of 43 banks, 8 had rolled out the agency banking service with Equity Bank, Co-operative Bank and Kenya Commercial Bank showing a significance performance index. However other banks that have rolled service (Family Bank, Diamond Trust Bank, Post Ban and ECO Bank) did not show much significance in the performance index. Agency banking is drastically improving leading increased financial performance in the banks that have adopted the model due to the convenience and low transaction costs. The findings show that commercial banks that had adopted agency banking were more effect based on the number of agent signed by the commercial bank.

Kandie (2013) sought to establish the effect of agency banking on financial inclusion in Kenya. The study adopted was a cross sectional survey approach in research design. The population consisted of six commercial banks with agency banking services in Kenya. She used secondary data with inferential statistics techniques being used to make a prediction about the dependent variable. The findings showed strong positive relationship between financial inclusion and agency banking.

Watiri (2013) sought to establish the contribution of agency banking in financial performance of commercial banks in Kenya. The study adopted a descriptive survey. It found out that low transaction cost through agency banking had a positive impact on the financial performance of Kenyan commercial banks. By this time, only 9 banks had adopted agency banking and by Dec 2014, 16 banks have adopted the model. This gives more accurate results than Watiris.

Also, Watiri's study didn't consider the financial performance before adoption of agency banking but my study will be a comparative study showing the financial performance before and after adoption of agency banking in Kenya commercial banks.

CGAP (2010) conducted survey of Russia on regulation of branchless banking. The survey was done using empirical analysis of relevant legal and policy changes through the end of 2009. The findings indicate that more than 100,000 automated payment terminals have sprung up in the larger cities in recent years. One provider, Cyber Plat, claims to have processed 1.2 billion transactions worth US$4.7 billion through the first three quarters of 2007 via its 70,000 "cash acceptance" points, mostly for prepaid airtime, television, Internet, and other utilities (CGAP).

Lozano and Mandrile (2010) studied agent model for branchless banking in Colombia. It examined traditional banking sector's interest in branchless banking and identifies available platforms for implementation of banking agent networks and empirically highlighted benefits of branchless banking for Colombian MFIs, and gives an overview of the current network of NBCs in the country. The findings presented a new model. where MFIs act as agents of branchless banking services. Implementation of the model would create a new microfinance value chain through a process of scale and inclusion, and enable the poor to access a wider array of banking services. Recommendations included: clear rules of representation to mitigate confusion of clients on roles of banks; synergy among all players for achievement of integrated branchless banking solution; and, expansion of infrastructure and technology to support the model.

Modupe (2010) examined the dynamic of financial innovation in the banking industry in the Nigeria, and found that a distinction between product innovation and process innovation is necessary as much as the adoption of each type of innovation has its own characteristics and

has a different impact on banking performance. They argue that product innovations have a market focus and are effectiveness driven, while process innovations have an internal focus and are efficiency driven. In fact, product innovations are introduced to satisfy an external user or market need, while process innovations are defined as new elements introduced into the firm's production or into the services it provides. The latter are essentially introduced by the firm with a view towards improving its efficiency.

Wambari (2009) sought to establish the importance of mobile banking in the day to- day running of small businesses in Kenya. The study used a random sample of 20 firms and selected senior personnel (owners, managers or supervisors) to whom semi-structured questionnaires were administered. The study established that in urban areas over 73 % of mobile phone usage is for business purposes while over 70 % of mobile phone usage in the rural areas is for social communication.

Laukkanen (2007) conducted a survey of mobile banking in developing countries with specific reference to secure framework for delivery of SMS-banking services. Using secondary data, the study established that the potential for SMS mobile banking services is high in countries were internet infrastructure hinders the access to electronic banking services. However, most developing countries particularly in Africa internet connectivity and bandwidth are low and the population is not urbanized and averagely poor hence internet banking services not viable in most parts of the continent. The study concluded that internet banking will remain the most attractive service for developed countries whereas SMS banking will gain more in-roads in developing countries.

Consultative Group to Assist the Poor (CGAP) (2016) conducted a survey on in branchless banking in Pernambuco, Brazil. It was found that bill payments and the payments of government benefits to individuals comprised 78 percent of the 1.53 billion transactions

conducted at the country's more than 95,000 agents in 2006.6 CGAP research in Brazil found that, of the 750 people who responded to a survey in Pernambuco State, 90 percent reported using banking agents to pay utility and other bills, only 5 percent reported opening a bank account at the agent, and less than 5 percent said they had made a cash deposit into their bank account at an agent. Indeed, 87 percent of those who had opened an account stated that they had done so just to receive w Kumar, Nair, Parsons and Urdapilleta (2016) explored the extent to which formal, regulated financial institutions such as banks have been able to partner with correspondents, commercial entities whose primary objective and business is other than the provision of financial services in Brazil. The findings indicate that Brazil has created an unusually favorable environment for correspondent banking. It was further established that costs and regulatory regimes affect the details of profitability or differential advantage of correspondent banking compared to branch banking. It was established that branchless banking allows banks to gain proximity to small and perhaps higher risk clients through a format that is friendly to this population segment, but with significantly reduced startup investments and ongoing costs. Economies of scale allow this despite low balances and profit margins from business with these clients' welfare or salary payments.

2.4 Conceptual Framework

An idea is a theoretical or general thought obtained from particular occasions (Kombo and Tromp, 2011). Unlike a theory, an idea does not need to be conversed to be agreed (Smyth, 2014). A reasonable system is an arrangement of wide thoughts and standards collected from relevant fields of investigation and applied to structure a resulting introduction.

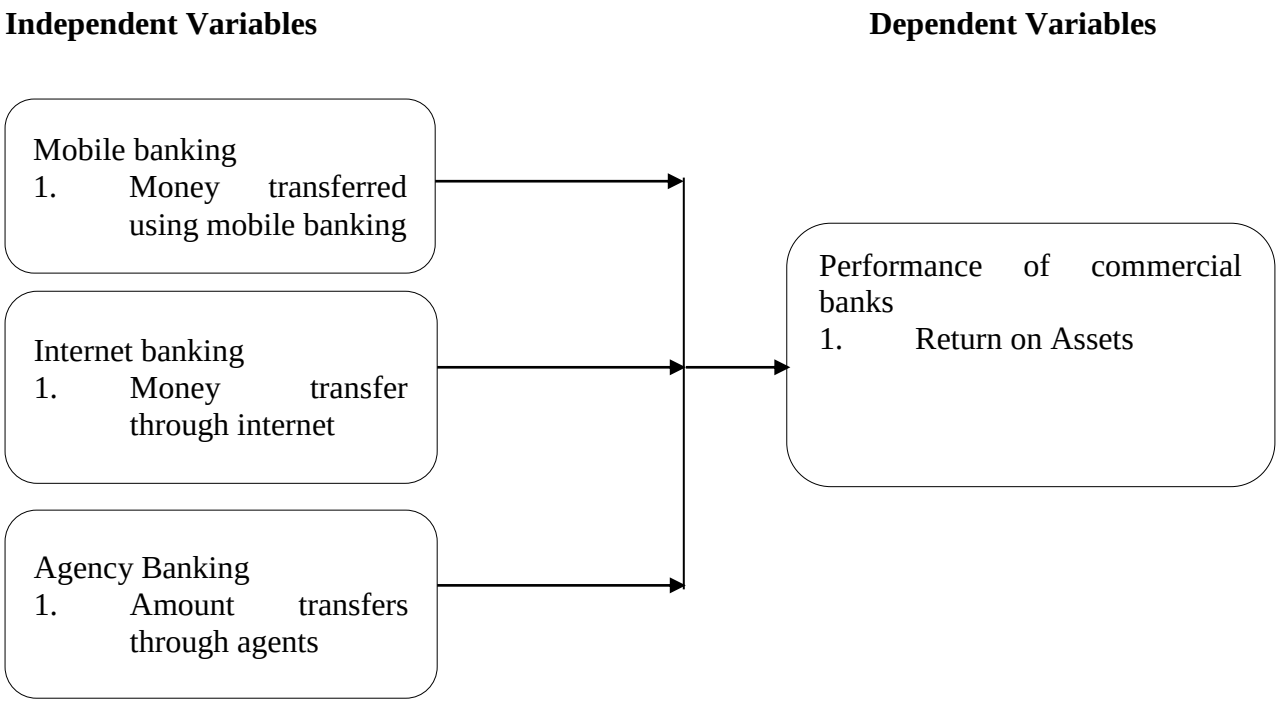


Figure 2.4: Conceptual Framework

2.5 Operationalization of the Variables

This section outlined how the both the dependent and independent variables would be conceptualized. The dependent variable was performance of commercial banks as measured by return on assets. The dependent variables would be internet banking as measured by the amount of money transacted through internet, mobile banking as measured by number of mobile banking users, and agency banking as measured by the number of agents in the bank.

Table 2.1: Operationalization of variables

Variables	Indicators	Measurement of variables
Performance of commercial banks	Net profitability Assets	ROA=Net income/total assets
Internet banking	Money transfer through internet	Log of money transferred through internet
Mobile banking	Mobile banking transfers	Amounts transferred using mobile banking
Agency Banking	Amount transacted through agency banking	Log of money transferred through agents

2.6 Research gap

The theoretical literature review is based on the Technical Acceptance model theory, Innovation-diffusion Theory, Agency Theory and Theory of Reasoned Action. It has come out clearly from the reviewed relevant empirical literature review of several writers like; Agboola, (2014), Hernando and Nieto (2016), Aduda (2013), Delone and Mclelan (2012) and Egland (2010), that innovations in information and technology have a good effect on performance indicators for Commercial Banks in Kenya in relation to the three objectives under study; mobile banking, internet banking and agency banking. They have been in unison on the transformational effects of technological innovation on bank performance and operational efficiency.

Despite what the above authors think, other scholars like; Hawkins (2011) who completed examination on the job of agency banking in improving budgetary incorporation in South Africa. to decide if banking agents are fit for the financial sector administrations. While Sullivan (2010) finds no efficient proof of an advantage of internet banking in US snap and

mortar banks. suggest that the innovations in information and communication technology have adverse effects on performance indicators. These different views from writers in various countries are mainly as a result of lack of complete and detailed analysis of the several innovations in the technological world and overall performance indicators for the Commercial Banking sector Kenya

A research gap therefore exists in the theoretical and empirical review while belief exists that mobile banking, internet banking and agency banking have a positive effect on the financial performance of commercial Banks in Kenya it's not stated that the above-mentioned variables have a positive effect on the overall performance of the Commercial Banks. The research question for this study will therefore be whether mobile banking, internet banking and agency banking have a positive effect on the financial, economic and organizational performance of commercial Banks in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter involves decisions and methodology on how data was selected and analyzed in order to come up with the findings. Specifically, this chapter covered on research strategy, target populace, data collection and data analysis.

3.2 Research Design

Kombo and Tromp (2009) describe a research design as the analysis of the overall research point and the writing of picked about techniques. Kothari (2014) suggests that research design structure encourages different examination tasks to be done with ease, accordingly making research as effective as would be prudent, yielding maximum information with minimum use of action, time and cash. Mugenda and Mugenda (2013) explains clear research design as a specific, exact and inquisitive form in which the analyst does not have an immediate control of independent variable as their sign has just happened or in light of the fact that they typically can't be controlled. This research used descriptive research design for the purposes of seeking and illustrating factual characteristics of the population under study.

3.3 Target Population

Lavrakas (2008) defines a population as any finite or infinite collection of individual elements. On the other hand, Hyndman (2018) describes a population as the entire collection of ‘things’ in which we are interested. The target population for a review is the whole arrangement of units for which the overview information are to be utilized to make inductions.

Subsequently, it characterizes the set of units for which the discoveries of the overview are intended to sum up. Setting up study destinations is the initial phase in planning a study. Characterizing the objective population ought to be the subsequent advance. The target population for this study comprised of 43 licensed commercial banks in Kenya that have adopted the three variables under study i.e. mobile banking, internet banking and agency banking (KBA, 2018).

3.4 Sampling and Sampling Design

Sampling ensures that some elements of a population are selected as riding representative of the population. Purposive sampling was selected for the study. Purposive sampling is a non-probability sampling method that occurs when "elements selected for the sample are chosen by the judgment of the researcher. Researchers often believe that they can obtain a representative sample by using a sound judgment, which will result in saving time and (Williams, 2016). It was employed due to the heterogeneous nature of the population. The purposive sampling criteria was selected for the banks that had all the innovation components under study, i.e agency banking, mobile banking and internet banking. A sample size is defined as a subset of a population selected for measurement, observation or questioning, to provide statistical information about the population. (Boundless, 2016). A sample size of 15 Banks was selected from the target population of 43 banks to be put under study for the 5 year period 2014-2018.

3.4 Data instruments and Collection

This study used secondary information. Secondary information was gathered from budgetary explanations, annual bank reports, Kenya National Bureau of Statistics, and Central Bank of Kenya. The banks audited financial statements were used to extract information on the performance indicators while Bank supervision reports from CBK were used to get

information on the names of the licensed Commercial Banks with all the study variables. The study used secondary data for 5 years from 2014-2018 which was based on availability and accessibility of data. This data to be collected was specifically related to the amount of funds transacted using internet sources from commercial banks; the volume of transfers that commercial banks handled based on mobile banking technology and the deposits mobilized through agency banking transactions. This period selected for the study provided current data and also was considered since all the innovations under study in Information and Communication Technology were in place during that period.

3.5 Diagnostic Tests

A number of diagnostic tests were conducted to enable fitting the appropriate model to explain the relationship between the dependent variable and independent variables.

3.5.1 Normality Test

It was assumed that data should be normally distributed in a linear regression. The error term showed the factors that should be considered in the study but had been assumed by the researcher in developing the model. Shapiro-Wilk test was used in establishing the normality of data.

3.5.2 Multi collinearity test

Multi collinearity emerges when there is a relationship among the independent variables (Hair, 2010). The Variance Inflation Factor (VIF) was the most suitable criteria to test for multi collinearity, it showed a high relationship with the other autonomous variable that may prompt avoidance of the variable from the model to be fitted.

3.5.3 Heteroscedasticity Test

One of the diagnostic tests that will be carried out is heteroscedasticity. Heteroscedasticity test was used to test whether the error term was the same across the observations. Heteroscedasticity is a problem in regression assumes that all residuals are drawn from a population that has a constant variance. The test was conducted using the Breusch-Pagan test. Where the p-value is more than 0.05 then heteroscedasticity is not a problem but if the p-value is less than 0.05 then there are problems relating to heteroscedasticity which should be rectified. The condition was corrected by applying corrected standard errors.

3.6 Data Analysis Technique

The information was analyzed by use of descriptive statistics such as mean, median, frequencies and standard deviation. STATA was used in analysis. The study used panel data since the selected commercial banks for the study was studied over a period of 5 years. Panel data constituted both cross-sectional and time series data that pools both the features of cross-section and time series data for better deductions (Greene, 2018). Data was analyzed by using regression analysis with the help of STATA. Regression equation is specified as follows:

$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon$

Where;

Y is financial performance of firm i at time t

β0 constant parameter

β1-β3 other parameters to be estimated

X_{1it} –Mobile banking as measured by amount transacted through mobile by firm i at time t

X_{2it} –Internet banking as measured by amount of money transferred through internet by firm i at time t

X_3 –Agency banking as measured by amount transacted through Agents by firm i at time t

ε - Error term

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

Data analysis was done in the chapter. The findings are also presented in this chapter. Discussions on the findings are also included.

4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Y	75	4.031467	1.908693	1.09	10.92
X1	75	85.1584	102.9011	.46569	540.9767
X2	75	19.7019	23.59405	.213712	87.68445
X3	75	225.5598	1147.132	5.638098	9994.842

On the descriptive statistics, return on assets (Y) displayed a mean of 4.032 between 2014 and 2018 with a minimum of 1.09 and a maximum of 10.92%. Mobile banking (X1) shows a mean of 85.158 million shillings with a minimum of 0.466 million shillings and a maximum of 540.98 million for the period. Internet banking (X2) displayed a mean of 19.70 million shillings with a minimum of 0.214 million and a maximum of 87.68 million shillings. Agency banking (X3) displays a mean of 225.56 million shillings with a minimum of 5.638 million and a maximum of 9994.842 million shillings. Mobile banking, internet banking and agency banking displayed high levels of standard deviation with agency banking showing the highest variation.

4.3 Diagnostic Tests

Table 4.2: Tests of Normality

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
Y	75	0.92269	5.034	3.528	0.00021
X1	75	0.76561	15.261	5.950	0.00000
X2	75	0.77200	14.845	5.889	0.00000
X3	75	0.13899	56.058	8.790	0.00000

The study sought to test for normality of the data used in the research. This was done using Shapiro-Wilk test. From the findings, all the variables display a p-value which is less than 0.05, hence the null hypothesis is rejected. This means that the data for the variables were not normally distributed.

Table 4.3: Multicollinearity Test

Variable	VIF	1/VIF
X2	1.43	0.699301
X1	1.22	0.819672
X3	1.07	0.934579
Mean VIF	1.24	

Multicollinearity was tested for the data used in the research. This was done using the variance inflation factor (VIF) which quantifies how much the variance is inflated. The findings indicate that the VIF values were close to 1 indicating that the variance of the variables was inflated at a very low level. The analysis exhibits signs of multicollinearity though low levels. This is shown by the low mean VIF value.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of Y

         chi2(1)      =     2.60
         Prob > chi2  =   0.1070
```

Figure 4.1: Heteroscedasticity

The study sought to establish whether the variance of the error term was constant or not. This was done using Breusch-Pagan test for heteroskedastic. From the findings, the chi-square value was small. The p value is also more than 0.05. This shows that heteroscedasticity was not a problem in the data.

4.4 Regression Analysis

Table 4.4: Model Summary and Anova

```
Fixed-effects (within) regression               Number of obs      =        75
Group variable: Number                          Number of groups   =        15

R-sq:                                           Obs per group:
     within  = 0.6231                                         min =         5
     between = 0.7576                                         avg =       5.0
     overall = 0.4184                                         max =         5

                                                F(3,57)            =     10.45
corr(u_i, Xb)  = -0.8341                        Prob > F           =    0.0189
```

From figure 4.1, the model showed an absolute corr (u_i, Xb) value of 0.8341. The F-statistic of 10.45 is less than calculated F value (2.76). This shows that the fixed effect model fitted the data and was the best model to use in the regression. The model showed a significant value of 0.000 which was less than 0.05. This shows that mobile banking, internet banking and agency banking have a significant relationship with financial performance. The data showed that R squared (within) of 0.6231. This shows that a variation of 0.6231 on financial

performance is experienced by commercial banks due to changes in mobile banking, internet banking and agency banking at 5% significance level.

Table 4.5: Regression coefficients

Return on Assets	Coef.	Std. Err.	T	P>t
Mobile banking	.4756	.1615	2.9444	.023
Internet banking	.6551	.2076	3.1563	.014
Agency banking	.2872	.0824	3.4855	.006
_cons	.9736	.3182	3.0600	.017

The regression model was;

The regression model was;

$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon$

Where;

Yit is financial performance of firm i at time t, β0 is the constant, β_1, β_2, and β_3 are other parameters to be estimated, X_{1it} is mobile banking value of firm i at time t, X_2 is internet banking value of firm i at time t, X_3 is agency banking value of firm i at time t while ε is the error term.

The derived model was:

$Y_{it} = 0.97361 + 0.4756X_{1it} + 0.6551X_{2it} + 0.2872X_{3it}$

From the above regression equation, it was revealed that holding mobile banking, internet banking and agency banking between 2014 and 2018 to a constant zero, return of assets of

commercial banks would stand at 0.9736. Unit rise in mobile banking would increase return of assets of commercial banks by 0.4756, unit rise in internet banking would increase return of assets of commercial banks by 0.6551, while a unit increase in agency banking would increase return of assets of commercial banks by 0.2872. All the factors were found to significantly affect financial performance.

4.5 Discussion of Research Findings

From the descriptive analysis, the study found out that internet banking had the lowest mean of 19.7019, followed by mobile banking with a mean of 85.1584 and agency banking which had the largest mean value of 225.5598 implying that it had the largest effect on innovation in the Banking sector. The regression analysis findings showed that mobile banking, internet banking and agency banking have a significant relationship with financial performance as seen in the study carried out by Siam, (2016) on the effect of mobile banking in Bank profitability in Jordan where the correlation had a statistical significance on the profitability of commercial banks in Kenya.

Regression of coefficients results in table 4.5 shows that mobile banking has a positive and significant influence on return on assets of commercial banks (r=0.4756., p=0.023). It was also established that internet banking has a positive and significant influence on return on assets of commercial banks (r=0.6551, p=0.014). Finally, agency banking was found to have a positive and significant influence on return on assets of commercial banks (r=0.2872, p=0.006). Therefore, the overall regression results imply that there is a positive and significant relationship between technological innovation and financial performance of commercial banks. As such, an improvement in technological innovation would lead to a corresponding improvement in financial performance of commercial banks in Kenya.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents and discusses the key data findings from the study, draws conclusion from the findings, and makes appropriate recommendations. The conclusions and recommendations drawn were focused on addressing themajor objective of the study.

5.2 Summary of the findings

From the descriptive statistics, commercial banks in Kenya displayed an average return on assets of 4.032% for the period 2014-2018. From the model summary, between 2014 and 2018 there was variation of 62.31% on ROA due to changes in mobile banking, internet banking and agency banking at 5% significance level. The variation was high as the value of R squared was more than 0.5. The effect was found to be significant as the value of the p-value was less than the recommended 5%.

From the Anova table, the calculated F value was found to be greater than the critical F meaning that the model fitted the data. The influence of mobile banking, internet banking and agency banking on the changes in the return on assets existed and was significant for the period. From the regression coefficients, it was revealed that holding mobile banking, internet banking and agency banking to a constant zero between 2014 and 2015, return on assets of commercial banks in Kenya would be at 0.97361.

Mobile banking displayed a mean of 85.158 million shillings transacted between 2014 and 2018. Thus, implies that commercial banks in Kenya had an average of 85.158 million shillings transacted through mobile banking. From the regression equation, mobile banking displayed a positive regression coefficient against ROA. This means that an increase in the

number of customers using mobile banking would increase the ROA of commercial banks in Kenya.

Internet banking displayed a mean of 19.70 million shillings. This means that the average amount of money transacted by commercial banks through internet banking between 2014 and 2018 was 19.70 million shillings million shillings. Between 2014 and 2018, the minimum amount transacted through internet banking was 0.214 million shillings showing that commercial banks have digitized their services with Kenyans adopting internet banking. From the regression equation, internet banking displayed a positive significant coefficient against ROA of commercial banks. This means that an increase in internet banking transactions would increase the ROA of commercial banks within the period.

Agency banking displayed a mean of 225.56 million shillings. This indicate that between 2014 and 2018 the annual amount of money transacted through agents of commercial banks averaged at 225.56 million shillings. The amount is low given that agency banking has existed for a very long time. From the regression equation, agency banking displayed a significant positive regression coefficient against ROA. This means that an increase in amount transacted through agents would increase the ROA of commercial banks.

5.3 Conclusions

The study concludes that mobile banking, internet banking and agency banking affect financial performance of commercial banks in Kenya. The study concludes that mobile banking has been implemented in commercial banks. It has been highly adopted by the customers given the large number of mobile banking users. mobile banking significantly affects financial performance of commercial banks in Kenya. Mobile banking positively affects financial performance of commercial banks in Kenya. This means that an increase in mobile banking users increases the financial performance of commercial banks.

The study concludes that commercial banks have adopted internet banking where customers have highly accepted. Internet banking has a significant effect on financial performance of commercial banks in Kenya. Internet banking positively affects financial performance of commercial banks in Kenya. This means that an increase in the usage of internet banking improves the financial performance of commercial banks in Kenya.

The study concludes that commercial banks have adopted agency banking in their business strategy. Agency banking has a significant effect on financial performance of commercial banks in Kenya. Agency banking positively affects financial performance of commercial banks in Kenya. This means that an increase in agency banking improves the financial performance of commercial banks in Kenya.

5.4 Recommendations

Adoption of ICT enables banks to perform better. This is mostly achieved by innovations such as mobile banking, banking through internet, and agency banking. ICT innovations promote banks net profits and return on assets generally improving the financial performance of commercial banks. The research therefore recommends that the banks seeking to improve financial performance should embrace all the three modes of innovation under study i.e. agency banking, internet banking and mobile banking. The banks management should consider ICT usages through their organizational levels and try to expose the positive influences of ICT in their organizations.

The study also recommended the need for the banks to conduct cost benefit analyses in order to ensure that the goals of effecting such innovations are achieved. and that the policy makers should adopt strategic plans that add value or contribute positively to the economy through expansion of various bank sectors and are in line with the country's vision 2030.

The study engaged in looking at banks given the green light to operate agency banking, mobile banking and internet banking out of the 43 banks licensed to operate in Kenya. It is important to know why the majority of the banks are yet to take up the three variables and it is recommended that the remaining banks should endeavor to get the license to operate mostly agency banking. This will give a holistic view on the performance of the banking industry that is attributed to agency banking. Given that this is a new concept it is recommended that the regulator should have grater supervision on the activities carried out by the most banks.

5.5 Suggestions for Further Research

Based on the findings the study recommends a study on the effect of electronic banking on shareholders' value as a measure of performance. The researcher also recommends a similar study over a longer period of time for comparison of results. A similar study focusing on microfinance institutions is also recommended by the researcher.

The study recommends to other scholars to carry out a research to establish the effect of extreme technological innovations on other independent variables in the country, for example the researchers may undertake a research to establish the effect of advanced technological innovations on economic growth and economic development in the Banking sector to evaluate if the financial performance shall be positively or negatively affected.

The study also needs to undertake a research on the challenges faced by the banking sector when implementing the technological changes in their systems and areas of improvement that the regulator, banks and agents have to ensure greater financial inclusion.

The study recommends that similar research be conducted in rural areas so as to determine if agency banking, mobile banking and internet banking has in fact improved financial

inclusion especially for the unbanked. This will aid in understanding the extent to which agency banking has improved the overall performance of commercial banks.

Based on the findings, the study also recommends provision of sufficient information to agency customers to make informed decisions regarding borrowings and investments.

5.6 Limitations of the study

The study posed several challenges while being conducted majority of which were surpass but the key challenge that was to affect the outcome of the study is mentioned hereunder. The duration in which agency banking has been in operation is rather short since its inception in the year 2014 and there wasn't much agency banking activity that has been seen over the years to form a trend.

The study was based on 5-year study period of 2014 to 2018. This means that the findings may differ with others done over a different period. When accessing the data there was a high level of bureaucracy which increased time in data collection. This was overcome by having an introduction letter from the university.

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APPENDICES

Appendix I: List of Commercial Banks in Kenya: 2014-2018

1. Kenya Commercial Bank Ltd
2. Co-operative Bank of Kenya Ltd
3. Commercial Bank of Africa
4. Diamond Trust Bank Kenya Ltd
5. Equity Bank Ltd.
6. Family Bank Ltd.
7. NIC Bank Ltd
8. Sidian Bank
9. Citi Bank Ltd
10. Consolidated Bank
11. Standard Charted Bank
12. I & M Bank
13. African Banking Corporation
14. Barclay Bank of Kenya
15. Eco bank

Appendix II: Data Collection Schedule

Year	Return on assets (%)	Amount of money transferred through mobile banking users	Value of money transferred through internet (Kshs.)	Amount transacted through agents (Kshs.)
2014				
2015				
2016				
2017				
2018				

Appendix III: Data

Bank	Year	Return on assets	Amounts transacted through Mobile banking	Money transferred through internet	Amount transacted through agents
		(%)	Kshs. million	Kshs. Million	Kshs. Million
Kenya Commercial Bank Ltd	2014	5.93	177.4126	64.5547	18.8153
	2015	5.01	210.6470	68.5351	43.4072
	2016	5.64	250.9652	73.8629	78.4455
	2017	4.94	272.1615	79.6353	134.5523
	2018	3.6	298.0349	87.6844	169.7191
Co-operative Bank of Kenya Ltd	2014	4.43	116.4693	42.3794	44.6528
	2015	4.14	138.2874	44.9925	51.1065
	2016	5.15	164.7558	48.4902	61.2462
	2017	3.1	178.6709	52.2797	91.3920
	2018	3.3	195.6565	57.5638	105.9815
Commercial Bank of Africa	2014	10.66	21.0234	1.2480	132.7010
	2015	2.57	22.2094	1.5270	220.5820
	2016	3.14	23.1840	1.5270	257.8260
	2017	3.6	22.3780	2.1443	301.6910
	2018	3.1	23.3985	2.3644	343.8200
Diamond Trust Bank Kenya Ltd	2014	4.47	0.4657	0.2137	120.0010
	2015	3.69	0.8950	0.2267	202.3270
	2016	3.64	0.9718	0.2267	280.7190
	2017	3.05	1.1256	0.4657	341.5290
	2018	2.9	1.4815	0.5013	398.9110
Equity Bank Ltd.	2014	7.26	19.2994	10.9203	9994.8420
	2015	6.56	46.7991	16.3605	14.8770
	2016	6	251.6603	16.3605	20.7520
	2017	5.68	321.2784	19.2994	28.6090
	2018	5.23	349.0199	28.8179	38.0690
Family Bank Ltd.	2014	4.24	12.5673	3.5093	53.3910
	2015	3.55	16.8466	3.9822	89.7540
	2016	2.91	21.3478	3.9822	109.1810
	2017	1.99	27.9773	5.1266	149.2810
	2018	2.78	34.5783	6.9784	197.6290
NIC Bank Ltd	2014	4.44	10.9650	2.2530	109.8930
	2015	3.99	14.7490	2.6328	171.1410
	2016	3.66	23.4681	2.6328	190.1990
	2017	2.94	35.9564	3.0544	248.1350
	2018	2.56	37.8346	3.6983	27.6800
Sidian Bank	2014	2.33	7.4530	3.3797	13.2180

	2015	2.07	8.9643	4.2977	22.8190
	2016	1.43	10.3746	4.2977	23.4820
	2017	2.06	15.8395	6.3287	29.0170
	2018	10.92	24.7956	7.2046	38.9270
Citi Bank Ltd	2014	5.22	13.9644	3.3775	71.5340
	2015	6.33	16.5638	3.9028	108.0090
	2016	5.84	17.4833	3.9028	146.8920
	2017	6.49	24.5629	5.5027	168.0910
	2018	6.24	31.9463	6.2451	191.4100
Consolidated Bank	2014	1.82	11.0474	1.7068	10.6270
	2015	3.35	1.7957	2.1342	14.0720
	2016	1.99	25.9564	2.1342	15.8290
	2017	3.26	36.3795	2.5021	18.0190
	2018	1.98	49.8366	3.1409	20.1680
Standard Charted Bank	2014	6.42	106.9893	38.9299	5.6381
	2015	3.83	127.0314	41.3304	12.7057
	2016	5.11	151.3454	44.5433	18.2219
	2017	3.34	164.1279	48.0243	24.4468
	2018	2.81	179.7310	52.8784	29.0183
I & M Bank	2014	5.64	16.8796	1.6328	10.6270
	2015	5.66	21.7849	2.9873	16.6200
	2016	5.27	28.5647	2.9873	187.4710
	2017	4.09	36.8746	3.6519	20.4030
	2018	5.11	540.9767	3.9097	233.8200
African Banking Corporation	2014	1.49	7.4984	2.2786	16.3280
	2015	1.61	9.9376	2.6122	19.3960
	2016	1.23	12.5986	2.6122	23.5810
	2017	2.82	15.8474	2.8649	26.7190
	2018	1.22	23.6596	3.4670	31.0920
Barclays Bank of Kenya	2014	5.44	113.7607	41.3939	16.6493
	2015	5.01	135.0714	43.9462	27.5531
	2016	4.02	160.9243	47.3625	35.6220
	2017	3.68	174.5158	51.0639	39.7094
	2018	3.19	191.1063	56.2251	42.0372
CFC Stanbic	2014	1.09	77.1948	28.0887	44.4340
	2015	2.18	91.6556	29.8206	55.0269
	2016	6.13	109.1986	32.1388	78.1399
	2017	2.68	118.4214	34.6505	81.4334
	2018	2.11	129.6793	38.1528	85.3178