

**TECHNOLOGICAL INNOVATIONS AND FINANCIAL PERFORMANCE
OF COMMERCIAL BANKS IN NAKURU COUNTY, KENYA**

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ABSTRACT

The advent of new technology was expected to lead to an improvement in the operations of the financial sector in Kenya. However, as a result of this new technology, the commercial banks are faced with new challenges that have led to a realization of mixed effects on performance. With empirical findings on the effect of technological innovations on financial performance continuing to reveal mixed findings, there was a need to establish the effect of technological innovations on financial performance of commercial banks. The specific objectives of this study were to establish the effect of mobile banking, agency banking and ATM/Credit cards on financial performance of commercial banks in Nakuru. The study also sought to establish the moderating effect of quality of internet on the relationship between technological innovations and financial performance. The study was hinged on the Agency banking theory, Rogers Diffusion of innovation theory and the Bank focused theory. An explanatory research design was adopted for the study. Data was collected using a questionnaire and analyzed using descriptive and inferential statistics. A multiple linear regression model was adopted for analysis and all tests were conducted at 5% level of significance. The study findings indicated that mobile banking has a positive but not significant relationship with the financial performance of Commercial Banks in Nakuru County; agency banking has a positive significant relationship with the financial performance of Commercial Banks in Nakuru County; ATM / Credit cards have a positive significant relationship with financial performance of Commercial Banks in Nakuru County while the quality of Internet does not moderate the relationship between technological innovation and financial performance of Commercial Banks. The findings imply that an improvement in technological innovations significantly improves financial performance of commercial banks. The study recommends commercial banks to readily provide saving financial services and deposit financial services, insurance financial services, avail bill Payment services on mobile phones, increase the savings amounts and encourage ATM cards use since it increases the commission fee based income.

INTRODUCTION

Background of the Study

It is important to recognize the crucial role of the commercial banks in shaping the economy in terms of resource allocation. These banks significantly enable the flow of finances in a cycle that covers savers and investors unceasingly. The commercial banks have a number of functions that extend beyond the basic function of financial intermediation all of which define the growth rhythm of the specific country (Arnaboldi & Claeys, 2008). A sound performance of the banks in terms of financial performance gives back better returns for investors' money that leads to increased investment and eventually a faster rate of economic growth. The opposite of this sound financial performance findings in banking failure as well as unprecedented financial crisis due to reduced financial performance all which have severe consequences on economic growth (Ongore & Kusa, 2013).

In today's global and dynamic financial sector, innovation of financial products and services such as ATMs, Internet banking, credit cards, online banking and agency banking are becoming more and more relevant. In Kenya the use of these innovations have revolutionized its financial sector and their application is taking place at an overwhelmingly fast pace. Indications of the CBK informs that the mean count of ATMs increased from 166 in 2001 to 2091 in 2010 while there was an increase of debit cards from 160,000 in 2001 to an excess of six million cards for the period culminating 2010 as mobile banking registered an upsurge from an annual figure of 48,000 recorded in 2007 to a figure exceeding 250,000 per annum in 2010 in terms of customer transactions (CBK, 2016).

There was also a significant rate of growth in terms of performance of the commercial banks for the period 2001-2010 registering an increase from KShs 2.7 billion to KShs 74 billion. According to CBK (2011) report, there was also a commendable rise in total income for the same duration from KShs 61 billion to KShs 178 billion as total assets registered a growth from KShs 425 billion to KShs 1.7 trillion. In developed economies numerous researches has been done on the influence of performance founded on the productivity of banks that extend the use of electronic banking services (CBK, 2016).

Weigelt and Sarkar (2012) found that general profitability of the banks that are based in the USA and European countries make advanced technology essential in using electronic banking applications. Accordingly, a positive and significant connection can be established between internet banking and competition enhancement for firms in the banking sector as well as performance of the individual banks.

Financial Performance

Trivedi (2010) describes firm performance as an organization's ability to achieve its goals effectively and efficiently with available resources. Performance is the record of results achieved on a given action during a given period of time. According to Ahmed and Duellman (2011), there are various ranges of organizational performance from monetary, market as well as shareholder returns. He argues that some of the monetary performance indicators are profits of an organization and the returns on assets, equity as well as investments.

According to Toutou and Xiaodong (2011), financial performance can be construed as an overall measure of how well a bank produces incomes from its capital. This measure also captures the

general financial health of the bank for a specific duration. Bank's stability as well as profitability accordingly define its financial performance. The former indicator of financial performance refers to the bank's risk factors while the latter refers to its financial return. The financial performance can be a significant element in determining net income, and is also important in evaluating the financial risk of the firm (Blake, 2013).

The extent to which the financial objectives of the bank are met is what actually connotes the bank's financial performance (Trivedi, 2010). It captures the effectiveness of value generation for the owners of the bank and can be presented in several measures such as net profit, ROA, ROE, EPS and can also be calculated and presented in any universally acceptable market value ratio. Further, a blend of financial ratios breakdown, benchmarking, and computing performance against budget have all been used to capture financial performance (Ahmed & Duellman, 2011). Profitability ratios, liquidity ratios, solvency ratios, as well as efficiency ratios are the most frequently used financial performance measurement ratios.

Technological Innovations

According to Frame and White (2014), this comprises of the strategy, establishment and execution of an effective creative financial tools as well as financial processes for effective design of innovative solutions to the challenges plaguing financial sector. There are numerous reasons that can account for development of financial innovations in the financial sector. These reasons according to Gorton and Metrick (2010) include lessening of bankruptcy costs, leveraging on tax advantages, and decrease in moral hazard, supervisory costs, transparency and customization.

Most commercial banks in the developing economies are adopting internet banking which has made it possible for customers to easily transfer money, gain access to their bank accounts, be able to conduct online shopping, obtain bank statement, settle their bills, as well as carrying out other necessary transactions that were not easy to accomplish within a short period of time previously. Implementation of ICT has enhanced variations that can be associated to saving costs, efficacy as well as suitability to clients (Muyoka, 2014). Banks have engaged themselves in the process of placement of information, communications and technology based banking facilities including ATM, the use of internet banking, application of mobile banking solutions, POS terminals, electronic financial accounting and reporting, HR solution (Juma, 2012). Ongori and Migiro (2010) contend that ICT has resulted to a more complete paradigm shift regarding the financial performance of firms and on the customer service provision.

In Kenya online banking is a recent innovation which started back in 2008 (CBK, 2009). The first bank in Kenya to offer online banking was I&M bank who were granted the charter to offer E-Commerce Internet system banking in the East African region in the year 2008 (I&M News, 2008). Since then several banks have adopted the online banking which is mostly targeting the people living in the Diaspora. Currently Kenya has over 30 banks offering internet banking all which are members of the Society of Interbank Financial Telecommunication (SWIFT) and Kenya Exchange Service Bureau (KENEX) (CBK, 2011). According to Makur (2014), commercial banks in Kenya have continuously been innovating new products, services and governance in order to improve their financial performance. Some of these products are debit cards, credit cards, ATM cards, M-pesa and others which facilitate the use of electronic means of payment and sometimes substitute for the use of physical cash.

Technological Innovations and Financial Performance

Muiruri (2015) posit that by applying internet banking, there is a significant improvement of accuracy in addition to effectiveness, consistency as well as swiftness of banks that gives these institutions a vital competitive advantage. The study posits that introduction of agent banking has ultimately led to the improvement in the count of transactions carried out in one day by the banks leading to a reduction in transaction charges. The agent banks channels have equally led to the customers gaining access to the financial services especially for the rural lot besides enhancing a healthy competition among the banks in the financial sector. The conclusion of this study has it that the numerous financial platforms that have resulted from technology improvement such as credit cards, internet banking, agent banking and mobile banking in Kenya has significantly influenced financial performance of the commercial banks in the country.

According to Mutevu (2015) there is a positive influence of M- Banking on transfers, expenditures, payments and drawings in financial transactions of small businesses ultimately leading to the conclusion that mobile banking reduces transactions cost, is sufficiently consistent in addition to being a straightforward way of carrying out business transactions and decreases cases of human error.

Ngumi (2014) argues that Mobile banking has enhanced customer transaction value besides lowering the overall costs of attending to the customers who may not be having bigger income bases thus greatly enhancing the financial performance of the banks. It is also important to note that there is a substantial enhancement in financial performance for the period of adoption of internet banking as opposed to the period when there is no internet banking when a comparison is made between the two different phases.

Commercial Banks in Kenya

In total forty three licensed commercial banks in addition to one mortgage finance company exist in the country. 31 out of the 44 institutions fall under the locally owned category while the remaining 13 are categorized as foreign owned. The first category is made up of 3 commercial banks that have their significant shareholding by the Government as well as several other State Corporations, 27 commercial banks as well as a single mortgage finance institution to make up the total figure of 44 financial institutions in the country (CBK, 2016).

A few large commercial banks typically foreign-owned control the banking industry, with others also partly owned locally (CBK annual report, 2015). Out of the major commercial banks, 6 are listed in NSE. The Companies Act of Kenya typically controls the activities of the banking industry apart from other Acts such as the Banking Act, the Central Bank of Kenya Act together with separate practical procedures issued by CBK. The guidelines as well as principles that direct the whole banking industry lies in lifting the controls towards the administration and impartial services (PWC, 2008). Through the manipulation of funds by financial intermediation by the commercial banks, they therefore act as custodians of depositor's funds that they obtain and forward to needy cases at the fixed rate of interest on the funds that have been loaned out. The loans that are being advanced are primarily based on the banks existing credit policy which is closely harmonized with the central bank interest rate policy. It is this policy on credit by the bank and how it goes about implementing it that informs and defines the level of financial risk in a specific bank (CBK, 2010).

Statement of the Problem

Commercial banks continue to face challenges in their operations. Even with the advent of new technology in the banking sector, new challenges have emerged as a result of this new development (Madiavale, 2011). Even though adoption of new technology has been seconded as a boost of the performance of commercial banks, it has come with its own challenges. Otoo (2013) argued that technological innovation in the sector exposes commercial banks to operational challenges like cybercrime and other internet related frauds including identity thefts. The impact of such crimes is detailed as opportunity costs and losses by the commercial banks and individuals. Expenditures to curb these risks increase operational costs which affects financial performance negatively. Otoo (2013) state that Kenyan commercial banks have seen a triple increase in cyber-crimes and credit related crimes with increase in financial innovations by the year 2010.

PWC (2011) report indicate that there has been an increase in IT related frauds in commercial banks whereby for instance in the year 2011, technology related frauds increased by 9% from what was experienced in the year 2009. BFIU (2013) report on the other hand indicated an increase in electronic crimes to around 34%. These technology-related frauds affect the performance of commercial banks. The effect of technological innovations on financial performance of commercial banks hence remains inconclusive. Grossman (2010) linked the collapse of the Royal British bank and City of Glasgow bank as well as the Barings bank to technology-related frauds. Other scholars record mixed results on the effect of technological innovations on performance of commercial banks. Franscesa and Claeys (2010) and Pooja and Singh (2009) argue that technological innovations only has a minimal impact on banks' financial performance. This contradicts Batiz-Lazo and Woldeesenbet (2006) who found a significant contribution of technological innovations to improved financial performance. Llewellyn (2009) on the other hand, blames technological innovations for breeding financial crisis. Boot & Marinč (2010) found that both dark and bright side of technological innovations. This inconsistent result motivated this study to focus on the theme.

The study is also motivated by existing knowledge gaps in the area. Malhotra and Singh (2009) focused on the effect of technological innovations on financial performance of commercial banks in Pakistan, Arnaboldi and Claeys (2008) focused on the effect of technological innovations on financial performance of commercial banks in the USA while Nader (2011) links technological innovations to better performance in the UK. These studies have focused on developed economies and there was a need to conduct a local study since technological innovations research in Kenya is still a growing phenomenon. The study hence sought to examine the relationship between technology and financial performance of commercial banks in Nakuru County, Kenya.

Objectives of the Study

The study was guided by both the general and specific objectives.

General Objective

The study's main objective was to determine the relationship between technological innovations and financial performance of commercial banks in Nakuru County, Kenya.

Specific Objectives

- i. To determine the effect of mobile banking on financial performance of commercial banks in Nakuru County, Kenya.
- ii. To establish the effect of agency banking on financial performance of commercial banks in Nakuru County, Kenya.
- iii. To determine the effect of ATM/Credit cards on financial performance of commercial banks in Nakuru County, Kenya.
- iv. To establish the moderating effect of quality of internet on the relationship between technological innovations and financial performance of commercial banks in Nakuru County, Kenya.

Research Hypothesis

- H₀₁ Mobile banking has no significant effect on financial performance of commercial banks in Nakuru County, Kenya.
- H₀₂ Agency banking has no significant effect on financial performance of commercial banks in Nakuru County, Kenya.
- H₀₃ ATM / Credit cards have no significant effect on financial performance of commercial banks in Nakuru County, Kenya.
- H₀₄ Internet quality has no significant moderating effect on the relationship between technological innovation and financial performance of commercial banks in Nakuru County, Kenya.

Significance of the Study

The study provides an in depth information to policy makers both at national and county government. The ministries of planning, finance, trade and investment can all benefit from the findings of the study when setting up policies and strategies related to investment and use of technology in the financial sector. Legal and regulatory framework was needed in order to curb fraud, theft and misuse of systems and the policy recommendations of the study can come in handy when policy makers are setting up systems safeguards.

The findings of the study can help financial institutions make better and informed investment decisions related to technological innovations. Investment in internet banking, mobile banking, electronic modes of payment and agency banking needs huge amount of resources. Financial institutions need to have deep analysis of the needs; priorities and relevance of these innovations. The study examined the relationship between these technological innovations and financial performance of commercial banks and thus its policy recommendations can help financial institutions in making better and timely decisions taking advantage of the strengths of these innovations while curbing and regulating their weaknesses.

There is a huge information gap on issues related to financial innovation and financial performance of commercial banks in Kenya. The use of technological innovation in the banking sector is a relatively new phenomenon in the country, therefore the findings of this study can significantly contribute to research and widen the knowledge base on the relationship between technological innovation and financial performance of commercial banks in Nakuru County and the country at large. The study findings can be a source of literature reference material to other researchers who would be interested in doing further research in the same area.

Limitations of the Study

The researcher encountered geographical limitation in collecting the research data. Nakuru County borders seven counties and has eleven constituencies and it covers an area of 7496.5 square kilometers however; the challenge was addressed by getting the service of research assistants to help in carrying out the research data from respondents in all parts of the county. Bankers operate on tight schedules; some respondents were not able to complete the questionnaire in good time and this may overstretch the data collection period. This was mitigated by having constant follow up on phone and physical visits to the respondents' offices by using research assistants.

Scope of the Study

The contextual scope of this study was the commercial banks operating in Nakuru County. The choice of the banking sector was informed by the significance of the sector in the Kenyan economy. Commercial banks are at the forefront of financial innovations. Banks have over the years developed new products and services and they include ATMs, debit cards, RTGS, EFT, internet banking and mobile banking, therefore the study examined the effects of technological innovation on the financial performance of commercial banks in Nakuru County. To achieve this, a cross section of employees was administered with questionnaires for data collection. The employees targeted were from different departments and levels of management in commercial banks operating in Nakuru County. The content scope was the relationship between technological innovations (mobile banking, agency banking and ATM/Credit cards) and financial performance of commercial banks in Nakuru County, Kenya with the moderating effect of quality of internet. The time scope was the year 2017 to 2018.

Organization of the Study

This proposal was organized into three chapters. Chapter one of the study covered the research background, problem statement, research objectives, research questions, significance of the study, scope, limitations and organization of the study. Chapter Two covered empirical and theoretical literature review of the key related concepts and theories, empirical review of the research objectives, presents the conceptual framework for the study, summary and knowledge gap. Chapter three presented the research design, target population, sampling technique and sample size, data collection procedure, research instruments, pilot study, reliability and validity tests, empirical model, data analysis, and ethical consideration. Chapter four presented the findings and discussions while chapter five presented study conclusion, recommendations for policy and further studies.

LITERATURE REVIEW

Introduction

The chapter presented the theoretical framework of the study by analyzing the available and related literature on the study. Related theories discussed included Agency theory, bank-focused model and Rogers Innovation Diffusion Theory. The chapter also presented Empirical literature both local and international related to the study variables and the objectives which are stated in chapter one. Finally the conceptual framework summarized the relationship among key variables and then Summary of Literature Review and Knowledge Gap to be filled.

Theoretical Literature

This theory was put forward by Jensen and Meckling (1976) while carrying out a research on the theory of the firm. They were specifically focusing on decision-making conduct, agency costs as well as proprietorship structure. Two divergent relationships of agency were fostered by the theory, one that is inclined to the shareholders and managers and the other between shareholders and investors lenders (Cardone-Riportella & Cazorla-Papis, 2001; Abor & Biekpe, 2009).

According to Cardone-Riportella and Cazorla-Papis, (2001) due to the information disproportionateness as well as the cases of conflicting interests among the different agents concerned, there arises struggles and agency costs that is deemed inevitable. The principal-agent theory involves two major concerns of moral hazard as well as adverse selection. The former denotes absence of effort demonstrated by the agent, as it is almost difficult for the principal to monitor entire actions carried out by the agent (Gauld, 2007). On the other hand, the latter denotes the distortion of capability demonstrated by the agent to the principal. Accordingly, the agent makes a statement that they have in possession certain skills as well as abilities during the time they are being hired for the job or to perform the contract. In this case as can be reasoned the principal is not in a good position to fully confirm existence of the supposed set of skills or abilities either during selection or during the time when the agent is carrying out the contract (Krasauskaite, 2011).

In commercial banking, agency problems can come into effect from three main causes: first fractional ownership of a bank by people who are both owners and managers who consequently may act in their own way that is not the utility-maximizing tendencies of owners alone; second, the existence of government-enabled payment cover programs unable to differentially price insurance handling to replicate risk coverage of specific banking firm and may choose to postpone acknowledgement of insolvency, leading to moral hazard since the management of the firm and stockholders may elect to go for high-risk investments making the effort to handover wealth from depositors to shareholders; and third, the presence of informational unevenness in which case owners and managers have varied information (Gichungu, 2015).

In this study the agency theory will help us explain and understand better the relationship between shareholders, managers and lenders and themes in principal-agent arrangements: moral hazard, adverse selection and agency costs when examining the influence of the independent variable of the study on the dependent variable.

Rogers Diffusion of Innovation Theory

The theory was proposed by Rogers (1962). The theory argues that the degree to which electronic commerce technology integrates into the firm's processes has been closely examined by diffusion studies (Al-Qirim, 2005). The studies are founded on the explanation of an innovation as an idea, practice, or object, seen as innovative by a person or an organization (Rogers, 2003). The theory makes an attempt to demystify the whole process of adoption of innovative ideas through a series of five elements of innovation that directly impact on adoption which are relative advantage, compatibility, complexity, trialability as well as observability. Compatibility can be construed as the extent to which a service seems to be reliable on the basis of the users' present morals, beliefs, and behaviors in addition to their current and earlier experiences (Chen *et al.*, 2004). Observability can be construed as the degree to which an innovation is physically visible to the members of a social system (Rogers, 2003). Complexity can also be understood as the extent to which an innovation is deemed challenging to

comprehend and apply (Rogers,2003),while trialability can be construed as the degree to which the innovation can be experienced before its actual adoption.

Sevcik (2004), argues that despite the aspect of quality of innovations, some may end up not being adopted and equally time factor also means that some of the innovations may yet not be immediately adopted. Consequently, financial institutions are supposed to know some of the features of adopter categories in addition to knowing that demonstrating opposition to change can be a huge limitation to circulation of revolutions immediate to mobile as well as internet banking. A new technology is adopted depending on whether there is relative advantage as seen by the user over preceding technology. In light of ICT adoption, advantages of immediacy, suitability and affordability to customers can be confirmed. According to Roberts and Amit, (2003), the assumption generally held is that if customers notice discrete rewards obtainable by ICT, they develop a tendency to try to adopt the technology.

The theory is relevant to the study since it has been used to elaborate the manner in which innovative ideas are embraced, through the discussed five attributes of an innovation that impact on adoption that it suggests. The theory is pertinent to the study as it sheds light on the effects of mobile banking on the financial performance of commercial banks in Nakuru County, Kenya. Other scholars such as Hernandez and Mazzon (2006) and Ngumi (2014) have also used the theory to explain the adoption of technology and its effect on firm performance.

2.2.3 Bank Focused Theory

The theory was proposed by Kapoor (2010). It comes into effect as a traditional bank adopts modern reduced-cost distribution channels in offering banking amenities to its current clients. For instance, the use of non-traditional ATMs, internet banking or m-phone banking to offer certain restricted banking services to its customers. The model is a form of conservative branch-based banking and therefore construed as additive in nature.

While the bank-focused model does provide several benefits that include more control and marking perceptibility of the relevant firm, the model still faces several challenges. Of primary interest to the customers is the quality of experience, safety of identity as well as transactions, consistency in addition to convenience of service also extends to the degree of personalization that is allowed. Banks tackle these concerns by creating and making available a branchless banking service that has an easy to use interface, whose safety is attained through multi-factor verification in addition to other technology, able to operate for a constant period of one year (Kapoor, 2010). Accordingly, the model does offer a stage for banks to exploit the advantages that result from embracing know-how that include ATM in progressing financial services.

The theory is relevant to the study since it places a great emphasis on uses of modern reduced-cost distribution channels by non-modern banks in extending their banking services current customers. For instance, the use of non-traditional ATMs, internet banking or m-phone banking to offer certain restricted banking services to its customers. In this study the theory will help us get a strong historical background when researching on the effects of Automatic Teller Machines (ATMS) on the financial performance of commercial banks in Nakuru County.

Empirical Literature

The section presents the empirical literature review conducted per study variable.

Mobile Banking

Hassan, Mammanand Farouk (2013) examined e-banking tools and performance of deposit money banks in Nigeria. Secondary data of 6 banks for the period 2006- 2011 was used in the study and established that embracing electronic banking products significantly influenced bank performance with the contrary side holding that e-direct and SMS alert do not significantly influence the performance of the banks.

Ngumi (2014) established a statistically significant influence of financial innovations when presented on income, ROA and profitability in addition to customer deposits of commercial banks. Accordingly, improved employment of personnel and the assets of the organization, augmented revenues and improved gain of access to financial facilities by the entire population have all resulted from better use of IT products. Kamau (2013) agrees with this sentiment that in a short period from 2007 to 2011, when mobile phone money transfer facilities have been available in Kenya; four mobile phone operators are now available that are offering money transfer services to over 15.4 million customers, this being made possible by deployment of over 39,449 agents. The number of financial transfer transactions in the year 2010 resulted to close to Ksh.2.45 billion daily which is about Ksh.76 billion a month subsequently leading to lesser transaction costs not forgetting the improved ease of accessing financial services. This portrays a precisely more useful market for electronic money transfers (Kamau, 2013).

Chibueze (2013) examined e-banking and bank performance in Nigeria. The study made use of secondary data of 4 banks that kept their product names and continue to be quoted in the Nigeria stock exchange. The outcomes of the study indicated that electronic banking and ROE are positively and significantly related for the Nigerian banks, despite it not significantly improving ROA of the Nigerian banks. In addition, Meihami, Varmaghani and Meihami (2013) analyzed the effect e-banking on productivity of banks by applying descriptive statistics as well as inferential statistics of correlation analysis and regression. The study found a positive relationship between e-banking and bank performance.

Malhotra and Singh (2009) examined the influence of internet banking on bank performance and risk whereby they established that on average the banks that make use of the internet more often in their transactions are associated with large size, increase in firm profitability, with significantly impressive efficiency in operation. Similarly, the findings of the study indicated that banks that have adopted internet banking notably have higher asset quality with improved management that lessens the expenditures. However, for smaller banks using internet banking technology, their profitability has been adversely affected.

Agency Banking

Aduda and Kingoo (2012) investigated the connection between e-banking and financial performance among commercial banks in Kenya. By adopting ROA to measure financial performance, investment in e-banking, the count of automated teller machines as well as the count of debit cards allotted to businesses as proxy for e-banking, the findings brought forth a positive relationship between e-banking and bank performance

ATM/Credit cards

According to a study by Koechand Makori (2014) on the effects of innovation orientation on financial Performance of Commercial Banks, they found out that higher profitability results from technology innovation. Permanent expenditures in technology revolution exist that enhances

non-interest income. This study is in tandem with the findings of another study by Gichungu and Oloko (2015) on the association between Bank Innovations and Financial Performance whereby they established that online banking, agency banking, mobile banking and automated teller machine have a positive impact on financial performance of commercial banks.

Moderating Effect of Quality of Internet

A study by Cherotich, Sang, Shisia and Mutung'u (2015) while examining the effect of financial innovations on performance of commercial banks established that financial revolutions in the country's banking sector positively affect financial performance of commercial banks. The study posits that financial revolutions have a substantial influence on the productivity of the commercial banks that also impacts on their competitive advantage. However, among the challenges facing adoption of technology in banks is the network coverage.

Summary literature and knowledge gap to be filled

The chapter will review extensively both empirical and theoretical literature related to technological innovations in the financial sector and its effects on the financial performance of commercial banks in Kenya. These innovations in the financial sector are relatively new in Kenya. Based on the review of literature, several research gaps have been identified. The research gap reveals that concepts, theories, and empirical studies turn out to be largely developed from outside Kenya. Therefore, this study sought to fill this research gap by investigating the effects of technological innovations on the financial performance of commercial banks in the Kenyan context in order to provide more vital information and knowledge on the subject. The variables that were examined in the study are agency banking, mobile banking, ATM and credit cards.

Table 2.1 Summary of Knowledge Gaps

Author	Focus and objective of the study	Methodology	Findings	Knowledge Gap
Nader (2011)	Effect of innovation on the profit efficiency of the Commercial banks in Saudi Arabia	Panel data analysis using Secondary Data	Financial innovation improves the profit efficiency of the Commercial	Contextual gap because it was conducted in Saudi Arabia Methodological gap because it used secondary data
Mabrouk and Mamoghli (2010)	Dynamics of Financial Innovation and Performance of Banking Firms	Explanatory Research Panel data analysis using Secondary Data	Financial innovation has led to an improvement in performance of commercial banks	Contextual knowledge gaps because it was conducted in USA Methodological gap because it used secondary data
Tarazi	Effect of agency banking	Content	The variety of services	

Author	Focus and objective of the study	Methodology	Findings	Knowledge Gap
(2010)	model technology on financial performance of commercial banks	analysis using qualitative data from Interview guide	provided by the agents enable them to produce transaction volume that lead to an improvement in bank performance	Conceptual knowledge gap because it focused on agency banking model only Methodological knowledge gap because it used qualitative data
Kithuka (2012)	Effect of money transfer technology on performance of commercial banks	OLS regression using Primary data (Questionnaires)	The money transfer technology in terms of agency banking has a significant effect on performance	Contextual knowledge gap because it focused on a developed economy outside Kenya Conceptual knowledge gap because it focused on money transfer technology only
Hassan, Mamman and Farouk (2013)	E-banking tools and performance of deposit money banks in Nigeria.	Panel data analysis using Secondary data	The use of e-banking has enhanced deposit collection and improved performance	Contextual Conceptual Methodological
Chibueze (2013)	E-banking and bank performance of commercial banks in Nigeria.	Panel data analysis using secondary data	The use of e-banking has enhanced deposit collection and improved performance	Contextual knowledge gap because it focused on Nigeria Conceptual knowledge gap because it focused on e-banking technology
Malhotra and Singh (2009)	Influence of internet banking on bank performance	Panel data analysis using secondary data	Use of internet banking is associated with an increase in profitability	Conceptual knowledge gap because it focused on internet banking only

Source: Researcher Compilation from Empirical Literature

RESEARCH METHODOLOGY

Introduction

This chapter presented the research design adopted, target population, research data collection instruments and procedures, empirical model, data analysis and presentation as well as ethical considerations. The section generally presents the methodology used to achieve the research objectives from the time of data collection to analysis and presentation of the findings.

Research Design

This is considered to be conceptual structure that portrays an accurate profile of the study (Cooper & Schindler, 2008). This structure constitutes what Kothari (2010) generally construes as an outline for obtaining, determining and examining data covering the study parameter relative to the specific features of a certain phenomenon of the independent as well as explanatory variables. The study used explanatory research design, influenced by the adopted research paradigm, concurring with the general and specific objectives of the study. According to Creswell and Plano (2011) explanatory studies enable researchers to establish a cause effect relationship between variables.

Target Population

Can be defined as the entire group of persons, occasions or objects that share the same physical features upon which the study can generalize results of the study (Mugenda & Mugenda, 2003). As of 31st December 2016 there were 40 Commercial Banks in Kenya (CBK, 2016). There are 26 banks that have branches in Nakuru County at the time of the study. The study conducted a census which involves considering the entire population. Census denotes studying the entire population whereby all the elements of the population are examined especially when the population is relatively small rendering it worthless to select a sample as a representative of the population. Mugenda and Mugenda (2009) support adoption of a census when the population is less than 200. The respondents were the operations, marketing, finance and branch managers of those respective banks. The researcher assumed that these respondents had sufficient knowledge of the bank's financial performance and use of technological innovations.

Table 3.1: Target Population

Strata	Population Size
Branch Managers	26
Operations Managers	26
Marketing Managers	26
Finance Managers	26
Total	104

Source: Researcher (2018)

Data Collection Instrument

Primary data was used for the purposes of analysis in this study. These data was collected by the use of semi structured questionnaire with both open as well as closed-ended questions. A questionnaire can be understood as a paper or sheet of papers comprising of several questions that are in print and ordered systematically to create a set of coherent forms (Mugenda & Mugenda, 2003). Saunders, Lewis and Thornhill (2009) also agree that the sole use of questionnaires is in carrying out descriptive or explanatory research. Five point Likert scale items was used because they are easily understood by respondents and the responses are easily quantifiable for computation purposes (Saldana, 2011).The questionnaire was designed to have five sections, the first part included general questions on the respondents personal and business information while the other four parts had questions on each of the three independent variables (mobile banking, agency banking and ATM / Credit cards) and the dependent variable(network and mobile phone subscriptions).

Data Collection Procedure

The researcher sought a letter of introduction from Kenyatta University as well as a research permit from National Council for Science, Technology and Innovation after which request letters were sent to the sampled respondents (banks) to be granted admission to conduct research in the institution. This study made use of questionnaires in obtaining primary data. The choice of this tool was based on the fact that questionnaires are less expensive to manage, besides giving each respondent the chance and freedom to fill them at their own convenience.

Primary data can be construed as that obtained afresh in addition to being obtained for the first time, which implies that the information obtained is strictly original (Kothari, 2004). The questionnaires were administered using a drop-and-pick method after which they were picked after a fortnight. To effectively collect the data, the researcher employed the services of three research assistants (RAs) and they were adequately trained and oriented on the purpose and objectives of the study purpose and the questionnaire before commencement of the data collection. The researcher wrote introduction letters for each to inform the organizational contact person that they are representing the project.

Data Analysis and Presentation

After the completion of the data collection, the data was cleaned, edited, coded and entered into the data base. The data was analyzed with the help of Statistical Package for Social Sciences (SPSS) version 21.0. The study generated quantitative data. Quantitative data was analyzed using both descriptive and inferential statistics. Descriptive statistics such as mean score, frequencies and percentages for each variable was calculated and tabulated. On the other hand inferential statistics including Chi-square tests, correlation, coefficient of determination and multiple regression analysis was used to analyze quantitative data. Application of inferential statistics enabled the researcher estimate population on parameters and, tests the hypotheses for the purpose of generalization of the findings. The data was presented in form of tables and charts.

Ethical Consideration

Ethics are the norms or standards for conduct that distinguish between right and wrong (Mugenda & Mugenda 2003). The researcher obtained an introductory letter from the School of Business, Kenyatta University and to avoid Plagiarism all major works and statements in the

study were dully cited with source clearly indicated within text and properly referenced. The researcher sought informed consent from the respondents before they complete the questionnaires. To ensure confidentiality the researcher explained the objectives of the study and assure all participating respondents any data obtained from them would be used only for the purpose of this study. To ensure anonymity of the respondents any information that would identify respondents in the study such as the names of the firm, names of entrepreneurs and location of the firm was not included in the study. Participation in the research was voluntary and anything that would infringe on the rights of the participants was avoided.

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

Introduction

This chapter contains analysis of data collected for the study. Presentation of the findings has been done as per each study objective. The findings have been discussed and corroborated to other studies. From the findings, a conclusion and recommendation is made.

Response rate

Figure 4.1 below indicates the response rate of the study.

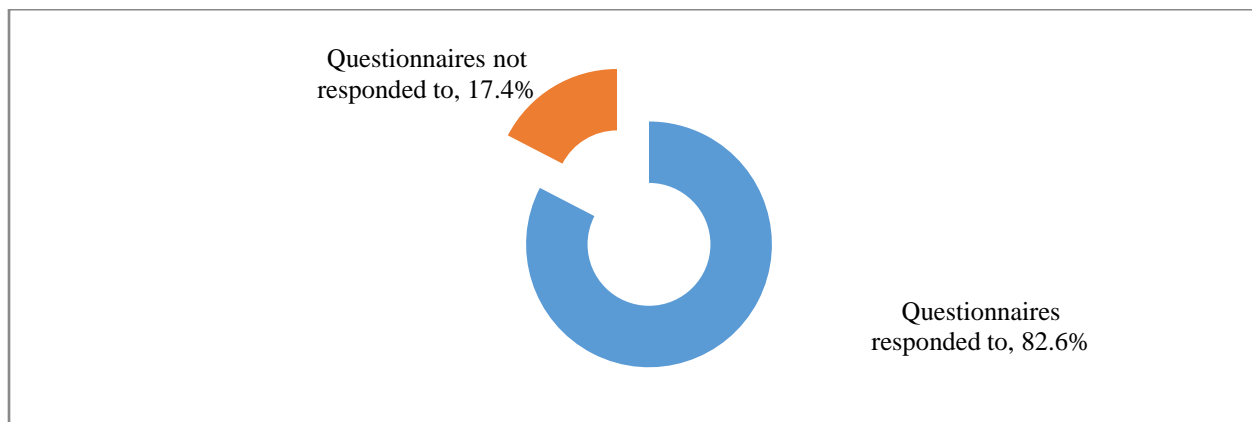


Figure 4.1 Response Rate

Source: Field Data (2018)

The number of questionnaires that were administered was 104. A total of 86 questionnaires were properly filled and returned. This represented an overall successful response rate of 82.6% as shown on Figure 4.1. According to Nulty (2008), return rates of 50% are acceptable to analyze and publish, 60% are good and 70% are very good. A response rate of 82.6% was hence good for the study. The high response rate was achieved because the method of drop and pick was effective. The respondents who were busy were given more time to respond to the questionnaire before they were picked.

Reliability Findings

The reliability of an instrument refers to its ability to produce consistent and stable measurements. Reliability of this instrument was evaluated through Cronbach's Alpha which measures the internal consistency. Cronbach's Alpha value is widely used to verify the reliability of the construct. The findings are presented in Table 4.1.

Table 4.1 Reliability Coefficient

Variable	Cronbach's Alpha	Number of questions	Comment
Mobile Banking	0.781	5	Reliable
Agency Banking	0.749	5	Reliable
ATM/ Credit cards	0.803	5	Reliable
Quality of Internet	0.731	4	
Financial Performance	0.793	5	Reliable

Source: Field Data (2018)

The findings indicate that the measures of the 5 variables used in the study had Cronbach’s alpha’s values higher than 0.7. Since the threshold for passing reliability is 0.7 (Cronbach, 1951), then the variables used in the study were concluded to be reliable to model the association between the independent and the dependent variable.

Demographics Analysis

This section contains findings on demographic analysis which include; Level of education and duration of the respondents in the company and their positions. It shows the demographic characteristics of the respondents.

Respondents Work Experience

The study sought to establish the Work Experience of the respondents. The findings are as shown in Figure 4.2 below.

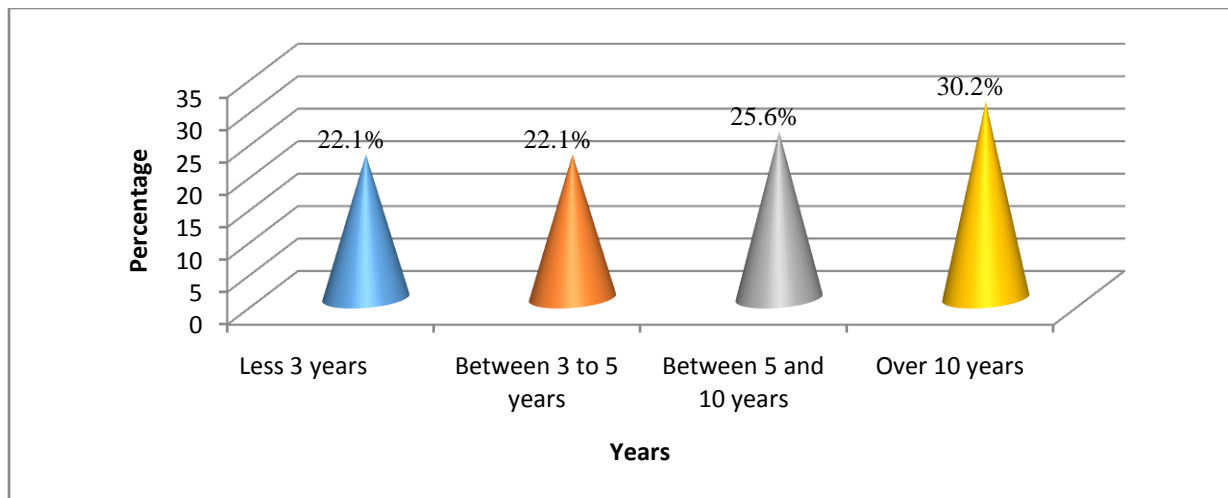


Figure 4.2 Work Experience of respondents

Source: Field Data (2018)

Findings on Figure 4.2 showed that 22.1% of the respondents had worked for less than 3 years, those who had worked for between 3 and 5 years were 22.1% while those who had worked between 5 and 10 years were 25.6% and those who had worked for over 10 years were 30.2%. The findings of the study implies that majority of the staff had worked for over 3 years. It implies low turnover among employees in management positions in the banking sector in Kenya.

Mobile Banking

The study also sought to find out the whether the respondents agree or disagree on the relationship between mobile banking and financial performance of commercial banks in Nakuru county, Kenya. The summary of responses is as shown in Table 4.4 below.

Table 4.4 Mobile Banking

Statements	Mean	Std Dev	Response
The bank readily provides Saving financial services	4.12	1.10	Agree
The bank readily provides deposit financial services	4.36	0.96	Agree
The bank readily provides credit financial services	4.29	1.04	Agree
The bank readily provides insurance financial services	3.96	1.37	Agree
Bill Payment services are readily available on mobile phones	4.08	1.12	Agree
Average	4.16	1.12	Agree

Source: Field Data (2018)

The findings indicated that the respondents agreed that the bank readily provides saving financial services (Mean = 4.12), the respondents also agreed that the bank readily provides deposit financial services (Mean = 4.36). In addition, the respondents agreed that the bank readily provides credit financial services (Mean = 4.29). The findings also indicated that the respondents agreed that the bank readily provides insurance financial services (Mean = 3.96). Finally, the respondents agreed that the bill payment services are readily available on mobile phones (Mean = 4.08). On average, the respondents agreed on the statements of mobile banking of commercial banks (Average mean = 4.16). A standard deviation of 1.12 indicated small variation in the responses from the mean. The findings imply that there is high adoption of mobile banking among commercial banks. Some of the most advanced services conducted through mobile phones are deposit, insurance and credit services.

Agency Banking

The study sought to find out the level of respondent's opinion on agency banking services in Commercial Banks in Nakuru County. The summary of responses is as shown in Table 4.5 below.

Table 4.5 Agency Banking

Statements	Mean	Std Dev	Response
The agency banks has increased the savings amounts	4.45	0.91	Agree

The agency banks has extended tailor made services to suite the consumers	3.52	1.28	Agree
Agency banking has enhanced financial services accessibility	4.29	1.18	Agree
The agents have increased the number of accounts holders	4.31	1.08	Agree
The agents have increased the amount of deposits	4.38	1.02	Agree
Average	4.19	1.09	Agree

Source: Field Data (2018)

The findings indicated that the respondents agreed that the agency banks has increased the savings amounts (Mean = 4.45), the respondents agreed that the agency banks has extended tailor made services to suite the consumers (Mean = 3.52). Moreover, the respondents agreed that agency banking has enhanced financial services accessibility (Mean = 4.29). Furthermore, the respondents agreed that agents have increased the number of accounts holders (Mean = 4.31). Lastly, the respondents agreed that the agents have increased the amount of deposits (Mean = 4.38). On average, majority of the respondents agreed with the statements concerning agency banking in commercial banks in Nakuru County (Average Mean = 4.19) with a small variation of the responses from the mean (Standard deviation = 1.09). The findings implies that agency banking has been adopted to a great extent by commercial banks. Agency banking has led to enhanced accessibility of financial services and increased deposits of the commercial banks.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of the findings, the conclusion and recommendations. The summary of the findings concerns the descriptive and inferential findings. The conclusions have been made based on the findings of the study. Recommendations to various beneficiaries such as commercial banks and regulator have been presented also. Areas of further research were also suggested.

This section presents the summary of study findings. The section has presented the findings per variable. Both descriptive and inferential analysis has been presented in the section.

Mobile Banking

The findings indicated that the respondents neither agreed nor disagreed that the bank readily provides saving financial services and deposit financial services, credit financial services, insurance financial services nor provides bill Payment services on mobile phones. The correlation findings showed that mobile banking had a strong positive and significant association with financial performance of commercial banks. The findings for regression also showed that there is a positive and but not significant relationship between mobile banking and financial performance of commercial banks.

Agency Banking

The findings established that the respondents neither agreed nor disagreed that agency banks have increased the savings amounts has enhanced financial services accessibility, has increased

the number of accounts holders nor the amount of deposits. They however agreed that agency banking model has extended tailor made services to suite the consumers. The correlation findings showed that agency banking had a strong positive and significant association with financial performance of commercial banks. The findings for regression showed that there is a positive and significant relationship between agency banking and financial performance of commercial banks.

ATM / Credit Cards

The findings also indicated that the respondents neither agreed nor disagreed that ATM cards have increased the commission fee based income, that most users of ATM cards are compatible with the technology, has lowered the risk associated with ATM cards fraud and that has increased the income generating potential of the bank. They however agreed that ATM cards has reduced complexity of banking service. The correlation findings indicated that ATM / Credit cards had the strongest positive and significant association with financial performance of commercial banks. The findings for regression also showed that there is a positive and significant relationship between ATM / Credit cards and financial performance of commercial banks.

Quality of Internet

Regarding the Quality of the internet, the findings indicated that the respondents neither agreed nor disagreed that there are minimum network interruptions from the service provider, that internet is frequently available during working hours, that there are enough network boosters in the region and that the bank has effective back up encase of network failure. Moderation findings indicated that quality of internet does not moderate the relationship between technological innovation and financial performance of commercial banks in Nakuru County.

Conclusions

The study concluded that mobile banking has a positive but not significant relationship with the financial performance of Commercial Banks in Nakuru County which implies that an improvement in mobile banking leads to an insignificant improvement in financial performance of Commercial Banks. The study also concluded that agency banking has a positive significant relationship with the financial performance of Commercial Banks in Nakuru County which implies that an improvement in Agency banking leads to a significant improvement in financial performance of Commercial Banks.

It was also concluded that ATM / Credit cards have a positive significant relationship with financial performance of Commercial Banks in Nakuru County which implies that an improvement in adoption of ATM / Credit cards services leads to a significant improvement in financial performance of Commercial Banks. Lastly, it was concluded that the quality of Internet does not moderate the relationship between technological innovation and financial performance of Commercial Banks which implies that customers subscribe to the technological innovation regardless of the quality of the internet in the area hence internet quality does not significantly influence internet subscription rate.

Recommendations of the Study

Based on the findings, the study recommends commercial banks to readily provide saving financial services and deposit financial services. There is also need for banks to readily provide

credit financial services. Moreover, the study recommends commercial banks to readily provide insurance financial services. The study further recommends commercial banks to readily avail bill Payment services on mobile phones.

The study recommends agency banks to increase the savings amounts. There is also need for commercial banks to extend tailor made services to suite the consumers. The study recommends agency banks to enhance financial services accessibility. There is also need for Agency banks to increase the number of accounts holders as well as the amount of deposits.

The study recommends commercial banks to encourage ATM cards use since it increases the commission fee based income. There is also need for the adoption ATM card use to reduce complexity of banking service. The study recommends ATM cards users to use card that are compatible with the technology. Moreover, the study recommends for the use of ATM cards since it has lowered the risk associated with ATM cards fraud and it has also increased the income generating potential of the bank.

On the quality of Internet, the study recommends the service providers to ensure there are minimum network interruptions. Moreover, the study recommends service providers to ensure internet is frequently available during working hours. Furthermore, the study recommends service providers to ensure there are enough network boosters in the region. Finally, the study recommends banks to ensure there are effective back-ups in case of network failure.

To the regulator, the study recommends an adoption of flexible policies that will ensure easy verification, passing and adoption of technology in the banking industry in Kenya since this will enhance performance of the commercial banks. To the academia, the study recommends further insight into the relationship on a wider scope and also test other technologies other than those in this study.

Contribution to Knowledge

The study has tested the effect of technological innovations on financial performance of commercial banks in Kenya thus adding to the existing theoretical knowledge on the theme. It can hence be argued that quality of internet does not play a significant moderating role on adoption of technology by the consumers of banking products. Perhaps other factors such as security and cost concerns moderate adoption of technology. The study has also established that mobile banking doesn't significantly determine the financial performance of commercial banks in Kenya. This study has hence opened up a need for further debate on the topic in developing economies.

Suggested Areas for Further Study

Further studies can be carried out on the effect of the technological factors on Commercial Banks in other Counties in Kenya so as to compare the findings. Furthermore, other studies can use other moderating factors like leverage as a substitute for the quality of internet. Similar studies can also be conducted to establish other factors not studied in this study that account for the remaining 53.3% of the financial performance of Commercial Banks. There is also a need to test other technologies in the banking industry other than mobile, agency banking and ATM / Credit cards tested in this study.

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