

**EFFECT OF SELECTED SELF-SERVICE TECHNOLOGY ON OPERATIONAL  
PERFORMANCE OF COMMERCIAL BANKS IN NAKURU COUNTY, KENYA**

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Requirements for the Award of the Degree of Master of Business Administration of  
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## DECLARATION AND APPROVAL

### Declaration

This project is my original work and has not been submitted to any other institution of higher learning.

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Date \_\_\_\_\_

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CM11/62545/15

### Approval

This project has been submitted for examination with my approval as the supervisor

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## **DEDICATION**

I dedicate this work to my parents, Mr. and Mrs. Mohamed Abdullai and my elder brother Shukri Mohamed who constantly prayed for me and encouraged me throughout this period.

## **ACKNOWLEDGEMENT**

Special appreciation goes first to Almighty Allah who has given me the strength, wisdom and direction from the beginning to the end of this master programme. I would like to express my heartfelt gratitude to Egerton University Council for offering me Scholarship without which it was not possible to pursue the programme. Special acknowledgement goes to my supervisor, Dr. Richard Bitange Nyaoga who tirelessly ensured that this project is of the required standard. I would like to extend my gratitude to Dr. Daniel. O. Auka, the Dean, Faculty of Commerce for his extended support and encouragement. I wish to also acknowledge Dr. Henry Kombo for his guidance and encouragement. I also wish to extend my gratitude to Ms. Jerotich Sirma, Mr. Robert Mugo, Mr. Felix Obegi, Mr. Kefa Basweti, Mr. Benard Muma, Mr. Simon Kamau and all the other lecturers for their valued ideas. I thank you all.

## **ABSTRACT**

The banking sector in Kenya has benefitted from the advancement of information solutions that has shaped the operational processes. Kenyan banking sector has adopted the use of self-service technology (SST) as a tool of increasing the efficiency and effectiveness in most business processes leading to an increase in sales, profits and relative growth in market share of most companies. The aim of this study was to determine the effect of SST on operational performance of commercial banks in Nakuru County, Kenya. The specific objectives of the study were: to establish the effect of automated teller machines (ATMs) usage on operational performance of the banks, to examine the effect of Internet banking on operational performance of the banks and to determine the effect of mobile banking on operational performance of the banks. The study employed correlational-cross-sectional survey design. The target population comprised 31 of the commercial banks. A sample of 28 commercial banks was used in the study. Primary data was collected using structured questionnaires from operations and IT managers. The questionnaires were self-administered. The data collected was analyzed using SPSS version 20. The data was summarized using frequencies, means and standard deviations. The research hypotheses were tested using Pearson Product-Moment correlation and multiple regression. The study revealed a significant positive relationship between automated teller machines usage and operational performance, the study also revealed a significant positive relationship between internet banking and operational performance; further the study also revealed a significant positive relationship between mobile banking and operational performance. The findings revealed that the combined effect of SST on operational performance was significant. The findings also revealed that among the SST, mobile banking had the greatest relationship with operational performance. The study therefore concluded that SST positively and significantly influences operational performance of commercial banks in Nakuru County. The study recommends that while mobile banking is the key technology to be invested in by the commercial banks, all the SST should be invested in for a greater improvement in operational performance. The study suggests that further studies should be conducted to relate SSTs with other variables like quality and flexibility which are not captured in the study.

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## LIST OF ABBREVIATION

<b>ATMs</b>	Automated Teller Machines
<b>CBK</b>	Central Bank of Kenya
<b>CBN</b>	Christian Broadcasting Programme
<b>CI</b>	Continuous Improvement
<b>ERP</b>	Enterprise Resource Planning
<b>IB</b>	Internet Banking
<b>ICT</b>	Information and Communication Technology
<b>IT</b>	Information Technology
<b>JIT</b>	Just-In-Time
<b>KRA</b>	Kenya Revenue Authority
<b>KTGA</b>	Kenya Tea Growers Association
<b>NPD</b>	Discontinuous New Products
<b>NSE</b>	Nairobi Stock Exchange
<b>PIN</b>	Personal Identification Number
<b>SAP</b>	Structural Adjustment Programme
<b>SPC</b>	Statistical Process Control
<b>SPSS</b>	Statistical Packages for Social Sciences
<b>TPM</b>	Total Productive Maintenance
<b>UK</b>	United Kingdom
<b>VSM</b>	Value Stream Mapping

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

In today's contemporary business environment, the need for self-service technology cannot be overemphasized. Self-service is the process by which consumers engage in all or a portion of the provision of a service or product (Castro, Atkinson, & Ezell, 2010). According to Meuter, Ostrom, Roundtree and Bitner (2000), self-service technologies (SSTs) are technological interfaces that enable customers to produce a service independent of direct service employee involvement. Examples of SSTs include automated teller machines, automated hotel checkouts, banking by telephone, and services over the Internet such as Federal Express package tracking and online brokerage services. Today, our lives have become digital and dependent on technology since we are interacting with different kinds of technologies to fulfill different kinds of tasks in our daily lives. Some of these technologies have become more important in our lives more than others like computer, Internet and mobile phones. Self-service technologies are viable for banks and other financial intermediaries because information processing is essential to their services. Technology increases the efficiency and effectiveness in most business process leading to an increase in sales, profits and relative growth in market share (Charles, 2015).

Sewpersad (2010) defined Automated Teller Machines as computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space without the intervention of a human clerk or a bank teller. The banking industry adopted the ATM concept for reducing costs and providing better services for the customers. The first ATM was installed in the early 1967 by Barclays bank in London, UK. The banks started installing ATM machines in the bank buildings first where a cash dispensing machine was not linked to the account directly. With the spread of Internet connectivity, the ATM machines have become a part of the urban landscape and available at parks, shopping malls or airports with many more services on offer than just cash dispensing (Abdelaziz, Hegazy, & Elabbassy, 2010).

Pikkarainen, Pikkarainen, Karjaluoto and Pahnla (2004) defined Internet banking as an Internet portal, through which consumers can use different kind of banking services ranging from bill payment to making investment, thus banks just offering information through their websites are not considered as using Internet banking. Thulani, Tofara and Langton (2009) defined Internet banking as the systems that enable bank customers to get access to their accounts and general information on bank products and services through the use of bank's website, without the intervention or inconvenience of sending letters, faxes, original signatures and telephone confirmations. It is intended to customers easy access to their money and other banking information while adding more value such as convenience.

According to Adewoye (2013), mobile banking is becoming more popular in modern banking and as such has been a subject of interest among researchers. Mobile banking means a financial transaction conducted by logging on to a bank's website using a cell phone, such as viewing account balances, making transfers between accounts or paying bills. It is a term used for performing balance checks, account transactions, payments etc. via a mobile device such as mobile phones. In recent time, mobile banking is most often performed via Short Message Service (SMS) but can also use special programs called clients downloaded to the mobile device. According to Ensor et al. (2012), mobile banking refers to using mobile devices to provide financial information, communication and transactions to customers such as checking account balances, transferring funds and accessing other banking products and services anywhere, at any time.

Birech (2011) contended that there are various performance measures that are within operations area. These are: standard individual performance measures include: productivity measures, quality measures, inventory measures, lead-time measures, preventive maintenance, performance to schedule, and utilization. Specific measures are as follows: Cost of quality – this is measured in terms budgeted versus actual, variances –this is measured in terms of standard absorbed cost versus actual expenses, period expenses – this is measured in terms of budgeted versus actual expenses, safety –which is measured on some common scale such as number of hours without an accident, and finally profit contribution which is measured in dollars or some other common scales. There are many different ways of measuring operational performance. However, the most

predominant approach in the literature is to use cost, quality, delivery, speed, reliability and flexibility as the basic dimensions of operational performance (Agboola, 2003).

### **1.1.1 Commercial Banks in Kenya**

Banking in Kenya started in 1896 with National Bank of India opening its first branch. Standard Chartered opened its first branch in Mombasa and in Nairobi in 1911. KCB was established in 1958 with Grindlays Bank of Britain merging with National Bank of India. The Co-operative bank of Kenya was established in 1965 with the aim of supporting co-operative societies financially three years after National Bank was incorporated (Ongori, 2013). According to Central Bank of Kenya (2014), as at 31<sup>st</sup> December 2014, the banking sector in Kenya is composed of the Central Bank of Kenya, as the regulatory authority, 44 banking institutions i.e. 43 commercial banks and 1 mortgage finance company, 8 representatives of foreign banks, 9 microfinance banks (MFBs), 2 Credit Reference Bureau (CRBs), 13 Monetary Remittance Providers (MRPs) and 87 Foreign Exchange (forex) Bureaus. Of the 44 banking institutions, 30 were locally owned banks composed of 3 with public shareholding and 27 privately owned while 14 were foreign owned. The 9 MFBs, 2 CRBs, 13 MRPs and 87 forex bureau are all privately owned. Of the 14 foreign owned banking institutions, 10 are locally incorporated subsidiaries of foreign banks and 4 are branches of foreign incorporated banks. Further, 11 out of the 44 banking institutions are listed on the Nairobi Securities Exchange.

Githinji (2013) argued that in the past, firms did rely on mails and letters for delivering and receiving information from their branches or associate businesses across the world. This trend is good at that time but in a constantly changing environment; the firms find that the method of communication is not the best since it was bringing business down or slowing operations because of time. Therefore, some firms resort to increasing budget in the communication department and cutting expenses on other departments that are seen as less important. Today's business environment is very progressive and undergoes rapid changes as a result of technological innovation, increased awareness, and demands from consumers. Organizations, especially the banking industry of the 21st century operate in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate (Agboola, 2003).

Malenje (2014) argued that there is no rational or deliberate approach to deployment of ICT resources in the university. Individual users or departments make requests for workstations and Internet connectivity according to their needs. Using this kind of avenue of acquiring ICT resources, corporate needs may not be realized. He further observed that, though effort has been made to invest in ICT resources, evidence indicates that the desired results of effects have not been realized. Employees who are expected to implement the automation still perform their duties traditionally. However, the same employees use ICT resources to do their private work. He further, contended that the rapid development of information and communication technologies (ICT) has resulted in expanded availability of the latest technologies at a very affordable cost.

Mbugua (2011) argued that there is laxity in times of system failures leading to more downtime. In conclusion, the following are observed as a result of the automation process; Not all users are computer literate hence a lot of training was compulsory, rigid policies that do not favor the ICT uptake e.g. some tasks being done manually due to the inculcated culture, there lack proper training to staff prior to uptake, retrenchment, change over problems due to inadequate training, downtime in cases of system failure and skills/knowledge gap among the staff.

According to Githinji (2013), many organizations have been pulled into the style and fashion of technology. Sadly, this has proved counterproductive as they have adopted technology for the wrong reasons. After much cost, time and labour hours, many companies have not realized the benefits they set out to achieve from the initial start. Bill gates rightly captures this when he said that the first rule of any technology used in a business is that automation applied to an efficient operation will amplify the efficiency and the second rule is that automation applied to an inefficient operation will amplify the inefficiency. Sanda and Arhin (2011) argued that there is a high degree of customer complaints with ATMs downtime, cash out, high charges and sometimes, poor service recovery efforts when customers have problems.

Olatokun and Igbiniedion (2009) argued that banks still have many customers transacting with tellers within their doors, and queues are still not a thing of the past inside the banks. The aim of ATMs is also not well defined and sometimes long queues are observed outside the ATMs, while at other times, there are few or no customers. It is consequently momentous to discover why this



is so, because as a technology ATMs, Internet banking and mobile banking are suppose to make life easier and more efficient for the customers of the banks such that they do not need to be there physically in the bank halls as opposed to what is found in every bank where there are long queues of customers waiting to be served.

## **1.2 Statement of the Problem**

Commercial banks have automated their services by use of Automated Teller Machines (ATMs), Internet Banking and Mobile Banking. The aim has been to schedule employees' duties with ease, reduce the building up of queues and increase employees' efficiency. Other reasons for adopting SSTs include; reduction of customer service delivery time, improvement of quality of service, bringing services closer to customers and cutting on cost of operations. The overall aim is to achieve the highest possible level of profits. While Commercial banks have adopted SSTs to make services conveniently available to customers, Olatokun and Igbinedion (2009) argued that there are many customers still transacting with tellers within the doors of the banks, and customers are found in queues every time in banking halls and ATMs. Similarly, these systems remained largely unnoticed by the customers and certainly are seriously underused. According to Wang et al. (2003), the queues develop due to system downtime and there is inefficiency in the operations since all the operations cannot run as required. Most studies done on self-service technology concentrated mainly on customers experience, for example, Narteh (2015) did a study on perceived service quality and satisfaction of self-service technology. Past studies have focused on other areas of SSTs and not specifically self-service technology and operational performance therefore not providing direct relationship between SSTs and operational performance. Organizations therefore, adopt SSTs without certainty on the expected outcome in terms of operational performance. It is therefore; evident that literature gap exists on the exact relationship between SSTs and operational performance. Hence this study sought to establish the effect of selected self-service technology on operational performance of commercial banks in Nakuru County, Kenya.

## **1.3 Objectives of the Study**

### **1.3.1 General Objective**

The general objective of the study was to determine the effect of selected self-service technology on operational performance of commercial banks in Nakuru County, Kenya.

### **1.3.2 Specific Objectives**

The specific objectives of this study were to:

- i. Establish the effect of Automated Teller Machines (ATMs) usage on operational performance of commercial banks in Nakuru County
- ii. Examine the effect of Internet banking on operational performance of commercial banks in Nakuru County
- iii. Determine the effect of mobile banking on operational performance of commercial banks in Nakuru County
- iv. Determine the joint effect of ATMs usage, Internet banking and mobile banking on operational performance of commercial banks in Nakuru County.

### **1.4 Research Hypotheses**

The study tested the following hypotheses

**H<sub>01</sub>:** Automated Teller Machines (ATMs) usage has no significant effect on operational performance of commercial banks in Nakuru County

**H<sub>02</sub>:** Internet banking has no significant effect on operational performance of commercial banks in Nakuru County

**H<sub>03</sub>:** Mobile banking has no significant effect on operational performance of commercial banks in Nakuru County

**H<sub>04</sub>:** ATMs usage, Internet banking and mobile banking jointly have no significant effect on operational performance of commercial banks in Nakuru County.

### **1.5 Scope of the Study**

The study was restricted to the effect of selected self-service technology on operational performance of commercial banks in Nakuru County and the target population of the study was the operations and IT managers. The study focused on operational performance such as cost of operations, reliability of service and speed of service. The study was conducted during the period of August 2016 to May 2017.

## **1.6 Significance of the Study**

This study is important to the management policy and practice: it seeks to guide managers and practitioners in dealing with the rapid changes in technology and guides them on how they can use SST to improve effectiveness and efficiency in operational performance. The findings and recommendations of this study is useful in generating knowledge in the automation process of a banking system which would in turn assist operations and IT managers in designing more meaningful intervention strategies that would enhance better use of technologies. In addition, it might also help them come up with appropriate measures to counter the challenges experienced in integrating technology and day to day operations of the commercial banks. To policy makers and the government who bear the primary responsibility for promoting growth and development to benefit the public, the results of this study could help in evaluating the quality of their interventions with a view of improving the effectiveness and efficiency of commercial banks.

This study seeks to enhance knowledge and literature in the field of operations management: it might be useful to the academicians and researchers as well. It might enrich existing knowledge on the operational performance applied in commercial banks in Nakuru County and invite further research in this field. The results of the study might be used as a basis for further research by other academicians in the field of operations management.

## **1.7 Limitations of the Study**

The study mainly concentrated on effect of selected self-service technology on operational performance within the commercial banks. The respondents may be unwilling to give accurate and reliable information and this may compromise the quality of the data to be collected.

The limitations were overcome by taking the following measures: the researcher made sure that proper communication was done so that the respondents understood the purpose of the study. The researcher assured the respondents the confidentiality of the information they provided.

## **1.8 Operational Definition of Terms**

### **Self-Service Technology**

Self-service technologies (SSTs) are technological interfaces that enable customers to produce a service independent of direct service employee involvement. Examples of SSTs include automated teller machines, automated hotel checkouts, banking by telephone, and services over the Internet such as Federal Express package tracking, online brokerage services, Internet banking and mobile banking. Therefore the study focused on selected SSTs which are Automated Teller Machines (ATMs) usage, Internet banking and mobile banking.

### **Operational Performance**

Operational performance is a process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into outputs both goods and services. There are a number of operational performance objectives that are considered to apply to all types of operations. These all-pervasive operational performance objectives are quality, speed, dependability, flexibility, cost and reliability. Therefore this study will focus on selected operational performance which are cost, speed and reliability.

### **Automated Teller Machine**

Is a computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space without the intervention of a human clerk or a bank teller.

### **Internet Banking**

This is an Internet portal, through which consumers can use different kind of banking services ranging from bill payment to making investment.

**Mobile Banking**

Refers to provision and availment of banking and financial services through the help of mobile telecommunication devices.

**Information and Communication****Technology**

Combines telecommunications, computing and broadcasting and covers any product that will store, retrieve, manipulate, transmit or receive information electronically, including telephones, faxes, computers and televisions.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter reviewed literature from past studies. Although several researchers have endeavored to investigate the adoption self-service technology, very few have gone further to study the effect of self-service technology on operational performance.

#### **2.2 Theoretical Perspective**

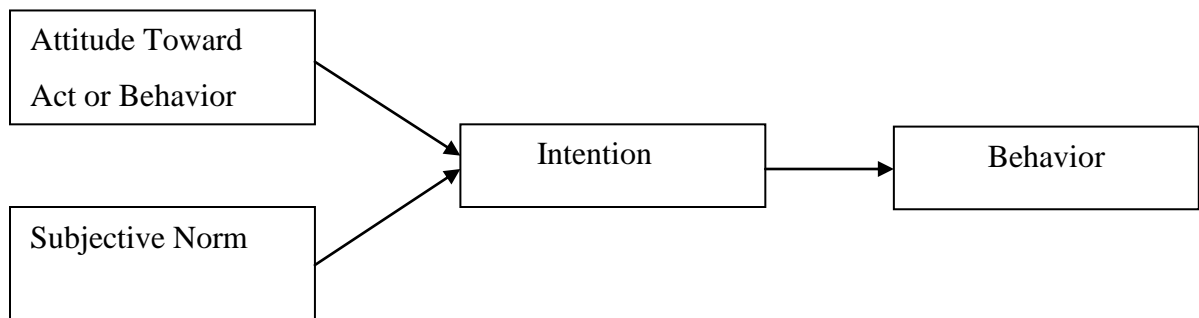
This study was guided by the following theories: diffusion of innovation, theory of reasoned action, technology acceptance model, bank-focused theory and social construction theory.

##### **2.2.1 Diffusion of Innovation**

This theory was developed by Everett M. Rogers in 1983. Diffusion of innovation is a theory of how, why, and at what rate new ideas and technology spread through cultures, performing at the individual and firm level. The theory finds innovations as being transmitted through certain channels over time and within particular social systems. Individuals are seen as possessing different degrees of willingness to adopt innovations, and thus it is generally observed that the portion of the population adopting an innovation is approximately normally distributed over time (Rogers, 1983). Rogers (1983) defined diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. The researcher further argued that it is a special type of communication because messages are concerned with new ideas, the more compatible the technology will be to users the less a change of behavior is required, therefore, allowing for faster adoption. Trialability is the degree that the innovation can be tested and experimented before its inclusion. The complexity (its ease of use) of technology will also impact on adoption. If the use of technology requires considerable learning it is less likely that users will persevere with it and observability, is where by the innovation use and effects must be visible by others. In the context of this study, this theory suggests that the degree of bankers adopting new technology depends on the willingness of the individuals and the more the technology is compatible with the needs of the bankers, the faster the adoption.

### 2.2.2 Theory of Reasoned Action

This theory was developed by Martin Fishbein and Icek Ajzen in 1963. Theory of Reasoned Action proposes that an individual's behavior is determined by his/her intention to perform the behavior and that this intention is, in turn, a function of his/her attitude toward the behavior and his/her subjective norm. The best predictor of behavior is the intention that the individual has. This intention is determined by three things: their attitude toward the specific behavior, their subjective norms and their perceived behavioral control. The theory of planned behavior holds that only specific attitudes toward the behavior in question can be expected to predict that behavior. In the context of this study, this theory puts forth that intention of the bankers and the management affects their behavior towards the technology to be adopted (Oduor, 2012). Figure 2.1 depicts the relationship between behavior, intention, attitude toward act or behavior and subjective norm.



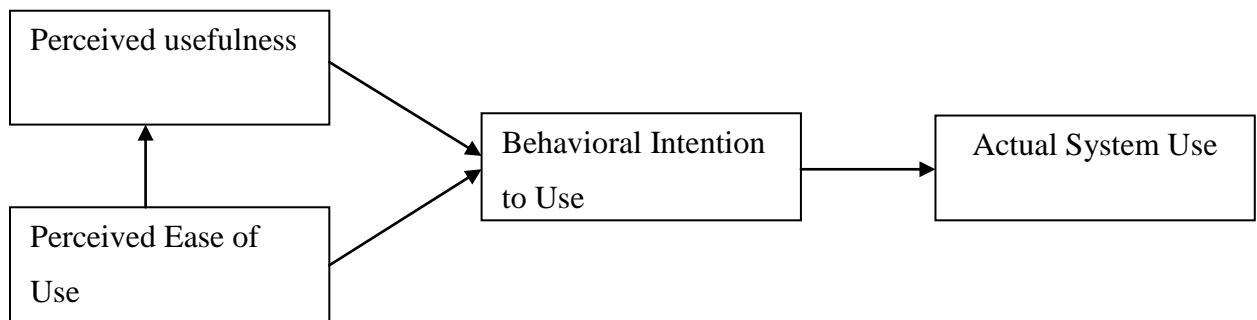
**Figure 2.1 Theory of Reasoned Action (TRA)**

Source: Ajzen and Fishbein (1980)

### 2.2.3 The Technology Acceptance Model (TAM)

This theory was developed by Davis in 1985. Technology Acceptance Model (TAM) theorizes that an individual's behavioral intention to adopt a particular piece of technology is determined by the individual's attitude toward the use of that technology. Attitude, in turn, is induced by two beliefs: perceived usefulness and perceived ease of use. Perceived usefulness is defined as the extent to which persons believe that technology will enhance their productivity or job performance (Davis, Bagozzi, & Warshaw, 1989). TAM research has shown that perceived usefulness is a strong determinant of user acceptance, adoption, and usage behavior and perceived ease of use is defined as the degree to which an individual believes that using a

technology will be simple (Davis et al., 1989). In the context of this study, the theory proposes that the customers', bankers' and management's behavioral intention determines the attitude toward adoption of the technology. Figure 2.2 depicts the relationship between actual system use, behavioral intention to use, perceived usefulness and perceived ease of use.



**Figure 2.1: The Technology Acceptance Model (TAM)**

Source: Davis et.al (1989)

#### **2.2.4 Bank-Focused Theory**

Vutsengwa and Ngugi (2013), argued that this theory emerges when a traditional bank uses non-traditional low-cost delivery channels to provide banking services to its existing customers. Examples range from use of automated teller machine (ATMs) to Internet banking or mobile phone banking to provide certain limited banking services to banks' customers. In the context of this study, this theory proposes that commercial banks switch from their old method of service delivery commonly referred to as traditional methods to new methods of service delivery commonly know as non-traditional methods.

#### **2.2.5 Social Construction Theory**

Njogu (2014) argued that technology does not determine how individuals receive and use mobile technology but that the individuals determine how and in what ways technology is used. The theory which was developed by Thomas Luckmannin (1966) postulates that the use of a technology or innovation cannot be understood without understanding how it is socially integrated within the society. Within different social contexts, technology can take different



meanings and adoption depends on how society views the technology. According to this theory, the adoption of technology is not only due to its technical superiority but also due to social factors. In the context of this study, mobile banking and internet banking services are been driven by both business factors in the context of banks operations and social networks within the society that relate to businesses and families.

### **2.3 Self-Service Technology**

Narteh (2015) argued that developments in information and communication technology have given service providers alternative options outside the brick-and-mortar buildings, to deliver services to customers. Within the banking sector, what has emerged as the self-service technologies (SSTs) have increasingly been deployed to provide banking service customers outside the traditional banking halls. Curran and Meuter (2005) argued that SSTs have gained popularity among commercial banks and their customers due to their ability to standardise service delivery, provide expanded service delivery and also reduce labor costs. According to Chowdhury, Patro, Venugopal and Israel (2014), self-service technology refers to technology that enables service delivery without customer having a face-to-face service-encounter. Technology is adopted by companies to make the processes uniform and free of errors. It also helps increase the speed of processing and in turn, improves customer satisfaction since the product or service quality is predictable. In addition, technology leads to reduced human resource related costs since fewer people are required to operate the systems as opposed to them carrying out the actual process.

Oladejo and Akanbi (2012) argued that for many years, accountants, bankers, technology specialists, entrepreneurs, and other practitioners have advocated for the replacement of physical cash and the introduction of more flexible, efficient and cost effective retail payment solutions in line with the global trend. Many conferences and seminars have been held to discuss the concepts of cashless and “chequeless” society (Bank for International Settlement, ,2005). Wang, Wang, Lin and Tang (2003) argued that for several years, commercial banks in Taiwan have tried to introduce Internet-based e-banking systems to improve their operations and to reduce costs. Despite all their efforts aimed at developing better and easier Internet banking systems, these systems remained largely unnoticed by the customers and certainly were seriously

underused in spite of their availability. In this study, self-service technology is discussed under the following subtopics: Automated Teller Machine (ATM) usage, Internet banking and Mobile banking.

## **2.4 Operational Performance**

Kyuska (2015) defined operational performance as a process of assessing progress toward achieving predetermined goals, including information on the efficiency with which resources are transformed into outputs both goods and services. The quality of those outputs is how well they are delivered to clients and the extent to which clients are satisfied and outcomes is the results of a program activity compared to its intended purpose.

According to Staughton and Johnston (2005), there are five basic“operational performance objectives” that are considered to apply to all types of operations. These all-pervasive operational performance objectives are quality, speed, dependability, flexibility and cost and they provide the key incentive for operations management tools and techniques, such as kanbans, Statistical Process Control (SPC), Enterprise Resource Planning (ERP), and just-in-time (JIT), all of which are directed on doing things better, faster, more efficiently, and more cheaply.

Kumar, Batista and Maull (2011) contended that operations performance factors for manufacturing firms are well established in the operations literature, which identifies cost, flexibility, quality, dependability, and speed as critical manufacturing competitive priorities. Kumar et al. (2011) argued that operations performance of service delivery comprises three critical performance factors (quality, dependability, and speed) that are usually present in a service delivery system. Consistent quality, dependability of delivery, and prompt delivery (speed) are critical operations performance factors in service delivery systems. Rahman, Laosirihongthong and Sohal (2010) have also considered four criteria to measure the operational performance. These criteria are quick delivery compared to the major competitor, unit cost of product relative to competitors, overall productivity and overall customer satisfaction. These measures are derived from several criteria, which have been conceptualized and used in previous empirical studies of lean manufacturing and supply chain management. Taj and Morosan (2011) argued that supply chains, human resources, and design of production systems have remarkable

positive effects on the flexibility and flow measures while quality is only related to the design of the production system.

Belekoukias, Garza-Reye and Kumar (2014) argued that JIT, TPM, automation, VSM and kaizen/CI are the cornerstones of the lean strategy and the most important measures of operational performance, i.e., cost, speed, dependability, quality, reliability and flexibility. Jammes and Smit (2005) argued that the environment of future manufacturing firms will be characterized by frequently changing market demands, time-to-market pressure, continuously emerging new innovations and global competition. Hence, next-generation manufacturing approaches must support global competitiveness, innovation, and introduction of new products, and strong market responsiveness. As a result, if cost and quality remain vital concerns, manufacturing systems need to become more strongly time-driven and time-oriented. This transformation requires considerably more flexibility and adaptability to change than present-day manufacturing systems can afford.

Moutinho and Smith (2000) argued that the drive towards ease of banking and convenience is favored by the customer and , therefore, banks should find alternative strategic routes designed for improved service delivery (either human-based or technology-based). The study further established that customer care and customer retention programmes should take into consideration that the increased ‘push’ towards the provision of convenient, easy and fast banking services is closely associated with human and technology based delivery processes. More importantly, they are greatly linked with the customers’ perceptions of how these bank services are delivered to them. These perceptual outcome, will in turn, affect the level of bank customer satisfaction ratings, retention and switching rates.

Ngugi and Karina (2013) argued that the banks used environmental analysis and response to change, the banks also used aggressive anti-competitors marketing campaigns. It was evident that product innovations affected performance of commercial banks. The study found that product replacement contributed to the bank's profitability, product repositioning contributed to the banks’ profitability. The study found that process innovation approaches such as reduction of costs and conformance to regulations contributed to the bank’s profitability. The study revealed that technological innovations affected performance of commercial banks.

According to Githinji (2013), automation of business process helps IQPlus in gaining a competitive advantage internationally as the decision makers track the market trends together with the marketing activities of rivals both locally and internationally. Further results show that automation leads to IQPlus improving their sales performance internationally. Findings also show that automating manual process as indicated by the respondents helps in lowering management costs, increases quality and controls access to very important and confidential data. According to Oladejo and Akanbi (2012), bankers in Nigeria perceive electronic banking as tool for minimizing inconvenience, reducing transaction cost, altering customers queuing pattern and saving customers banking time.

Abdullahi (2012) contended that many banks in Nigeria have over the years streamlined their organizations, tailored their products and services delivery and automated their operations to enhance their performances and capture the market. As the struggle to enhance performance by the deposit money banks, the focus is moving to the complete automation of all their operations and services. The system or industry is highly competitive and it is expected to motivate new players of local and global scope to enter the market. As the competitive terrain becomes more challenging, banks need to maintain their competitive edge, and to do this, they have to adopt new innovations.

Agboola (2007) argued that today, a variety of ICT products are increasingly being used in the banking industry of the Less Developed Countries, and this is as a result of increased sophistication of the customers and higher competition that emanates from the increased globalization of the banking industry. These products include Automated Teller Machines (ATMs), mobile banking, MICR cheques, Electronic Funds Transfer, Electronic Data Interchange, Electronic Home and Office Banking, Electronic Fund Transfer at Point of Sale, Electronic Letter of Credit, Debit Card, Electronic Cash, Electronic Billing, Local Area Network among others. Agboola (2007) argued that adoption of ICT has influenced the content and quality of banking operations. From all indications, ICT presents great potential for business process reengineering of Nigerian Banks. Investment in information and communication technology should form an important component in the overall strategy of banking operators to ensure effective performance. It is important for bank management to escalate investment in ICT products and services in order to facilitate speed, convenience and accurate services, or

otherwise lose out to their competitors. The banking sector in Nigeria presents ICT providers with great opportunity to market their innovations. Success in this area ,however, depends on how they can customize their services to appeal to the ready minds of various stake holders in the industry.

Simiyu (2013) argued that the new market innovation approaches employed by the commercial banks were availability of resources and capabilities, creating and nurturing strong brands, aggressive anti-competitors marketing campaigns, creating value through pricing, environmental analysis and response to changes, customer satisfaction and retention. The study recommended that for commercial banks to be successfully in adopting the innovation approaches, they should ensure that the staff are well knowledgeable/trained on the necessary skills or abilities required to adopt these approaches, the firm should also set aside enough budget for the adoption of these approaches and also there should be performance evaluation in the firm so as to ensure its success in the firm.

## **2.5 Selected Self-Service Technology and Operational Performance**

Studies have emerged in recent times that have perlustrated the relationship between self-service technology and operational performance. Empirical research has shown that SST contributes positively to operational performance. Wang (2007) did a study on technology-based self-service and its impact on service firm performance- A resource-based perspective and found that improved service quality, rather than reduction of labor costs, was the primary value of self-scanning in Swedish retail food stores and employees and customers are positively affected by using technology-based self-service. Sannes (2001) did a study on self-service banking: Value creation models and information exchange in Norway and found that current self-service banking is too narrow to be a complete business concept, and that banks have failed to address the functions that create customer value. Neo (2010) did a study on embracing self-service technology for hotel productivity growth in Singapore and concluded that if the hotel industry is not able to watch the evolution of such uptrend in the global market and utilizing it to maximize their productivity, it will mean they will lack in the services they could provide for their customers. Businesses such as online travel services and other tourism industry like the airports, which have moved towards using SST, have seen a high return on their productivity growth and

cost-savings to date. Singapore hotel businesses thus need to seriously consider adopting the SST as one of the means towards their productivity growth. With the Singapore government favorable incentives and support in this area, and the current efficient infrastructure already in place, there is indeed no reason to delay in adopting SST to gain higher competitive measures. For the customer, it will be an added value that will just keep them coming back.

In Kenya, Ongori (2013) did a study on self-service technology and customer satisfaction in commercial banks in Kenya. He concluded that there was a significant relationship between self service channels such as ATMs, internet banking, mobile banking and customer satisfaction in Kenyan banks. Self service channels enhances reliability, responsiveness, ensures security of customer transactions and accessibility. Moreover, these channels help in keeping records accurately, provide more information for the customers and provide more punctuality, transparency and accountability. Charles (2015) studied determinants of self-service banking technology in Kenya and he concluded that self-service banking technology in Kenya is likely to become increasingly more important to banks. Banks strive to minimize costs and maximize service in order to remain competitive in expanding market place. Bank managers need to continually assess consumers' propensity to accept and use the new self-service technology that they offer. The levels of optimism, insecurity, need of interaction and discomfort on facilitating condition towards using new self-service technology appear to be either a contributor or an inhibitor to the diffusion of innovative self-service technology for most consumers. Banks need to take advantage of the contributor (Optimism) and address the inhibitors (Insecurity, need for interaction and facilitating) in order to enhance the likelihood of Kenyan consumers using self-service technology to complete banking transactions. Esther (2016) studied exploratory study of Kenya power customers use of self-service technology options and concluded that the company should enhance the use of self-service technology options by increasing awareness levels about SST, enhanced customer confidence and enthusiasms consistently maintaining high standards of SST service delivery and promoting the use of SST. The study further revealed that the full of array of SST provided by the company had not been fully embraced. The most important factors that determined the actual use of SST was cost, extent to which service was preferred and speed of SST.

### **2.5.1 Automated Teller Machines (ATMs) Usage and Operational Performance**

Sewpersad (2010) defined Automated Teller Machine as computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space without the intervention of a human clerk or a bank teller. Such transactions are done by inserting a personal “bank card” into the machine and the client/customer accessing his/her bank account using a personal identification number (PIN) which is inserted into the machine before the transaction can continue.

According to Narteh (2015), over the last few decades, the automated teller machine as part of self-service technology (SST) has emerged as a major channel for routing banking services to customers. Reasons for the introduction of ATMs in retail banking include lower labour cost, efficiency, greater consumer involvement, standardization of service delivery, customer satisfaction and loyalty. Jegede (2014) contended that less than the benefits, the deployment of ATMs terminals have averagely improved the performance of Nigerian banks because of the alarming rate of ATM fraud. According to Narteh (2015), convenience, reliability, ease of use, privacy, security, responsiveness and fulfillment were found to be the major dimensions of ATMs service quality. Katono (2011) argued that card issues, reliability, and location are the most important students’ service quality evaluation diemensions of ATMs in Uganda. The study further recommends that managers should consider the identified diemensions when designing an ATM network to encourage usage of ATM facilities and decongest their banks.

According to Haruna (2013) promptness of card issue, service quality of ATM personnel, quality of notes, machine performance, safety and security, cost effectiveness, and service quality of ATM personnel were the critical ATM customer satisfaction parameters . He further argued that based on the beta values, the three most important determinants of satisfaction were found to be promptness of card issue, safety and security and cost effectiveness. Management of these banks must take into account these factors in designing and implementing ATM based policy reforms.

Hiuko (2008) studied the usage of automated teller machines case study: Barclays bank of Kenya and found that the factors that affect the usage of ATMs includes the presence of a guard at ATMs location, the preference for ATMs located at a bank branch, the measures taken to ensure

sufficient security at ATMs location, the reliability of ATM to provide services, the length of the queue at the ATMs, the cleanliness of the ATMs location, sufficient lighting at the ATMs location, the choice of the ATMs location aligned to customer preferences, the surveillance camera deployed at ATMs locations and ATMs located within a lobby (enclosed area) are preferred.

### **2.5.2 Internet Banking and Operational Performance**

Pikkarainen, Pikkarainen, Karjaluoto and Pahnla (2004) defined Internet banking as an Internet portal, through which consumers can use different kind of banking services ranging from bill payment to making investment, thus banks just offering information through their websites are not considered as using Internet banking. According to Jenkins (2007), evidence from survey studies and from banks' websites indicated that banks in North Cyprus have been consistently moving towards providing Internet banking services despite a very small potential market to share. In 2004, the majority of commercial banks claim that the potential market is too small to adopt Internet banking services in North Cyprus. Yet, in 2006 the same banks are in the process of introducing Internet banking as an assurance to their customers that they would be able to maintain a competitive quality of service in the future, hence avoiding losing their customers, to the branches of foreign.

Shanmugam, Wang, Bugshan and Hajli (2015) argued that money transfer and bill payment are the most popular facilities with UK Internet banking adopters. In order to resolve customers' security concerns about Internet banking, some banks have introduced technologies such as cards readers to avoid online fraud. Moreover, the researchers also find out that customers are highly satisfied with Internet banking. Aduda and Kingoo (2012) argued that e-banking has strong and significant marginal effects on return on assets in the Kenyan banking sector and the electronic banking has made banking transaction to be easier by bringing services closer to customers hence improving banking industry performance. Njogu (2014) argued that there is a strong positive relationship between financial performance of commercial banks and Internet banking. Internet banking also helps the commercial banks to lower their cost of banking, through technology which has created greater opportunities to the banks to offer great flexibility to the customers. Commercial banks are also interested in expanding their market through Internet



banking. Okibo and Wario (2014) argued that e-banking has enhanced the growth of customer base for the banking institutions in Kenya, through enhancing banking services accessibility to a larger population in the country and the study recommends that banks should embrace e-banking as a key competitive advantage. Jayawardhena and Foley (2000) argued that Internet banking renders location and time irrelevant, and empowers customers with greater control of their accounts. Banks achieve cost and efficiency gains in a large number of operational areas.

Malhotra and Singh (2007) argued that the larger banks, banks with younger age, private ownership, higher expenses for fixed assets, higher deposits and lower branch intensity evidence a higher probability of adoption of this new technology. Banks with lower market share also see the Internet banking technology as a means to increase the market share by attracting more and more customers through this new channel of delivery. Further, the adoption of Internet banking by other banks increases the probability that a decision to adopt will be made.

Njogu (2014) argued that major changes in the financial performance of commercial banks in Kenya could be accounted to changes in Internet banking, point of sales, automated teller machine, mobile banking and size of the bank at 95% confidence interval .The study revealed that there was a strong positive relationship between financial performance of commercial banks and electronic banking. Adeniran and Junaidu (2014) argued that the distribution of banking services can be understood as a means by which the bank services are tendered to the clients. In conclusion, banks are trying to create a diversified distribution strategy in order to market the wide range of their services so that they offer customers several ways through which they can benefit from the bank services. The two main factors that led to the use of multiple distribution channels by banks are: (i) major changes in the banking sector by growing competition, increasing pressure from competitors and (ii) changing customers' preferences. As result, the banks resorted to compete over price, and now the emphasis is on differentiation by distribution channels used.

Joseph, Wilson and Samuel (2014) contended that information and communication technology (ICT) is perceived as a necessity to pursue the rationalization and cost management due to intensified competition in the financial sector. Information technology has enabled Nigerian banks to streamline the back office operations by improving both efficiency and cost reduction.

Internet banking concept becomes popular when banking activities and information and communication technology are merged. The banking transaction has become much easier after the introduction of computers in banking industry. Commercial banks are able to automate the accounting process and back office functions like maintenance of deposits, calculation of interest and maintenance of general ledgers. The automation of front office function improves the customer service with reduction in processing time, hence improving the overall performance of Nigeria banks. Okiro and Ndungu (2013) argued that the adoption of Internet banking has enhanced performance of the banking industry.

### **2.5.3 Mobile Banking and Operational Performance**

According to Okiro and Ndungu (2013), mobile banking refers to provision and availment of banking and financial services through the help of mobile telecommunication devices. Njenga (n.d.) argued that the terms mobile phone banking and mobile banking (M-Banking) are used interchangeably. M-Banking denotes the access to banking services and facilities offered by financial institutions such as account-based savings, payment transactions and other products by use of an electronic mobile device. Mobile banking has resulted in a multiple effect on the number of solutions available to the clients. This is in addition to more efficient transactional environment and the high substitution of banking points. Mobile banking takes several dimensions of execution of all representing a new distribution channel that allows financial institutions and other commercial players to offer financial services outside traditional banking premises.

Toroitich and Jelaga (2016) studied factors affecting individuals to adopt mobile banking in Kenya: a case of Kenya commercial bank (k.c.b), Eldoret and they concluded that perceived usefulness (PU) and perceived ease of use (PEOU) are the most significant factors affecting adoption of M-banking technology. It is therefore, important for M-banking service providers to emphasize the benefits of M-banking technology to bank customers. It can also be concluded that perceive risk (PR) hinders majority of bank customers from adopting it. M-banking service providers and stakeholders involved in this area should ensure security measures are enforced.

Ibrahim (2015) studied an analysis of adopting mobile banking in Kenya and he concluded that mobile banking has gained much recognition by customers due to ease of use and cost efficiency. This new mode of banking does not need one to wait or walk long distance so as to access banking services. Despite of the benefits and success of mobile banking, its adoption and diffusion in the emerging markets is mostly dependent on what consumers feel about the benefits, expected outcomes and how easy it will be to use. He further argued that mobile banking is of great importance to many people around the world. This development has managed to bring services to customers at very low cost. This system enables customers to participate actively in mobile banking financial services.

Bonface and Ambrose (2015) did a study on mobile banking and financial performance of commercial banks in Kenya. They concluded that the prices of M-banking services had a high positive influence on the financial performance of commercial banks in Kenya. M-Banking helped to promote efficiency and confidence in the financial system thus winning public trust. The study also concluded that security and speed through M-banking had a positive impact on the financial performance of commercial banks in Kenya with many of the banking institutions recording high amount of deposits and thus creating enough pool for willing investors to borrow, thus increased profits.

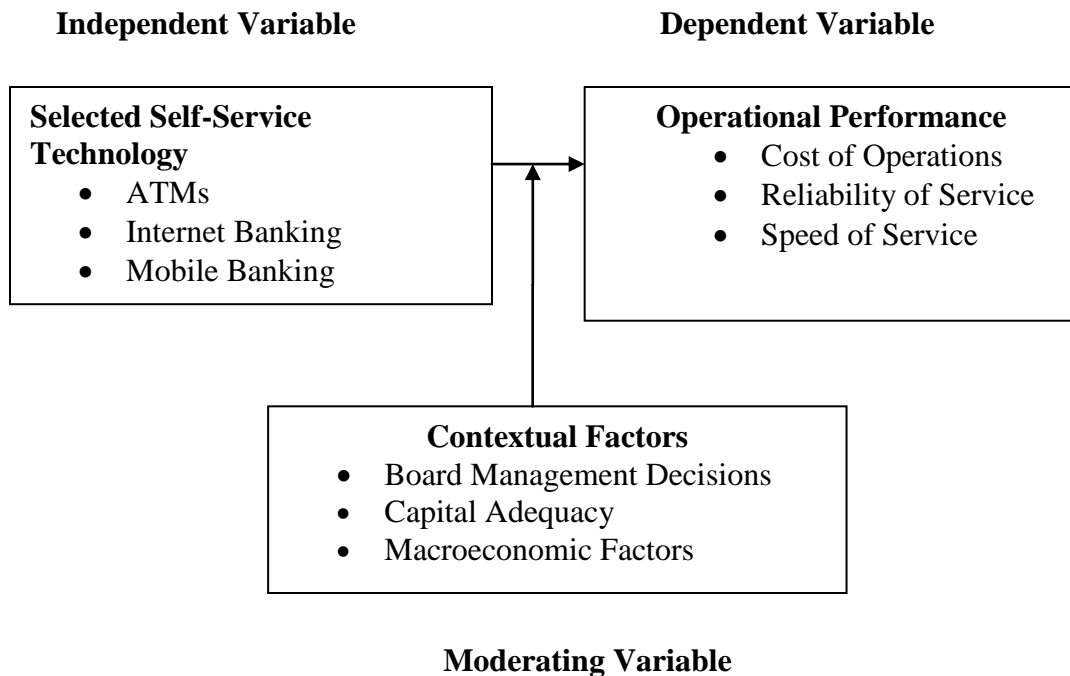
## **2.6 Summary of Reviewed Literature and Research Gap**

From the literature, most studies had focused on self-service technologies and its relationship with organizational performance. They identified that Automated Teller Machines, Internet banking and mobile banking are the SSTs in the banking sector. Narteh (2015); Curran and Meuter (2005); Jegede (2014); Shanmugam, Wang, Bugshan and Hajli (2015); Aduda and Kingoo (2012); Okibo and Wario (2014); Jayawardhena and Foley (2000); Malhotra and Singh (2007), Njogu (2014); (Abdullahi (2012); Aduda and Kingoo (2012); Agboola, (2007) have shown that there is a positive relationship between self-service technology and performance of the commercial banks. Wang, Wang, Lin and Tang (2003) argued that there is a negative relationship between SSTs and performance. None of these studies focused on self-service

technology and operational performance. Therefore, this study will be carried out to determine the effect of SST on operational performance of commercial banks in Nakuru County, Kenya.

## **2.7 Conceptual Framework**

In this study, the independent variable is selected self-service technology and it includes Automated Teller Machines usage which was operationalized through; cash withdrawal, cash deposit and balance inquiry; Internet banking which was operationalized through cash deposit and balance inquiry and mobile banking which was operationalized through cash withdrawal, cash deposit and getting transaction statement and the dependent variable is operational performance which was operationalized through cost of operations, reliability of service and speed of service . The relationship between selected self-service technology and operational performance is moderated by contextual factors which include board management decisions, capital adequacy and macroeconomic factors. The variables and their relationships are shown in Figure 2.3.



**Figure 2.3: Relationship between SST, Contextual Factors and Operational Performance of Commercial Banks**

As shown in Figure 2.3, there exists a relationship between independent and dependent variables in this study. However these variables are affected by contextual factors such as board management decisions, capital adequacy and macroeconomic factors. According to Ongore (2013), the performance of commercial banks in Kenya is driven mainly by board management decisions. According to Frederick (2014), management efficiency measured by operating expenses to total income, capital adequacy measured by equity to total assets and inflation measured by consumer price index (CPI), are significant factors affecting performance of domestic commercial banks in Uganda over the period 2000-2011.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

This study adopted a correlational-cross-sectional research design. According to Zheng (2015), cross-sectional research design is a research approach in which the researchers investigate the state of affairs in a population at a certain point in time. Very often, the elements in the sample survey are selected at random to make inference about the population as a whole. The purpose of a correlational study is to establish whether two or more variables are related Williams (2007).

#### **3.2 Target Population**

The target population of this study comprised of the commercial banks in Nakuru County. There are 31 commercial banks in Nakuru County (Nakuru County Government, 2016) with Kenya Commercial Bank, Co-operative Bank and Equity bank having 3, 2 and 3 branches respectively which makes a total of 31 commercial banks and through simple random sampling, the researcher chose 28 commercial banks. A list of the commercial banks is shown in Appendix III.

#### **3.3 Sampling Technique**

The study adopted a simple random sampling. According to Teddlie and Yu (2007), a simple random sample is one in which each unit (e.g., persons, cases) in the accessible population has an equal chance of being included in the sample, and the probability of a unit being selected is not affected by the selection of other units from the accessible population (i.e., the selections are made independently). The researcher did a simple random sampling for Kenya Commercial Bank, Co-operative bank and Equity bank whereby in each of the three banks, the researcher chose a branch.

#### **3.4 Data Collection**

Primary data was collected regarding the effect of selected self-service technology on operational performance. Data was collected using structured questionnaires. The questionnaires were administered to 56 respondents who are operations and IT managers through drop and pick method. The drop and pick approach is considered an appropriate method for the study because it

gives the respondents time to fill the questionnaire and allows the researcher an opportunity to review the questionnaires before picking them to ensure completeness of responses. Questionnaires are preferred because of their simplicity and low cost associated (Oruma, 2014).

### **3.5 Pilot Study**

A primary test was done on the data collection tools and procedures to identify any likely problems. The researcher took necessary actions before the actual data collection. This test was conducted in Uasin Gishu County specifically Eldoret town whereby 8 questionnaires were administered to operations managers and 8 to IT managers respectively in commercial banks. Eldoret town was preferred because of its proximity and economy. The filled questionnaires were later checked for comprehensiveness and consistency.

### **3.6 Test of Validity, Reliability and Regression Assumptions**

According to Golafshani (2003), validity determines whether the research items truly measure what they are intended to measure or how factual the research results are. To test validity, the researchers sought experts opinion from supervisor, other lecturers, operations and IT managers of the commercial banks. The research questions were developed to represent dimensions of each variable in the research.

According to Golafshani (2003), reliability is the extent to which results of a study are consistent over time and there is an accurate representation of the total population under study. Reliability analysis aims at finding out the extent to which a measurement procedure will produce the same results if the process is repeated over and over again under the same conditions (Toke, Gupta & Dandekar, 2012). Cronbach alpha coefficient was computed using SPSS to determine the value of reliability. According to (Manerikar & Manerikar, 2015), the Cronbach alpha coefficient above 0.7 shows that the measurement procedure is reliable.

The researcher carried out reliability test of the research instrument. The results are as presented in Table 3.1

**Table 3.1 Reliabilty Statistics**

<b>Variable</b>	<b>Cronbach's Alpha</b>	<b>N of Items</b>
Automated teller machines	.910	4
Internet Banking	.847	5
Mobile Banking	.784	4
Operational Performance	.869	9

As shown in Table 3.1, the reliability test for each variable was carried out. Automated Teller Machines usage had a coefficient of 0.910, Internet banking had a coefficient of 0.847, mobile banking had a coefficient of 0.784 and operational performance had a coefficient of 0.869. These results were greater than the threshold of 0.7 and all the items were therefore considered reliable.

**Table 3.2 Diagnostic Test Result**

<b>Variable</b>	<b>Collinearity Statistics</b>	
	<b>Tolerance</b>	<b>VIF</b>
ATMs Usage	.315	3.171
Internet banking	.271	3.689
Mobile banking	.468	2.136

Table 3.2 shows the multicollinearity test for the variables. multicollinearity occurs when two or more predictors in the model are correlated and provide redundant information about the response (Bitange, Wang, & Obara, 2015). The diagnostics variance inflation factor (VIF) and tolerance were used to test multicollinearity of the independent variables. According to O'Brien (2007), a tolerance value less than 0.1 or VIF greater than ten (10) roughly indicates significant multicollnilarity. The results of this study indicate that Tolerance values were greater than 0.1 and VIF values were much lower than the recommended cut-off of 10 (Bitange et al., 2015), thus suggesting the absence of multicollinearity in the data ( respective VIF were Automated Teller Machines = 3.171, Internet banking = 3.689 and mobile banking = 2.136).



### 3.7 Data Analysis and Presentation

Data was collected, coded and analyzed through SPSS (Statistical Package for Social Sciences) version 20. Descriptive statistics such as percentages, means and standard deviations were used to describe the effect of selected self-service technology on operational performance. Pearson Product-Moment correlation was used to test the relationship between selected self-service technology and operational performance. ANOVA test was used to determine the level of significance of the entire model. Values more than 0.05 indicated statistically insignificant relationships while value less than 0.05 indicated statistically significant relationships. The following general multiple regression model below was used in the study.

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \varepsilon$$

Where:

Y= Operational performance

$\beta_0$  = constant

$\beta_1$ - $\beta_3$  = Regression Coefficients

$X_1$  = ATM

$X_2$  = Internet banking

$X_3$  = Mobile banking

$\varepsilon$  = Error Term

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSIONS**

#### **4.1 Introduction**

This chapter presents the results and discussions of the results of the study. The presentation of the results is based on the objectives. The chapter starts with descriptive statistics of the study variables and test of hypotheses. Finally, the chapter presents discussion of the results of the study.

#### **4.2 Descriptive Statistics**

This section presents and discusses results of descriptive statistics of respondents. It also presents descriptive analyses results of the study variables.

##### **4.2.1 Demographic Information**

The study targeted 28 commercial banks in Nakuru County. Responses were obtained from 26 commercial banks representing a response rate of 92.86%. The respondents in this study were operations and IT managers. It also presents descriptive analyses results of the study variables. The demographic information of the respondents is shown in Table 4.1.

**Table 4.1 Descriptive Results on Demographic Information**

<b>Aspect</b>		<b>Frequency</b>	<b>Percent</b>
Gender of IT Managers	Male	19	73.1
	Female	7	26.9
	Total	26	100.0
Gender of Operations Managers	Male	17	65.4
	Female	9	34.6
	Total	26	100
Position of respondents	Operations manager	26	92.86
	IT Technician	26	92.86
Educational Qualification of IT Managers	Diploma	1	3.8
	Undergraduate	17	65.4
	Postgraduate	8	34.6
	Total	26	100.0
Educational Qualification of Operations Managers	Undergraduate	17	65.4
	Postgraduate	9	34.6
	Total	26	100.0
Experience of IT Managers in the bank	1-2 years	7	26.9
	3-4 years	10	38.5
	5-6 years	4	15.4
	7-8 years	4	15.4
	9 years and above	1	3.80
	Total	26	100.0
Experience of Operations Managers in the bank	1-2 years	11	42.3
	3-4 years	5	19.2
	5-6 years	3	11.5
	7-8 years	3	11.5
	9 years and above	4	100.0
	Total	26	

As shown in Table 4.1, out of the 26 IT managers who responded 19 were male, 7 were female. This showed that majority of IT managers in the commercial banks are males. Out of the 26 operations managers who responded, 17 were male and 9 were female. This showed that majority of the operations managers are male. The results also revealed that there 26 operations and IT managers respectively.

Out of the 26 IT managers who responded, 1 had Diploma, 17 had Undergraduate and 8 of them had Postgraduate degree. This showed that majority of the IT managers were graduates. Out of the 26 operations managers who responded, 17 had undergraduate and 9 of them had postgraduate degree. The results show that majority of the operations managers were graduate as well.

Out of the 26 IT managers who responded, 7 of them had an experience of 1-2 years, 10 had experience for 3-4 years, 4 of them had experience for 5-6 years, 4 had experience for 7-8 years and 1 had experience for 9 years and above. The results show that majority of the IT managers had experience for 3-4 years. Out of the 26 operations managers who responded, 11 had 1-2 years of experience, 5 had 3-4 years of experience, 3 had experience for 5-6 years, 3 had experience for 7-8 years and 4 had experience for 9 years and above. The results show that majority of the operations managers had experience for 1-2 years.

#### **4.2.2 Automated Teller Machines Usage**

The study sought to describe automated teller machines usage in commercial banks. Respondents were asked to indicate the extent to which they agreed that the statements on the items of dimensions of automated teller machines usage described their commercial banks in response to the objective. Each item had a 5-point Likert-type scale, ranging from 'Not At All' (1) to 'Very Great Extent' (5). To measure the distribution of the responses to the statements, mean and standard deviation were used. The results are presented in Table 4.2

**Table 4.2 Mean and Standard Deviation for Measures of Automated Teller Machines Usage**

	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std. D</b>
In my bank, ATMs are constantly serviced	26	1	5	3.70	1.253
My bank embraces use of ATMs	26	1	5	4.40	1.226
My bank has invested in latest ATMs technology	26	1	5	3.52	1.135
ATMs are user-friendly	26	1	5	4.14	1.281
Valid N (listwise)	26				

As shown in Table 4.2, the mean scores for automated teller machines usage was 3.94 and the standard deviation was 1.224. The highest mean score suggests that the respondents were satisfied with the statement “my bank embraces use of ATMs” (M=4.40, SD=1.226), “ATMs are user friendly” (M=4.14, SD=1.281), “in my bank ATMs are constantly serviced” (M=3.70, SD=1.253) and “my bank has invested in latest ATMs technology” (M=3.52, SD=1.135).

The results show that there was no variability in respondents’ response. The results generally indicate that the respondents agreed with the statements regarding ATMs. These results were interpreted to mean that the commercial banks embrace and use ATMs to a very great extent.

### **4.2.3 Internet Banking**

The study sought to describe internet banking in commercial banks. Respondents were asked to indicate the extent to which they agreed that the statements on the items of dimensions of Internet banking described their commercial banks in response to the objective. Each item had a 5-point Likert-type scale, ranging from ‘Not At All’ (1) to ‘Very Great Extent’ (5). To measure the distribution of the responses to the statements, mean and standard deviation were used. The results are presented in Table 4.3.

**Table 4.3 Mean and Standard Deviation for Measures of Internet Banking**

	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std. D</b>
My bank embraces use of internet banking	26	1	5	3.09	1.320
Our customers use our internet banking	26	1	5	3.43	1.356
Our internet banking is user-friendly	26	1	5	4.26	1.878
Internet banking has enhanced banking services accessibility	26	1	5	3.79	1.894
Our internet banking service is secure	26	1	5	3.80	1.454
Valid N (listwise)	26				

As shown in Table 4.3, the mean scores for internet banking were 3.68 while standard deviation was 1.580. The mean scores suggests that majority of the respondents were satisfied with the statement “that internet banking is user-friendly” (M=4.26, SD=1.878), “our internet banking is secure” (M=3.80, SD=1.454), “internet banking has enhanced banking services accessibility” (M=3.79, SD=1.894), “our customers use our internet banking” (M=3.43, SD=1.356) and “my bank embraces use of internet banking” (M=3.09, SD=1.320).

The results generally indicate that the respondents agreed with the statements regarding Internet banking in their commercial banks. These results were interpreted to mean that the commercial banks invested in internet banking to a great extent.

#### **4.2.4 Mobile Banking**

The study sought to describe mobile banking in commercial banks. Respondents were asked to indicate the extent to which they agreed that the statements on the items of dimensions of mobile banking described their commercial banks in response to the objective. Each item had a 5-point Likert-type scale, ranging from ‘Not At All’ (1) to ‘Very Great Extent’ (5). To measure the distribution of the responses to the statements, mean and standard deviation were used. The results are presented in Table 4.4

**Table 4.4 Mean and Standard Deviation for Measures of Mobile Banking**

	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std. D.</b>
Our bank embraces use of mobile banking	26	1	5	3.30	1.267
Our customers use our mobile banking	26	1	5	3.52	1.166
Our mobile banking service is secure	26	1	5	3.67	1.232
We keep our mobile banking customers' information private and confidential	26	1	5	3.29	1.241
Valid N (listwise)	26				

As shown in Table 4.4, the mean scores for all the items for mobile banking were 3.45 and the overall standard deviation was 1.227. The highest mean score was for the item “our mobile banking service is secure” (M=3.67, SD=1.232), “our customers use our mobile banking” (M=3.52, SD=1.166), “our bank embraces use of mobile banking” (M=3.30, SD=1.267) and “we keep our mobile banking customers’ information private and confidential” (M=3.29, SD=1.241)

The results generally indicate that the respondents agreed with the statements mobile banking. These results were interpreted to mean that the commercial banks embrace and use mobile banking.

#### **4.2.5 Operational Performance**

The study sought to describe operational performance of commercial banks. Respondents were asked to indicate the extent to which they agreed that the statements on the items of dimensions of operational performance described their commercial banks. Each item had a 5-point Likert-type scale, ranging from ‘Not At All’ (1) to ‘Very Great Extent’ (5). To measure the distribution of the responses to the statements, mean and standard deviation were used. The results are presented in Table 4.5.

**Table 4.5 Mean and Standard Deviation for Measures of Operational Performance**

	N	Min	Max	Mean	Std. D.
Reduction in cost of operations	26	3	5	4.58	1.578
Reduction in cost of labor	26	3	5	4.78	1.804
Reduction in cost of maintenance	26	4	5	4.59	1.471
Our services are reliable	26	4	5	4.58	1.504
Our bank provides reliable internet service	26	3	5	4.62	1.571
Our bank has skilled personnel on network management to avoid down time	26	2	5	4.69	1.679
Prompt delivery of service	26	3	5	4.54	1.582
Minimized delay in service delivery	26	2	5	4.50	1.762
Easy accessibility of service	26	2	5	4.54	1.706
Valid N (listwise)	26				

As shown in Table 4.5, the mean score for the mobile banking was 4.57 and the overall standard deviation was 1.629 which reflects that the responses were not far spread from each other among the respondents thus indicating low variability in response to the statements. The item with the highest score was “reduction in cost of labor” (M= 4.78, SD=1.804) while the item with the lowest score was “minimized delay in service delivery” (M=4.50, SD= 1.762). The results generally indicate that the respondents agreed with the statements regarding operational performance in their commercial banks. These mean scores indicate that the respondents generally agreed that the operational performance of their commercial banks increased as a result of self-service technology.

### 4.3 Test of Hypotheses

This section discusses the results of hypotheses testing in relation to the research hypotheses. The study sought to establish how the variables of the study; automated teller machines usage, Internet banking and mobile banking and operational performance were related (Hypotheses H<sub>01</sub>



to H<sub>03</sub>). The analysis was done using Pearson's Product Moment correlation. The results are presented in Table 4.6

**Table 4.6 Correlations Matrix for Automated Teller Machines Usage, Internet Banking, Mobile Banking and Operational Performance**

Variables		ATM Usage	Internet Banking	Mobile Banking	Operational Performance
Automated Teller Machines Usage	Pearson Correlation	1	.821**	.661**	.545**
	Sig. (2-tailed)		.000	.000	.000
	N	26	26	26	26
Internet Banking	Pearson Correlation	.821**	1	.718**	.597**
	Sig. (2-tailed)	.000		.000	.000
	N	26	26	26	26
Mobile Banking	Pearson Correlation	.661**	.718**	1	.615**
	Sig. (2-tailed)	.000	.000		.000
	N	26	26	26	26
Operational Performance	Pearson Correlation	.545**	.597**	.615**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	26	26	26	26

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

#### 4.3.1 Automated Teller Machines Usage and Operational Performance

The study sought to establish effect of Automated Teller Machines usage on operational performance. It was hypothesized that Automated Teller Machines usage has no significant effect on operational performance. Data was analyzed using Pearson's Product Moment correlation and the results are presented in Table 4.6.

The results in Table 4.6 showed that there is a significant positive correlation between Automated Teller Machines usage and operational performance ( $r = 0.545$ ,  $p < 0.05$ ). Therefore,

according to the results the hypothesis that Automated Teller Machines usage has no significant effect on operational performance of commercial banks was rejected. Therefore, it was concluded that automated teller machines usage affects operational performance.

This study is consistent with the findings of Jegede (2014) who argued that that Automated Teller Machines contribute to the effectiveness of banking sector. He further argued that Automated Teller Machine stimulate banking industry growth. This is expressed in the number of customers using the ATMs.

#### **4.3.2 Internet Banking and Operational Performance.**

The study sought to establish the effect of Internet banking on operational performance of commercial banks. It was hypothesized that Internet banking has no significant effect on operational performance. Data was analyzed using Pearson's product moment correlation. The results are presented in Table 4.6.

The results in Table 4.6 showed that there was a significant positive correlation between internet banking and operational performance ( $r = 0.597, p < 0.05$ ). According to the results the hypothesis that Internet banking has no significant effect on operational performance of commercial banks was rejected. It was therefore, concluded that Internet banking affects operational performance.

The findings of this study is in line with the findings of Jattani (2014) who concluded that Internet banking positively and significantly influences the operational efficiency of commercial banks in Kenya. The findings are also consistent with the findings of Kagan, Acharya and Rao (2005) who concluded that banks that provide extensive online banking services tend to perform better than those who lag behind and that online banking improves the earnings of the banks.

#### **4.3.3 Mobile Banking and Operational Performance**

The study sought to establish the effect of mobile banking on operational performance of commercial banks in. It was hypothesized that mobile banking has no significant effect on operational performance. Data was analyzed using Pearson's product moment correlation. The results are presented in Table 4.6.

The results in Table 4.6 showed that there was a significant positive relationship between mobile banking and operational performance ( $r = 0.615$ ,  $p < 0.05$ ). According to the results of the study, the hypothesis that mobile banking has no significant effect on operational performance of commercial banks was rejected. It was therefore, concluded that mobile banking affects operational performance.

The findings of the study are consistent with the findings of Adewoye (2013) who established that mobile banking improve banks service delivery in a form of transactional convenience, saving of time, quick transaction alert and cost saving. The findings of the study are also consistent with the study by Kiganane, Bwisa and Kihoro (2012), in which they concluded that mobile banking had positive significant effect on sales volume, profit, worker productivity and customer satisfaction among others.

#### **4.3.4 Effect of Selected Self-Service Technology on Operational performance**

The study sought to establish the joint effect of selected self-service technology dimensions on operational performance. It was hypothesized ( $H_{04}$ ) that self-service technology dimensions have no significant effect operational performance. The hypothesis was done using multiple regression. The results of the analysis are presented in Table 4.7

**Table 4.7 Regression Results for Joint Effect of Automated Teller Machines Usage, Internet Banking and Mobile Banking on Operational Performance**  
**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.656 <sup>a</sup>	.430	.422	.48841

**ANOVA<sup>a</sup>**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	38.018	3	12.673	53.126	.000 <sup>b</sup>
Residual	50.332	23	.239		
Total	88.351	26			

**Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.761	.179		9.855	.000		
Automated Teller Machines Usage	.073	.080	.085	.922	.000	.315	3.171
Internet Banking	.204	.078	.260	2.604	.010	.271	3.689
Mobile Banking	.329	.067	.372	4.896	.000	.468	2.136

a. Predictors: (Constant) , Automated Teller Machines Usage, Internet Banking, Mobile Banking

b. Dependent Variable: Operational Performance

Regression Model in Table 4.7 showed the effect of self-service technology dimensions on operational performance. The Model showed that R Square is 0.430, which shows that 43% of the variation in operational performance is explained by the joint dimensions of self- service technology.

The ANOVA demonstrates test for the joint effect of the dimensions of self-service technology on operational performance. The ANOVA results showed that the model was significant ( $F = 53.126, p < 0.05$ ). This indicates that the joint dimensions of self-service technology; automated teller machines usage, Internet banking and mobile banking have a positive significant effect on operational performance.

The standardized coefficients showed that the effect of automated teller machines usage on operational performance is positive and significant ( $\beta = 0.085, t=0.922, p < 0.05$ ), the effect of internet banking on operational performance is positive and significant ( $\beta =0.260, t =2.604, p < 0.05$ ), the effect of mobile banking on operational performance is positive and significant ( $\beta =0.372, t = 4.896, p < 0.05$ ). This show that mobile banking has the greatest effect on operational performance ( $\beta =0.372$ ).

The full regression model in Table 4.7 can also be interpreted to show how dimensions of self-service technology affect operational performance. All the three variables: automated teller machines usage, Internet banking and mobile banking had significant results. The unstandardized coefficients show that for every unit increase in automated teller machines usage, a 0.073 unit increase in operational performance is predicted holding other variables constant. For every unit increase of Internet banking, a 0.204 unit increase in operational performance is predicted holding other variables constant and for every unit increase in mobile banking, a 0.329 increase in operational performance is predicted holding other variables constant.

Therefore, the equation for the regression model can be given by:

$$Y = 1.761 + 0.073X_1 + 0.204X_2 + 0.329X_3$$

The findings of this study are consistent with the findings of Haruna (2013) who found the critical ATM customer satisfaction parameters to be promptness of card issue, service quality of ATM personnel, quality of notes, machine performance, safety and security, cost effectiveness, and service quality of ATM personnel. Based on the beta values, the three most important determinants of satisfaction were found to be promptness of card issue, safety and security, and cost effectiveness. Management of these banks must take into account these factors in designing and implementing ATM based policy reforms as they affect their performance. Okiro and Ndungu (2013) found that the adoption of internet banking has enhanced performance of the banking industry due to increased efficiency, effectiveness and productivity. Kiganane et al. (2012) found that mobile phone calls, M-pesa and mobile instant messaging had positive significant effect on sales volume, profit, worker productivity and customer satisfaction ratings among others. Mutua (2012) found that there was a positive relationship between mobile banking and financial performance of commercial banks in Kenya. This could be attributed to the trends recorded in the two variables where the number of users and monthly transfers maintained a positive growth rate and thereby had a positive influence on the performance of the commercial banks.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter presents the summary of the research findings, conclusions and recommendations of the study. The chapter discusses summary of findings regarding the research objectives, hypotheses and conclusions of the study. Finally, the chapter discusses implications of the study to management theory and practice and directions for further research.

#### 5.2 Summary of the Findings

The first objective was to find out the effect of automated teller machines usage on operational performance of commercial banks. The findings reveal a positive and significant relationship between automated teller machines usage and operational performance of commercial banks. Thus hypothesis  $H_{01}$  which predicted that ATMs usage has no significant effect on operational performance was rejected. Regarding automated teller machines usage, the findings of the study revealed that commercial banks embracing use of ATMs or ATMs being user-friendly was a factor with the greatest effect on operational performance. However, ATMs being constantly serviced and investing in the latest ATMs technology had the least effect on operational performance.

The second objective of the study was to determine the effect of internet banking on operational performance of commercial banks. The findings revealed a positive significant relationship between internet banking and operational performance. Therefore hypothesis  $H_{02}$  which predicted that Internet banking has no significant effect on operational performance was rejected. Regarding Internet banking, the findings of the study revealed that internet banking being user-friendly, internet banking being secured and internet banking enhancing banking services accessibility had greatest effect on operational performance. However, banks embracing use of internet banking and customers using internet banking had the least effect on operational performance.

The third objective of the study was to determine the effect of mobile banking on operational performance. The findings revealed a positive significant relationship between mobile banking and operational performance. Hence hypothesis H<sub>03</sub> which predicted that mobile banking has no significant effect on operational performance was rejected. Regarding mobile banking, mobile banking service being secure and customers using mobile banking were factors with the greatest effect on operational performance while banks embracing use of mobile banking and keeping mobile banking customers' information private and confidential were factors with least effect on operational performance.

The fourth objective of the study was to determine the joint effect of automated teller machines usage, Internet banking and mobile banking on operational performance. The corresponding hypothesis was tested using multiple regression analysis. The regression results showed that the joint effect of automated teller machines usage, Internet banking and mobile banking explained a greater variance in operational performance than individual variables alone. Therefore hypothesis H<sub>04</sub> which predicted that ATMs usage, Internet banking and mobile banking jointly have no significant effect on operational performance was rejected. The findings further revealed that mobile banking had the greatest effect on operational performance.

### **5.3 Conclusions**

The results of the study revealed that commercial banks in Nakuru County have embraced self-service technology to a greater extent. The findings of the study lead to the following conclusions:

Automated Teller Machines usage affects operational performance of commercial banks; automated teller machines usage is positively related to the operational performance of commercial banks. The finding confirms that automated teller machines usage is crucial in enhancing operational performance. Hence, the more investment in automated teller machines usage, the higher the improvement in operational performance.

Results of the study also revealed that there is a link between Internet banking and operational performance; hence, Internet banking affects operational performance. Further, the results of the



study also revealed that mobile banking affects operational performance. The finding confirms that mobile banking is crucial in enhancing operational performance. Hence, the higher the investment in mobile banking, the higher the improvement in operational performance.

Finally, the results show that the joint effect of automated teller machines usage, internet banking and mobile banking on operational performance is greater than the effect of individual variables alone. This shows that combining automated teller machines usage, internet banking and mobile banking achieves a greater effect on operational performance than implementing individual variables one at a time. Thus in the long run, this creates a high operational performance for the commercial banks.

#### **5.4 Recommendations of the Study**

The aim of the study was to establish the effect of selected self-service technology on operational performance. The findings of the study conducted in commercial banks in Nakuru County have various implications for operations management and management policy and practice explained below.

##### **5.4.1 Recommendations for Management Policy and Practice**

This study has implications to management policy and practice. First, the study confirmed a positive relationship between automated teller machines usage and operational performance. This implies that automated teller machines usage is essential for an increased operational performance. Thus to create a competitive edge and improve operational performance, commercial banks need to invest more in automated teller machines. Mobile banking having the greatest effect on operational performance among the dimensions of self-service technology needs to be the key vision of operational performance.

Lastly, the results show that the joint effect of automated teller machines usage, internet banking and mobile banking have a greater effect on operational performance than the effect of the individual variables. This implies that to improve operational performance, commercial bank managers need to integrate all dimensions of self-service technology.

#### **5.4.2 Recommendations for Further Research**

The study adopted a correlational-cross-sectional research design in which data was collected once at a single point in time due to constraints of cost and time. Future research can adopt longitudinal research design in data collection to enhance understanding of the linkages between variables or other causal relationships involved in the study.

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## APPENDICES

Appendix I Letter of Introduction

EGERTON UNIVERSITY

P.O BOX 536-20115

EGERTON

Dear Sir/Madam

### **RE: PERMISSION TO CARRY OUT ACADEMIC RESEARCH**

I am a student at Egerton University undertaking a Master of Business Administration (MBA) in the Faculty of Commerce, Department of Accounting, Finance and Management Science. I have completed my course work and currently conducting a research project titled **“Effect of Selected Self-Service Technology on Operational Performance of Commercial Banks in Nakuru County, Kenya”** as part of fulfillment of the course.

The purpose of this letter is to kindly request you to fill in the questionnaire objectively and also give any other additional information that you may feel is necessary for the study. All the data collected for this study will be treated with utmost confidentiality and will solely be used for academic purposes.

Thank you.

Yours' Faithfully

Hussein Mohamed Abdullai

Appendix II Research Questionnaire

Please answer the following questions by a tick (√) in the relevant column. You may also make comments if considered necessary in the space provided at the back of questionnaire, clearly indicating the section and the row. Any information provided will be treated with utmost confidentiality.

**Section A: Demographic Information**

1. Gender

Male [ ]

Female [ ]

2. What is your position in the bank?

Operations Manager [ ]

IT Technician [ ]

3. Educational qualification

a. Secondary [ ]

b. Diploma [ ]

c. Undergraduate [ ]

d. Postgraduate [ ]

e. Others (Specify).....

4. How long have you been working with this bank?

a. 1-2 years [ ]

b. 3-4 years [ ]

c. 5-6 years [ ]

d. 7-8 years [ ]

e. 9 years and above [ ]

**Section B: Selected Self-Service Technology**

5. The statements below relate to the effect of selected self-service technology on operational performance of commercial banks. Kindly indicate the extent to which you agree with the following statements: The scale ranges from Not At All to Very Great

Extent. Not At All (1), Little Extent (2), Moderate Extent (3) Great Extent (4), Very Great Extent (5).

	<b>Statements</b>	<b>Rating</b>				
		1	2	3	4	5
	<b>Automated Teller Machines (ATMs) Usage</b>					
	In my bank, ATMs are constantly serviced					
	My bank embraces use of ATMs					
	My bank has invested in latest ATMs technology					
	ATMs are user-friendly					
	<b>Internet Banking</b>					
	My bank embraces use of internet banking					
	Our customers use our internet banking					
	Our internet banking is user-friendly					
	Internet banking has enhanced banking services accessibility					
	Our internet banking service is secure					
	<b>Mobile Banking</b>					
	Our bank embraces use of mobile banking					
	Our customers use our mobile banking					
	Our mobile banking service is secure					
	We keep our mobile banking customers' information private and confidential					

**Section C: Operational Performance**

6. The following statements relate to Operational performance. Using the scale Not At All (1), Little Extent (2), Moderate Extent (3), Great Extent (4), Very Great Extent (5), please tick as appropriate the extent to which you agree with them.

	Statement	Rating				
		1	2	3	4	5
	<b>Cost of Operations</b>					
	Reduction in cost of operations					
	Reduction in cost of labour					
	Reduction in cost of maintenance					
	<b>Reliability of Service</b>					
	Our services are reliable					
	Our bank provides reliable internet service					
	Our bank has skilled personnel on network management to avoid down time					
	<b>Speed of Service</b>					
	Prompt delivery of service					
	Minimized delay in service delivery					
	Easy accessibility of service					

Thank you for taking your time to fill the questionnaire

Appendix III List of Commercial Banks in Nakuru County

	<b>Name of Commercial Banks</b>
1	ABC Bank
2	Bank of Africa
3	Barclays Bank-East Branch
4	Bank of Baroda
5	Chase Bank
6	Consolidated Bank of Africa
7	Commercial Bank of Africa
8	Co-operative Bank –East Branch
9	CFC Stanbic Bank
10	Credit Bank
11	Diamond Trust Bank
12	Equity Bank-Gate House
13	Ecobank Kenya Ltd
14	Family Bank
15	First Community Bank
16	GT Bank
17	Guardian Bank
18	I&M Bank
19	Jamii Bora Bank
20	Kenya Commercial Bank- Menengai Crater Branch
21	National Bank of Kenya
22	M Oriental Bank
23	NIC Bank
24	Prime Bank
25	Spire Bank
26	Standard Chartered Bank
27	Sidian Bank
28	Trans-National Bank
	<b>TOTAL</b>

Source: Nakuru County Government Website As At 13<sup>th</sup> July, 2016

Appendix IV Budget

Item(s)	Unit of Measure	No. of items	Unit cost (Kshs)	Total cost (Kshs)
Printing of draft proposal	Page	50	10.00	500.00
Binding of draft proposal	Copy	5	100.00	500.00
Printing proposal for defense	Page	50	10.00	500.00
Photocopying proposal	Page	250	2.00	500.00
Binding final proposal	Copy	6	200.00	1,200.00
Stationary	Ream	5	500.00	2,500.00
Printing questionnaire	Page	4	10.00	40.00
Photocopying questionnaires	Copy	60	2.00	120.00
Printing draft project	Page	70	10.00	700.00
Photocopying draft project	Page	425	2.00	850.00
Printing final project	Page	85	10.00	850.00
Binding Final Project	Copy	6	100.00	600.00
Field work			15,000.00	15,000.00
Publishing research project		1	20,000.00	20,000.00
<b>Grand Total</b>				<b>43,860.00</b>



Appendix V Work Plan

<b>YEAR</b>	<b>2016</b>					<b>2017</b>	
<b>ACTIVITY/MONTH</b>	Aug	Sep	Oct	Nov	Dec	Jan	June
<b>Proposal Preparation</b> ○ Preliminary Literature Review ○ Problem Identification ○ Proposal Writing and Submission							
<b>Departmental proposal Defense</b> ○ Oral examination at the Department ○ Correction of Proposal after Defence							
<b>Data Collection</b> ○ Administration of Research Instrument ○ Collection of Research Instrument for data Analysis and Data Analysis Report Writing and Project Defense							
○ Correction of Project after Defence Submission of Project to Graduate School							
<b>Graduation</b>							