

**INFORMATION COMMUNICATION TECHNOLOGY ADOPTION AND  
PERFORMANCE OF DEPOSIT TAKING SAVINGS AND CREDIT CO-OPERATIVE  
SOCIETIES IN KIAMBU COUNTY, KENYA**

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## DECLARATION

This project is my work and has never been submitted for the award of degree to any other institution.

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I testify that this Project is an original work of my student named above.

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## **DEDICATION**

This Project is devoted to my family, Miriam, Nicholas, and Grace; you are pillars in my life and an inspiration to seek higher education. Am sure this project will inspire you. God bless you.

## **ACKNOWLEDGMENT**

I am much indebted to my creator for His unmerited loveliness with knowledge and wisdom to carry out this research. Secondly, I show gratitude my intimate, colleagues, and all my foxes for their unceasing engagement, material and moral sustenance all through my academic journey. It is also my pleasure to acknowledge my supervisor and mentor Dr. Joshua Tumuti for his guidance, patience, and support. Lastly, am grateful to the School of Business in Kenyatta University for the opportunity to advance my career, may the Lord bless you.

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## ACRONYMS AND ABBREVIATIONS

<b>DT SACCOS</b>	Deposit Taking Saccos
<b>E-Commerce</b>	Electronic Commerce
<b>ICT</b>	Information Communication Technology
<b>IT</b>	Information Technology
<b>IOT</b>	Internet of Things
<b>KUSCCO</b>	Kenya Union Of Saving and Credit Co-Operatives
<b>LAN</b>	Local Area Network
<b>SACCO</b>	Savings and Credit Cooperative
<b>SASRA</b>	Sacco Societies Regulatory Authority
<b>SMS</b>	Short Message System
<b>SME</b>	Small and Medium Enterprises
<b>WOCCU</b>	World Council of Credit Unions
<b>WAN</b>	Wide Area Network

## OPERATIONAL DEFINITION OF TERMS

<b>Credit growth</b>	This refers to loan or advances increment as disbursed to various customers
<b>Cyber security</b>	Techniques of protecting computers, networks, software, and data from unauthorized access.
<b>Data security</b>	These are measures undertaken by organizations to safeguard data integrity, access, and storage.
<b>DT SACCOs</b>	These are licensed and regulated Saccos by SASRA to take and keep deposits from the public. Their operations are similar to commercial banks.
<b>E-Commerce</b>	It's a platform where businesses can purchase and sell goods and services to their consumers online.
<b>Efficiency</b>	This refers to turn around time or processes utilised to deliver a service within a stipulated time or location.
<b>Information Communication Technology</b>	Refers to the technique that initiates a process, maintains and shares information.
<b>Information Technology</b>	Consists of all the hardware and software that an organization utilizes to achieve its financial goals. This includes computer peripherals, storage devices, and mobile devices, and computer applications.

<b>ICT adoption</b>	This is the implementation of innovative techniques towards efficient data processing, communication, and storage to impact the organization's performance positively.
<b>Internet of Things</b>	This is the convergence of data, processes, and people to collect and analyze data towards understanding behavior and artificial intelligence.
<b>Network infrastructure</b>	Refers to communication media, protocols, and hardware to link devices and people such as routers, WAN, LAN, Internet Of Things, intranet, or extranet.
<b>Performance</b>	Defined as a quantitative measure of a firm's resource allocation to make advancement in terms of membership, Turnover, Services efficiency, Savings, and Loans facilities.
<b>Savings</b>	This refers to funds set aside by members in their accounts to be used in future
<b>SMS portal</b>	This refers to short messaging system platform which delivers messages to members Mobile devices
<b>Turnover</b>	This refers to total incomes within a specified period
<b>Virtual banking</b>	Refers to carrying banking transactions over the internet or handheld devices without visiting physical banking halls

## ABSTRACT

Organizations use Information Communication Technology (ICT) to transform their internal processes, data processing, and services delivery to consumers. The Savings and credit cooperatives (SACCOs) regulator require them to implement robust ICT platforms as part of the prudential standards set. Though there is an observable adoption of ICT by Deposit Taking (DT) SACCOs to provide services to members, there are concerns of how the DT SACCOs have adopted ICT, similarly, there is a noted diminishing rate of growth in performance in regard to DT SACCOs' turnover, membership growth, savings and credit mobilization. The intentions of the study was to determine; the impact of mobile banking on DT SACCOs and performance in Kiambu County, Kenya, the influence of agency banking on performance of DT SACCOs in Kiambu County, Kenya, the usage of Automated Teller Machine on the performance of DT SACCOs and to assess SACCOs' data security policies and controls. The study used the technology acceptance model, Diffusion of innovation and Resource based view theory. The study used a descriptive research design on a population of 14 deposit-taking SACCOs which were licensed and operating in Kiambu, Kenya between the years 2010 and 2017. The researcher used the purposive sampling technique to pick 4 respondents, who were the Branch Manager, ICT, Operations, and Finance managers, per DT SACCO. This translated to a targeted population of 56 respondents. The primary data was collected using self administered semi structured questionnaire to the respondents. The research used multiple regression analysis techniques to analyse data while the presentation of the findings was done using tables and graphs. The study found that respondents considered mobile banking as a tool to enable members to access services anywhere-anytime as well as positively affecting DT SACCOs Performance. It was further found that the majority of the respondents felt safe as users while using the Networks and internet services as well as affirming that Saccos used stored data to determine the member's financial behavior. Similarly, it was affirmed by the respondents that agency banking positively affected commissions and the overall income of the SACCOs. The study found that mobile banking helped the DT-Saccos to improve their performance by enabling services accessible through mobile. Additionally, the study found that agency banking positively enlarged the income-generating channels as the DT Saccos do not need to have physical branches as they can deliver services through virtual operations. Lastly, the study found that data security policies are important to business continuity in these Saccos. DT-Saccos can utilize data analytics to customize services and communication to their members. The study therefore concluded that ICT adoption could explain 56.7 % of the positive variations on the performance of DT SACCOs in Kiambu County. The study, therefore, recommends that DT Saccos ought to deepen their investments in ICT innovations as the technology offers effective and efficient channels which in turn positively influence their overall performance. The Saccos further needs to frequently revamp their technological innovations to match market requirements; this should be coupled with training and sensitization to members on these developments.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background of the study

Among other monetary organizations, Savings and Credit Co-operatives (SACCOs) offer a variety of services with a motivation for profitability and sustainability. They invest more in sustainability, profitability, cost reduction, and customer relations. SACCOs as financial institutions, pool risk through a collection of deposits from a large group of individuals who want to grow their credit limit. (Jeucken and Bouma, 2017).

Alhaji and Rosmaini, (2012) states that the banking sector is vital in every economy. SACCOs offer loans and savings under savings and loans associations. All these services are critical to the economy and enhancing their efficiency will contribute to a thriving economy. In particular, information technology concerns the use of a variety of electronic-based devices, codes, and electronic data to enhance target functionalities or processes. SACCOs like many other organizations have adopted Information Communication Technology (ICT) in their operations intending to reduce operating costs and enhancing operations. Information technology goes beyond just purchasing hardware and software by focusing on the utility of the hardware and software in delivering banking services (Jeucken *et al.*, 2017).

There is a need to ensure that the technology adopted contributes to the synergy and profitability of these crucial financial institutions. According to (Rogers, 2003) *technology* is a tool that minimizes the variance in the relationships of cause and effect which leads to the attainment of desired output which consists of hardware and software. The hardware is defined as technology embodied as a physical or material object, while the software is the tool information base. (Rogers, 2003). Software, as an invention of technology, has low levels of both adoption and observability; it should however be put into consideration during research.

Computer crime survey founded on the 351 security respondents within the United States government and various financial organizations found out 46 percent of the responding organizations had suffered a security breach in their computers in a span of one year. This involved malware attacks (67%), followed by phishing fraud (39%), Mobile devices and laptop scams (34%), botnets attacks (29%), and insider dealings (25%). The costs of these crimes could be in the billions of dollars (Laudon, 2012). Mpofu *et al.* (2011) found that in developing nations, ICT adoption by SMEs', generally hasn't made maximum use of the intensity of the Internet to expand their operations beyond their localities except for using simple communication tools such as emails.

While technology continues to evolve and increase in its utility, SACCOs are finding it challenging to shift to the latest technology while maintaining an integrated operating environment. SACCO's have the burden of adopting the latest technology releases on each operation front. The information technology also creates new operational tasks such as cybersecurity measures that most SACCOs did not traditionally envisage in their organizational culture (Okiro & Ndungu, 2013). Currently, the SACCO industry is faced with diverse challenges such as growth in membership, digital transformation, and automation of processes. Serianu (2018). By adopting ICT, SACCOs can recruit members without opening physical branches, offer Sacco products online at the comfort of members as well as simplify the services delivery model. ICT is part of the conventional business strategy, as well in the organization; it is being taken up by everyone and every department. ICT is no longer just another component in the enterprise but an essential innovation in the organization and hence ICT departments are under increasing pressure to achieve an above-average performance using ICT (Kamau, 2015).

An organization that is participating in a competitive and dynamic market must make things happen, it must invent new ways of maximizing returns. If it does not invent, it risks being overrun by the competition (Kimmingi, 2010). This is further affirmed by Vimala (2015) who found that the banking industry is becoming complex and the financial institutions which fail to tap the full potential of ICT to take their services to the consumer will stand to lose.

There were over 100 DT-SACCOs connected to Cooperative Bank ATM networks while a few others linked to Pesa point ATM networks (Sasra report, 2010). As of the year 2017, 114 DT-Saccos had been connected to ATM networks while 60 Saccos were unconnected. Similarly, 120 DT-SACCOs were utilizing Mobile banking applications. AS of the year 2017, there were 107 DT-SACCOs acting as Agencies of other financial institutions, however, a new trend is witnessed in which the said SACCOs are rolling out their Agencies (Sasra report, 2017)

SACCO Societies adoption of digital services is hampered by huge capital expenditure investments associated with rolling out ICT infrastructures, measures to curb cyber-insecurity, and deployment of qualified and competent ICT experts all necessary to sustain the SACCOs' Management Information Systems. This is bound to impact the ease of use and accessibility of financial services so as remain competitive as well as growing the non-funded incomes. Therefore, SACCOs lack options, but to invest heavily in the deployment of technologies that are both digital and financial. Key customer-oriented services such as membership application, application for and approval of credit facilities, servicing of loans, deposits and withdrawals, funds transfer, utility bills payments, and online statements, should be made a vital component on the internet or through customized mobile applications; failure to which customers will transfer to other players offering effective and accessible services. SASRA report (2017)

For DT Saccos in Kiambu County to compete competitively and positively influence their performance, the use of technology should be enhanced to match up to their competitors who continuously deploy new technologies to influence their performance. This includes mobile banking, money transfers, online transactions, ATM transactions, and online savings and credit channels. These technologies influence the growth in numbers of customers, capital structure as well as total turnover which results in the growth of financial parameters. (Kimingi, 2010)

### **1.1.1 Deposit Taking SACCOs' Performance**

Performance evaluation is significant in various businesses globally. It helps in reducing expenses and enhancing production as well as service delivery. It also helps the overseers and shareholders to determine new measures to take in an organization and set standards or principles that will align with those of the business activities (Njoki, 2018). Organizational performance is a model elaborating an institution's accomplishment. This enables a firm to benchmark across the industry and related periods (Shirin, 2008).

Value-added services and innovative banking products increase operational efficiencies thus reducing the overall costs. This can be further cemented by deploying a differentiated strategy as a performance management framework (Darling, 2012). Measurement of a firm's performance can either be in financial terms or non-financial terms. This study measured the effectiveness of ICT in improving productivity through adoptions such as Agency banking, ATM usage, Mobile banking, and data security. Performance is defined as the conversion of inputs into outputs achieving results Kamau J. (2015). Balogun, (2016) while studying how much of an effect ICT had on how the Nigerian banking industry performed, found that the financial institution customers are not only focused on the safety of funds and return on their investments, but also demand convenient, efficient, and personalized services. This further calls for the management to

increase the investments in ICT to ease the delivery of accurate and convenient services. Masenge (2014) while studying the effect of ICT on enterprises in the city of Nairobi found that the organizations which had utilized ICT services had improved their performance through improved efficiency, productivity, and hence greater customer satisfaction and faster data sharing.

DT-SACCOs have continued to use resources geared towards maximising shareholders' wealth this is as per Olando *et al.* (2013). Similarly the ultimate goal of DT-SACCOs is ensuring that members enjoy better services through savings mobilization and advancement of credit facilities at favorable interest rates (Ofei, 2001). Key performance indicators for DT Sacco's growth on performance include Savings, Loans, share capital, membership, and reserves. Saccos that have adopted ICT have experienced enhanced operational efficiencies, market penetration, and member retention. Kenya Financial Sector Stability Report, (2017), states that Saccos contributed 5.72% of Kenya's GDP which amounts to 442.9 Billion shillings, in 2017; the amount was 393.5 billion in 2016 hence the growth rate of 12.4%. The total number of members has however stagnated at 3.6M between the years 2016 and 2017.

DT-SACCOs key performance indicators for the year 2017 show that total assets grew by 12.4% to hit Kshs 443 Billion from Kshs 393 Billion in 2016. The loan portfolio grew by 11.3% in 2017 to reach Kshs 331 Billion from Kshs 297.6 Billion recorded in 2016. The total deposits had a 12.01% increment in 2017 to reach Kshs 305.3 Billion from Kshs 272.58 Billion in 2016. The overall analysis shows a fall in the growth of assets, deposits, and loans in 2017 which stood at 12.4%, 12%, and 11.3% respectively, in comparison to 14.8%, 14.8%, and 15.3%, respectively which were the rates of growth registered in 2016. The loss in loan provisioning is a pointer of a risky loan portfolio and is expensed in the income statement, continued on a negative trajectory

up to Kshs 10.7 Billion which increased by 23.4% from Kshs 8.6 Billion that was recorded in 2016 (Financial sector stability report, 2017).

In Ileri's study of the effectiveness of IT on the activities of the Saccos within Nairobi while using the methodology of descriptive research, document analysis, and questionnaires, that the efficiency of ICT entails ATMs, Loans, Saving and Financial Management system have impacted the Saccos performance immensely. Therefore, there is the need for Saccos to increase more resources in ICT to improve their operations (Ileri *et al.*, 2017).

### **1.1.2 Information Communication Technology adoption**

Ashrafi *et al.* (2008) described ICT as the technology that initiates the process, maintains and shares information. The technologies include handheld devices, data storage systems, business productivity systems, and infrastructure and communication networks. ICT provides an opportunity where firms or businesses can manage to communicate and share provisions with the shareholders, and consumers as well as create liaisons that will be significant to the businesses.

Technology has evolved the way customers consume financial services. It has transformed financial institutions from bulk paper to paperless and a means of transacting funds. This includes the usage of ATMs, use of mobile in financial transactions, online banking, and money transmission technologies. This further leads to tighter cybersecurity measures to assure consumers of safer business transactions (Manjusha, 2013).

ICT plays a vital role in productivity resulting in the profitability of SACCOs through cost-effective distribution channels, reduction in supply time, customer relations management, entering new markets, and increasing the market share (Keah, 2014). The use of ICT has enhanced customer relationship management, cybersecurity, sharing of tasks in remote sessions, internal and external communications, such as, through emails, Voice over Internet Protocols. In

businesses, adopting these technologies is important for exceptional service delivery and the provision of quality services. The use of technology in Saccos will help in curtailing time and expenses in accessing the required services for the operations in the Saccos (Njau, 2015).

DT SACCOs should expand their ICT adoption levels on financial services, however, the costs on these services should not deter consumer's uptake. Modern cybersecurity mechanisms should mitigate potential losses as well as assure the availability of services to the members. SASRA report (2017).

### **1.1.3 DT-SACCOs in Kiambu County**

The county leading in DT Saccos headquarters in Kenya is Nairobi at forty-two (42), while Kiambu County follows at fourteen (14) out of the 174 DT-Saccos licensed by Sasra in Kenya, however, Kiambu County has the leading branch network at forty-six (46) followed by Meru (39) and Nairobi (33) (SACCO supervision report, 2017). All the Saccos with head offices in Kiambu have native roots of the county. Kiambu county has a mixture of different categories of Saccos biased towards Agribusiness, Commerce, and salaries based. This gave the study a balanced view from different economic activities. SASRA regulations require Saccos to adopt ICT as part of the prudential standards and licensing pre-conditions. In the year 2010, there were a total of sixteen (16) Saccos in Kiambu County, while by the year 2017 they had dropped to fourteen (14). ICT adoption in Kiambu Saccos was therefore gauged to know if it's spurring growth and if its implementation is optimal.

According to Mwaura (2018), the Saccos have a similar objective; pool resources in the form of savings and turn offer them as credit facilities. Saccos encourage members to manage their finances wisely and invest in income-generating activities. DT-Saccos in Kiambu county are managed by the ministry of trade, industrialization, and cooperatives as a devolved function and

further regulated and licensed by SASRA. Ndirangu (2016) states that, over the years, SACCOs were known for savings and giving loans as their core business. Changes in the business environment have made Saccos in Kiambu county change to various products and services including investment in real estate, transport industry, and also professional investment advice. This has continued to boost the rating of SACCOs as a competitor in the financial sector. They offer a diverse range of products which include personal and business loans, mortgages, savings, money transfers, payment services, and insurance. Despite the growing popularity, other bodies offering financial facilities compete with SACCOs; this necessitates continuous changes in ICT within SACCOs in Kiambu County.

As per the Sacco Societies report (2010), and (2017), Kiambu county Saccos have grown in Assets from 6.9B to 26.5B, loans from 4.9B to 20.6B, deposits from 4.7B to 16.2B, and turnover from 1.98B to 4.59B between the year 2010 and 2017 respectively.

## **1.2 Statement of the problem**

ICT adoption does not by itself guarantee better service delivery, but it depends on the efficient and calculated application to meet diverse and dynamic consumer needs. Financial facilities are increasingly being offered on an Information Technology platform. Organizations have continued to invest in ICT as they are a key tool for doing business. Sometimes these necessities are driven by industry standards. While DT Saccos continues to upgrade their management information systems, the usage of Mobile banking, Agency Banking, ATM usage and cyber security measures have been lagging behind. This has squeezed Sacco's optimum usage of the information systems to deliver financial services while mitigating the operational risks that ride on automation. Similarly, there is a growing concern regarding sub-optimal deployment of ICT

infrastructure and amplified occurrences of cyber fraud among the DT Saccos (Sasra report, 2011).

Ileri *et al.* (2017) conclude that SACCO's continually miss business opportunities since some of the Saccos have not adopted IT infrastructure in their operations. The SACCO's have lagged in the adoption and utilization of various recent emergent technologies. The fundamental performance parameters show that DT Saccos grew by 12.4% in total assets in the year 2017 from the year 2016; however, there is a reduced growth rate in assets, loans, and deposits at -2.4%, -4%, and -2.8% respectively between the two years, (Financial stability report, 2017). As per the (financial stability report, 2011), the subsector key indicators, total assets, gross loans, and deposits grew by 13.1%, 15.2%, and 22.5% respectively between the years 2010 and 2011. As per the (SACCO supervision reports, 2010,2017), the total incomes of Kenyan DT Saccos in the year 2010 was 22B of which 83.9% was contributed by Credit portfolio, Total turnover for the year 2017 was 63B of which 83.51% was contributed by Loan portfolio. Therefore, there are concerns if ICT is enhancing growth and if it has been optimally implemented to support key business growth indicators. Similarly, there have been complaints from members on the effectiveness of ICT services. Members complain about the uptime and deficiencies in functionalities of key ICT services.

Kamau (2013) reviewed the effects of ICT on commercial bank's financial performance and Gitau (2012) studied ICT effect and multinational banks in Kenya competitive advantage. Keah (2014) studied effects resulting from ICT adoption on Sacco's financial performance in the County of Nairobi and found that, with ICT introduction, efficiency can be harnessed and SACCOs would be able to record higher performance and just like other financial institutions,

SACCOs have embraced technology so that they are abreast with others. Despite these studies in ICT, none has delved into specific attributes of ICT that affect organizations performance.

### **1.3 Objectives of the Study**

#### **1.3.1. Overall Objective**

The overall aim was to determine ICT impact on DT-SACCOs performance in County of Kiambu

#### **1.3.2. Definite Objectives**

The particular objectives were;

- i. To establish how SACCOs performance is impacted by Mobile banking within Kiambu County, Kenya.
- ii. To find out the influence of Agency banking on DT SACCOs performance in Kiambu County, Kenya
- iii. To find out the impact of data security measures on SACCOs performance in Kiambu County, Kenya
- iv. To determine the impact of Automated Teller Machine usage on SACCOs performance in Kiambu County, Kenya

#### **1.3.3 Research Questions**

The project pursued to determine the answers to;

- i. How do Mobile banking affect the DT SACCOs' performance in Kiambu County, Kenya?
- ii. How does Agency banking influence the performance of DT SACCOs in Kiambu County, Kenya?
- iii. How do data security policies, tools and controls affect the SACCOs' performance in Kiambu County?

- v. How has the adoption of ATMs impacted the SACCOs performance in Kiambu County, Kenya

#### **1.4 significance of the study.**

The study pursued crucial information about ICT usage on SACCOs at the county level. Thus, the government and regulators were sensitized on the need for further controls and support to safeguard members' funds. Additionally, the outcome of the study will help cybersecurity policymakers on specific aspects of information communication technology applied to SACCOs. An interesting aspect of the study on use of information communication technology was that due to the frequency of technological changes, frequent studies are necessary to help the organization make updated decisions. The study desired to help understand the combined effect of information communication technology on SACCOs performance.

#### **1.5 Scope of the study**

This study had a scope of SACCOs under the regulation of SASRA that are licensed to operate in Kiambu County. This translated to 14 Deposit Taking Saccos which are fully licensed and operational in Kiambu County within year 2010 and 2017. The focus of this study was on the analysis of primary data from the selected SACCOs and identify how ICT adoption was expected to have a direct influence on their performance regarding data security, ATM, Agency banking, and Mobile banking,

#### **1.6 Limitation of the study**

The fear by the respondents to share confidential and security measures was among the barriers during this study. This was mitigated by indicating that the facts collected was exclusively for scholastic tenacity. Another limitation was the difficulty in accessing recent information of interest as most SACCOs limit the information shared to protect their interests. Similarly, it was

expected to have a low response rate. This was however mitigated by close follow-ups on selected correspondents.

### **1.7 Organization of the Study**

Five sections hereby referred as chapters were organized from this study, each addressing specific aggregate concerns. In this study, the initial chapter addressed the research upbringing, study objectives, statement of the problems, importance of this study, research gaps and expected shortcomings. Chapter one introduced the context of the study and argued that there is a problem that current studies have not addressed which the study addressed. The subsequent chapters are informed by chapter one. Literature review was covered in Chapter two, in which, theories pertinent to this study, research gaps built on the strengths of current literature and how to address the gaps in research. Identification of study gaps is critical as it is the most important justification for conducting research.

The third chapter covered research methodology by addressing the research approach. The research methodology addressed the target population, sampling strategy, recruitment of study subjects, and ways of ensuring data integrity. The fourth chapter analysed the data using graphs and tables while as regression analysis was used to interpret the data. The fifth chapter presented the conclusions, the recommendations, and additional studies areas by future researchers.

## CHAPTER TWO : LITERATURE REVIEW

### 2.0 Introduction

This section expounds on the presentation of requisite theoretical and empirical inclination of the study. In the theoretical review, the outlook and propositions concerning the study under review were given. The empirical analysis gave previous reviews on the subject areas and conceptual framework.

### 2.1 Theoretical Review

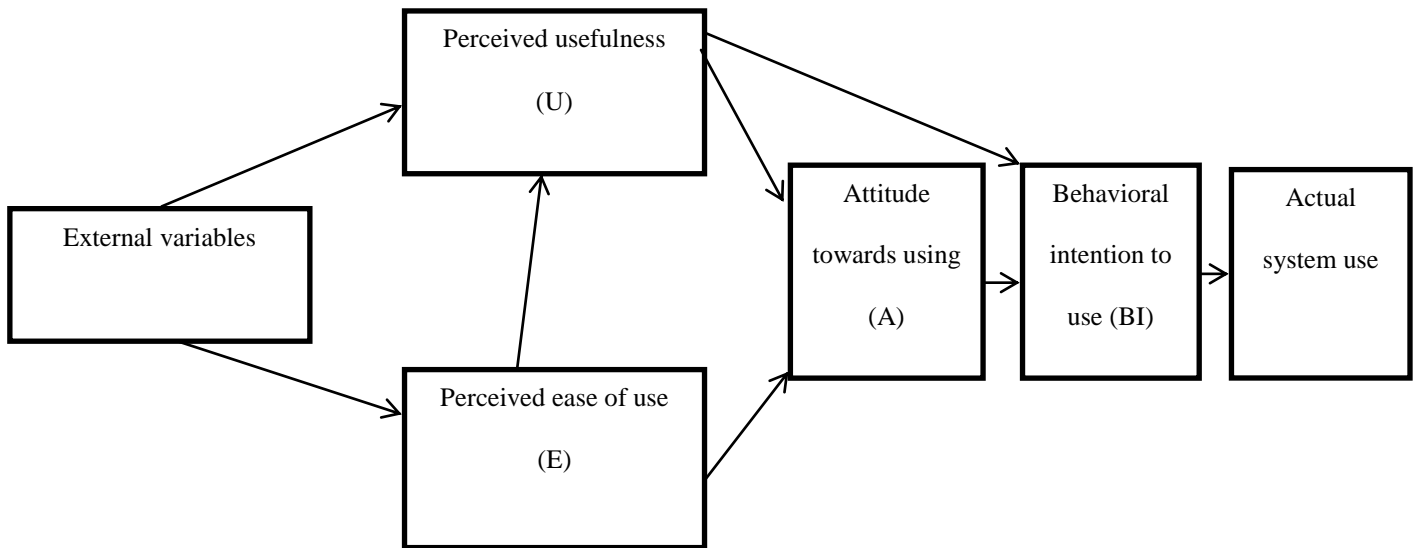
#### 2.1.1 Technology Acceptance Model

TAM relies on the Technology of Reasoned action and is applied to describe one's acceptable behavior. It was proposed by Davis in his doctoral thesis in 1989. The need for advancement of the TAM Model was occasioned from IBM Canada joint study with MIT, (the *Massachusetts Institute of Technology*) in 1980 to understand the then unrealized ability of recently made products to the market and present a justification on what determines the usage of computers. (Davis, Bagozzi & Warshaw, 1989). TAM has been extensively applied to examine individual technology behavior in different modes of information framework. Various analyses have been done which has been the motive of the variations in the initial suggested model. There is a recent model fashioned to link TAM and Technology Planned Behavior (TPB) that is initiated by Taylor and Todd in 1995. Venkatesh and Davis in 2000 established a recent version of TAM called TAM2 which increases recent variables to the present theory (Surendran, 2012).

In TAM assumption, there are two aspects; the recognized convenience aspect along with the recognized ease of use aspect is significant in computer use behaviors. According to Davis, the recognized convenience is the potential users' personalized likeliness that applying a certain application framework will improve their work's performance. Recognized user-friendliness is

explained as the level to which the potential customer anticipates to not struggle with the said system. In accordance with TAM, the recognized ease of use, as well as the recognized convenience, is the main significant factors of actual framework application. These two aspects are impacted by the external variables. The major external elements that are known are social, cultural, and political elements. Social elements entail language, experiencing, and easing situations. Political aspects are mainly the influence of applying technology in politics and political crises (Surendran, 2012).

The model TAMs purpose is to signify the influence of extrinsic environment associated with the information system about the user such as intentions and user attitudes (Davis, Bagozzi & Warshaw, 1989; Davis, 1989).



**Figure 2. 1: Technology Acceptance Model**

**Source: Venkatesh, et al (2003) User acceptance of information technology**

Moon and Kim (2001) suggested the need for the playfulness aspect to be incorporated to review the acceptance of the World Wide Web. TAM has also been used by various analysts to affirm various kinds of information systems. Shafeek (2011) in an analysis examined the acceptance of the e-learning framework by teachers by applying TAM by (Everett, 2003) established an

assumption that relies on TAM and TPB to comprehend mobile service adoption which cites that recognized convenience is the healthy aspect in adoption (Surendran, 2012).

This theory was vital in this study as it expounded why prospective adopters of ICT may accept or reject it. This study explained why SACCOs may choose various components of ICT to enhance their performance. The theory states that users tend to admit or reject certain technologies with the aim of enhanced performance, that is, perceived user-friendliness, and how the technology usage will involve less effort, that is, perceived user-friendliness. In this study, TAM theory was used to explain the issues affecting user's perception in adopting various ICT technologies which are aimed at improving the overall performance and operations of Organizations. Agency banking, Cybersecurity measures, Mobile banking, and ATM usage are such technologies that significantly influence how the DT-Saccos deliver their services to members in a convenient, safe and responsive environment.

### **2.1.2 Diffusion of Innovation Theory**

Rogers (2003), initiated the assumption which has been applied to explain the innovation-decision process. In this theory there are five roles; the knowledge role happens when one is disclosed to an innovation's presence and attains some discernment of how it operates. The persuasion role happens when an individual creates a beneficial and adverse attitude towards innovation. The decision role happens when one participates in operations that are a motive to accept or neglect innovation while the implementation role happens when one applies innovation. The confirmation role happens when one pursues augmentation on an innovative decision made to accept or neglect the innovation.

Four major components that affect the scope of innovation include, the means of communication, innovation itself, time, and the social system. These components rely to a great extent on human

capital. Rogers further categorizes adopters as; those who innovate, those who adopt early, those who are an early majority, the late majority, and those who lag.

This theory was useful to this study in showing how innovation spread. An individual or an organization gathers information about an innovation and considers its benefit before a decision is made and lastly evaluates its impact. In this study, DIT theory was used to show how different innovations such as Agent banking, ATM cards, and Mobile banking got communicated and persuaded to members to initiate patronage. For instance, mobile banking is used by SACCOs to market their new products and services as well as provide channels for savings and loans disbursements.

### **2.1.3 Resource-Based View Theory**

The impression of considering organizations as a large set of resources emanates from the work of (Penrose, 1959). The author stated that the growth of a firm is founded on its internal resources and limit to managerial resources. According to (Wernerfelt, 1984), RBV theory acknowledges that, though the business external environment is important, organizational resources are far more vital than the environment in which the business operates. Firms can therefore possess a competitive advantage if they can exploit their unique resources of value, which are rare, non-substitution able and non-transferable and therefore cannot be copied by competitors (Barney, 1991).

RBV theory states that businesses are heterogeneous and they possess heterogeneous resources and that the firm's inherent capabilities allow the businesses to add value in the customer value chain improve on services or expand to new markets. Organizations should assess themselves to find sources of strength through rare resources which are also valuable, and difficult for others to imitate, furthermore, it is possible to explore other prospects using existing resources in a way

that is more effective and efficient as opposed to hiring new skills every time a different prospect arises. (Barney, 1991).

Therefore, RBV Theory was used in this study to show how organizations are made up of capabilities that can be utilized to deliver sustained competitive advantage for a positive performance. Internal tangible and intangible resources such as ICT hardware and software technologies will determine the SACCOS competitiveness in the external environment.

## **2.2 Empirical Review**

This relates to philosophical basis on which this study associates to previous researches.

### **2.2.1 ICT adoption and Performance of Saccos**

ICT denotes the usage of computers to produce, process, and backup, communicate, and broadcast information. This encompasses databases, networks, Hardware, Software, and other related peripherals which are used to form the information systems. When Mahboub (2018) was researching the effect of ICT investments on how the Lebanese banks performed, he found that the usage credit cards and mobile banking to consumers pointedly had an impact on how Lebanese banks performed on average. However there were gaps on ways to deepen the consumer interest in mobile banking applications by creating awareness for consumers to adopt and use these technologies. Financial institutions should compete to onboard new consumers by deploying innovative products which are preferred due to the appropriate features both locally and internationally.

Sevrani and Bahiti (2008) suggested that there is a need for players in Albanian SMEs to be able to address their challenges than to be the obstacles. They also cited the need for players in SMEs to embrace the desire to gain the necessary skills and knowledge on Information Technology. By using secondary data method in their review on 'ICT in Small and Medium Enterprises (Cases of

Albania)', they suggested that SMEs are an important aspect of the growth of the EU economically, hence helping the SMEs embrace technology will help them advance and hence enhance the economies of various countries under EU. According to Sevrani and Bahiti (2008), there is the need for states under the EU to initiate avenues where SMEs operators will gain the knowledge and skills required for applying ICT (Sevrani et al., 2008).

In Nigeria, Alalade *et al.* (2014) studied selected banks on their ICT adoption and performance. They found that staff ignorance on emerging systems, the inability of the bank's management to keep abreast on new IT innovations, and lack of customer training on the availability of IT-enabled services are barriers to the efficient deployment of IT systems (Okundaye *et al.*, 2019) interviewed executive-level SME leaders who influence to consent to the application of ICT within their firms. They also used the technology acceptance framework which defined the liaison amid discerned usefulness, recognized ease of use, behavior towards the application of computers, and the motive to consume technology to comprehend Nigerian SMEs ICT adoption strategy. The empirical suggestion of the study was to establish that SMEs are successful and that they help in curtailing unemployment levels that will also aid in enhancing socio-economic development through ICT adoption.

This review was intended to solve the current literature gap concerning aspects that impact the culture of ICT adoption, the cost of application of ICT, present ICT experience, and ICT and infrastructure skills as the main future aspects of the adoption of ICT by SMEs in Nigerian.

Dabwor and Ezie (2017) researched on ICT effect on the competitive dynamics of banks in an emerging economy; a case study of Nigeria established the existence of relationship between the ICT and how banks performed in Nigeria. Thus suggesting that a change in investment and adoption of ICT technologies such as ATMs, online transactions, and mobile banking in the

banking industry resulted in a proportional increase in turnover. The study recommended that the organization must increase investment in ICT products to spur efficient service delivery, convenience, and accuracy. This led to competitive businesses that were highly efficient and profitable which resulted to a globalized economy controlled by ICT. Dawbor et al. (2017); Mpofu and Mathys (2011) conducted a review on Southern Africa firm's adoption of ICT. Mpofu and Mathys aimed to evaluate ICT adoption among minor hotel establishments in Botswana, Zimbabwe, and South Africa. While using the qualitative research that relied on several case studies from both South Africa and European Union small and medium enterprises (SMEs) description, Mpofu *et al.* (2011) found that when ICT adoption is done in a conducive environment with institutional willingness, case studies proved that the financial department and overseers were willingly inclusive in ICT adoption. Here, the social networks proved to be significant among the small business with resource challenges. The case studies helped in attaining the personal behavioral elements despite the essential perceptions of the ICT adoption technique. The case studies were done on the footing of 60 semi-structured interviews as well as the secondary data.

Wachira *et al.* (2014) reviewed 'the perceived outcome of ICT's on Saccos' performance'. According to the study, the competitiveness of a company about the existing economic threats needs efficient management operations and a scheduled role guided towards exceptional management of knowledge and the influence of ICT on institutional frameworks. The study examined the capacity of ICT in Saccos in fulfilling their goals, the degree of perception in Kenya, the degree of innovations, current infrastructure, consolidation of cooperative methods, and the awareness among shareholders. While using the method of case study from various

social-economic patterns and a survey research method, the study targeted the discerned ICT elements towards performance such as innovations, infrastructure, perception, and principles.

The study identified that firms that discern the use of ICT as essential, easy, adaptable, and have less risk while consuming is probable to embrace ICT in their daily activities. The reason why the adoption of ICT was low is the fear it will be less effective as expected and will give fewer expenses and more revenue. The study recommended the need for the state to improve the skills of individuals in ICT and encourage the use of ICT in enterprises as per Wachira *et al.* (2014).

Ndubi (2013) noted that ICT adoption has enabled electronic systems such as debit cards, and electronic money transfer, and internet banking to be a reality in the financial sector. These technologies have simplified the organization's operations by reducing capital costs, enhancing outreach to consumers, and improving online security while making financial transactions, with the result being higher turnover for the business.

Otieno (2015) while studying the factors advancing utilization of ICT by SMEs in Nairobi County discovered that small and medium-sized enterprises were likely to adopt ICT solutions when they could positively quantify the advantages to be accrued by the businesses, attention being on improving productivity and lowering the operational costs. The study further found out the cost of ICT integration can be a hindrance to its adoption if the company has invested in specialized hardware and software. To mitigate these risks, organizations should invest in ICT systems and applications that are standardized and tested. Murigi (2017) while investigating the security practices of information technology and the impact of the enterprises' performance in Nairobi City County found that a third of these businesses had no policy on ICT. The study further recommended such businesses which have adopted ICT, should deploy and practice an ICT policy such as use of encryption, Pass words, and periodic reviews.

Ndegwa (2011) conducted a study on ‘utilization and adoption of ICTs by SACCOs in Kenya: A case of Tharaka Nithi Teachers Sacco Society Limited’. While using both quantitative and qualitative techniques, Ndegwa identified that Saccos in Tharaka Nithi had not embraced ICT and the Department of Cooperative Development and Marketing lack crucial frameworks to aid rural areas SACCOs. They suggested that Saccos should attain open-source software which permits customization and that would enable networking. The study suggested the need for the state to use the department of Cooperative Development and Marketing to pervade in ICT system, that also KUSSCO go ahead and perform its role by enhancing the use of ICTs in Saccos. The study focused on locating and auditing ICT frameworks within the SACCO in Tharaka Nithi, determining the levels that ICTs were consumed to improve the provision of services and determine the threats that the SACCO was encountering when embracing as well as consuming ICT.

Kimungi (2010), while conducting a study on financial performance and technological innovations on Kenyan banks concludes that ATM services, internet banking, and mobile banking had led to improved performance by growth in sales, profit levels, and the return on equity. Traditionally, ICT investments included IT equipment, communications equipment, and software. Businesses should, therefore, allocate funds to the ICT budget regarding their global objectives. An advanced performance therefore requires; a modern ICT infrastructure coupled with good ICT management practices as per Kamau (2015).

### **2.2.2 Mobile Banking and SACCOs’ Performance**

Today DT-Saccos continue to roll out Mobile banking facilities for easy access to their services by members. These facilities are not limited to Mobile withdrawals and deposits but include electronic loan applications, membership applications, mini-statements requests, marketing

messages broadcasts, and pay bill services. In the aim of investigating the effects of using ICT on how commercial banks performed in Kenya, Kamau J, (2015) carried out a study in all licensed commercial banks. The researcher found that mobile banking had extended the income-generating capabilities of the banks, as well as increasing the funded and non-funded incomes. Musango (2018) carried out a study on what extent commercial banks in the county of Nairobi financially included mobile banking and found that banks were able to access more clients using mobile money transfer applications, as proved by an increase in the mobile transfer services usage by customers. Availability of mobile transfer services leads to the attraction of a wider number of customers especially low-income earners that previously held no bank accounts.

### **2.2.3 ATM usage and Performance of SACCOs**

The ATM is known to ease transactions from any ATM connected to the Sacco. It gives account data, deposits, and cash disbursement. Due to the immense capital expenditure required to set up the ATM infrastructure only 2 of the licensed Saccos has their custom-made ATMs. Over 100 Saccos have partnered with commercial banks to ride on their existing ATM networks to connect their members (SACCO report, 2016). Kombe *et al.* (2015) while investigating how Kenya, online banking affected how commercial banks performed financially, discovered there has been a consistent growth in electronic banking technologies like ATM, funds transfer, internet, and mobile banking. Similarly (CBK report, 2017) found that ATM usage has been surpassed by Mobile banking thus giving customers access to faster, convenient, and more efficient services. Kimingi (2010) while reviewing the commercial banks' performance and technological innovations discovered that ATM, electronic money transfers had led to better performance by Kenyan commercial banks. As evidenced by more sales, growth in profits, and increased return

on equity. Technological innovation caused growth by introducing improvements in efficiency, quality of service, competitive advantage, and market share positioning. The conclusion, therefore, is that technological innovation is proportionately related to performance.

According to Ileri *et al.* (2017) while studying the effectiveness of IT on the activities of the Saccos within Nairobi it was concluded that Sacco members could gain access to their savings, access their accounts, generate their statements, access loan disbursement all through the ATM. The ATM system lead to higher efficiency and effectiveness in the SACCO, further influencing the overall performance of the SACCOS.

#### **2.2.4 Data security measures and SACCOs Performance**

With the need to embrace ICT by Saccos, most of them have identified the need to find ways to protect their data. These include cybersecurity training, application of cloud and IoT, cybersecurity management, and increasing the skills among employees on ICT usage. Some of the threats that the Saccos encounter when dealing with data security entail digital transformation, cloud, and outsourcing, automation of processes, growth in members, and mobility. Managers of Organizations have realized that Information Technology and data are finite and dynamic resources. Organization's bottom lines and Operations could be negatively affected if data processing, production and communication are not optimally structured; therefore data security is vital to firms' operations, Murigi (2017). (Chiteli, 2013) noted that stored data can be analyzed spanning tens of years to understand customer behavior and help a SACCO develop responsive products based on data rather than speculation. Sacco staff has to be sensitized of the cyber risks, the adoption of cloud and IoT need to be embraced by the Saccos to block access by attackers on the data. Saccos are required to formulate the 'bring your device policies to mitigate ingress by attackers as well as embracing cybersecurity budget where Saccos

set aside funds that may be used to curtail access by attackers to crucial data from the site (Serianu, 2018).

### **2.2.5 Agency Banking and SACCOs' Performance**

As per the (financial stability report, 2017), 107 DT-Saccos had partnered with commercial banks as their Agents. With the ICT adoption, Saccos are now rolling out their agencies to enhance their footprint and access points to their members. According to Kamau D, (2015), the use of ICT technologies has positively affected the profitability of the banks owing to high margins and low costs of maintenance. Automated teller machines (ATMs) were ranked with having the highest effect on the profitability of the banks, followed by mobile banking, with transfer of funds electronically, and point of sale (POS) terminals following in that order. The Agencies brought down the number of members visiting banking halls for the basic services. This, therefore, left the Sacco staff to perform other strategic core tasks.

Ngumi (2013) while studying the outcome of deploying technological innovations and performance of Kenyan banks, found that agency banking networks are being rolled out by the Kenyan financial institutions as it provides a platform to serve more customers in rural and urban areas. This provides an opportunity for the institutions to establish agency banking in locations that are non-traditional, thereby providing higher incomes for the institutions. POS terminals do not require huge capital expenditure, however, they can generate incomes as it allows consumers to complete financial transactions thus enabling financial institutions to earn more and improve on their return on resources.

### **2.3 Summary of the Research Gaps.**

This study used diffusion, resource-based view, and technology acceptance theories to expound on the consequences of adopting ICT on Sacco's performance. Diffusion theory depicts the

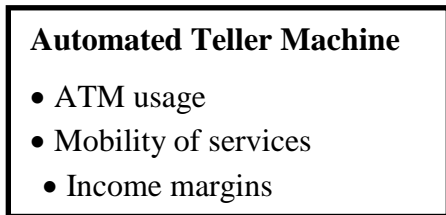
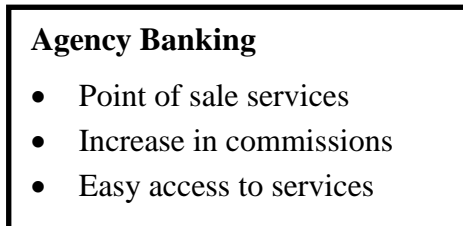
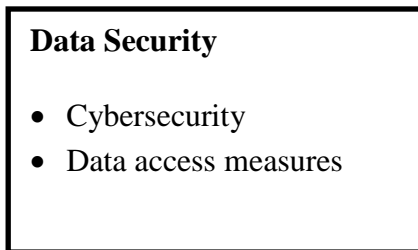
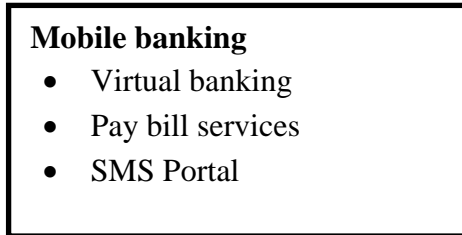
decision-making process and how innovation spread. An individual or an organization gathers information about an innovation and considers its benefit before a decision is made and lastly evaluates its impact, Technology Acceptance theory was used to elaborate the issues affecting user's perception in adopting various ICT technologies which are aimed at improving overall performance and operations of organizations. Resource-based view theory as introduced by (Penrose, 1959) and further reviewed by Wernerfelt (1984) was handy for firms to look internally to find sources of competitive advantage through rare resources that are also valuable, and difficult for others to imitated; in this case, DT SACCOs can look into ICT security policies, human expertise, and technological advancements to propel the service delivery channels to members.

Even though previous studies have investigated the Performance of Saccos, particular studies on how ICT adoption affects performance of DT-Saccos in Kiambu are still scarce. There was an emerging gap in the past studies. Most of them focused on financial innovations, Competitive strategies on enhancing Saccos Financial performance, customer satisfaction, and governance policies that affect Sacco's performance. Other researchers focused on ICT adoption in commercial banks and ICT adoption factors influencing SMEs. Another gap was that most researchers focused on the customer side of the value chain, this study focused on the business side, their security policies, and technological innovations implemented by Saccos to influence Performance.

## Conceptual Framework

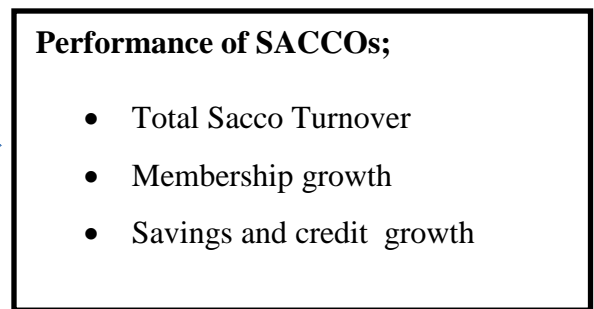
Independent Variable

**ICT adoption**



Dependent Variable

**Performance of Saccos'**



**Figure 2. 2: Conceptual Framework**

Source: Author (2020)

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

Here, the methodology that was applied and techniques applied to perform the analysis are analyzed. The review in this chapter entailed research structure, sampling, the study population, data collection techniques, and analysis of the data.

### **3.2 Research Design**

The descriptive research design was used in this research since it is essential in indicating flow of approach and attitude as well as aid in the judgment of the outcome of the analysis to be conducted. The use of descriptive research design helped in revealing associations with regards to variables that were specified without varying any environmental factor. Cooper , Bulmberg and Schindler (2011), stated that descriptive research aims to identify the what, how, and where of a provided experience. It regards itself with the resolve of what is happening with the mention of specific variables (Njoki, 2018). This technique was significant in the manner that is cost-effective and less time-consuming.

### **3.3 Target Population**

This was defined as the entire collection which a statistical sample is gained from and has some familiar discernible characteristics. The population studied was 14 deposits taking SACCOs with an average of 50 employees under the regulation of SASRA in Kiambu County as per the Kiambu County fiscal paper (2018).

**Table 3. 1: DT-SACCOs Headquartered in County of Kiambu**

<b>Sub-County with DT-SACCOs</b>	<b>DT-Sacco's Name</b>
<b>1. Githunguri</b>	1. Tai DT-SACCO 2. GDC SACCO 3. Fariji SACCO
<b>2. Thika</b>	1. Azima SACCO 2. All Churches SACCO
<b>3. Kiambu</b>	4. Metropolitan DT-SACCO 5. K-Unity DT-SACCO 6. Dimkes DT-SACCO
<b>4. Kiambaa</b>	1. Good Faith DT-SACCO 2. Joinas DT-SACCO
<b>5. Ruiru</b>	1. Jacaranda SACCO 2. Kingdom SACCO
<b>6. Juja</b>	1. Fundilima DT-SACCO
<b>7. Kikuyu</b>	1. NRS DT-SACCO

Source: Kiambu county fiscal report (2018).

### 3.4 Sampling and target population

Data was collected from 4 respondents, who were the Branch Manager, ICT, Finance, and Operations managers, per regulated SACCO in Kiambu County. This aided in gaining data from the selected respondents. This research used the purposive sampling technique as the respondents were deemed to be in an advantaged position to know how various ICT innovations impacted the performance of the Sacco.

**Table 3. 2: Distribution of the Target respondents**

SACCO Employee	Target respondents
ICT Manager	14
Head of operations	14
Branch Manager	14
Finance Manager	14
Total Respondents	56

**Source: SACCO and County Co-operatives report (2017)**

### 3.5 Data Collection instruments

First hand facts were gathered through administration of a questionnaire, which had questions that were both closed and open-ended. This ensured that respondents of the semi-structured questionnaire were able to give their opinion. The questionnaire was further subdivided into various sections. The first, section A applied, to collect general information, section B collected information on aspects influencing the adoption of ICT in various SACCOs, and in section C, information on the essence of ICT in SACCOs. An opinion on the suitability of the research instrument was sought from the supervisor.

### **3.5.1 Pilot Test**

Pilot study assists in the enhancement of the instrument's quality and limiting the research errors. The test measured how reliable the research instrument was. The feedback of the tests was not part of the data analyzed in the study. The pilot study was directed at DT-Saccos in the city of Nairobi.

### **3.5.2 Validity of the instrument**

The data collector ensured the instruments of collecting data were valid by having unbiased questions in the data collection instrument. The input of the supervisors from the department of management science was also sorted for guidance.

### **3.5.3 Reliability of the instrument**

Reliability refers to a degree to which the instrument used for the research realizes dependable outcomes after repetitive tests, Mugenda & Mugenda (2003). Cronbach's Alpha factor of 0.70 and above was recommended.

### **3.5.4 Diagnostic tests**

The diagnostics test assesses the validity of a model and data collected. The study carried out diagnostics tests through examination of tolerance and the Variance Inflation Factor (VIF) which are two Collinearity diagnostic factors helpful in identifying multicollinearity .Robert (1995) while interpreting the variance inflation factors concluded that it's acceptable to have a VIF of 1-

### 3.6 Data Analysis and presentation

This is defined as a procedure applied to investigate, transform and model data to create summaries, perceiving the trends and framework to be able to create inferences that can be applied to generate enlightened conclusions (Njoki, 2018). In this research, descriptive data analyzers were applied to analyze responses from the questionnaire. The SPSS software and the use of MS Excel were employed in the qualitative and quantitative data analysis. To explain the degree and effect of relationship among the variables, a correlation model and multiple - regression were generated.

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where

Y= Performance of the SACCO

X<sub>1</sub>= Agency banking

X<sub>2</sub>= Mobile banking

X<sub>3</sub>= Cyber Security

X<sub>4</sub>. ATM usage

ε= Error Term

### 3.7 Ethical Considerations

This study ethics involved the methods used to guarantee that the review was done in a way enabling the upholding of the rights and privacy of participants in the questionnaire (Bulmberg *et al.*, 2011). A research authorization was acquired from the University (*see appendix 3*) and letters were sent to the 14 SACCOs in Kiambu a week earlier before the start of data collection practice to ensure proper preparedness of the respondents for the questionnaire. The research permit was also sought from NACOSTI (*see appendix 4*).

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

### **4.1 Introduction**

Here, results are presented through data analysis and presentations as collected from respondents. Beginning the chapter are the response rate, demographics analysis, descriptive analysis, reliability tests, and ending with inferential statistics. Results are presented according to the stated objectives.

#### **4.1.1 Response rate**

This investigation was conducted in the County of Kiambu and respondents drawn from fourteen (14) Deposit taking SACCOs which have banking services. Fifty-six (56) Questionnaires were distributed in a span of 3 weeks to these Saccos in which the target was 4 respondents per Sacco. For the data collection, 50 questionnaires were returned completed. Thus the rate of response was 89%. Mugenda & Mugenda (2003) alludes that a 50% or more rate of response to be suitable. It is generally acceptable to have a higher rate of response (80% and above) from a small sample compared to a low rate of response in a larger respondent group. However, some questionnaires were halfway filled while others had incomplete information hence were left out in the study; therefore, a 100% response rate was not achievable.

**Table 4.1: Rate of Response**

Responses from the respondents.

<b>Response</b>	<b>Rate frequency</b>	<b>%</b>
Returned	50	89%
Unreturned	6	11%
<b>Total</b>	<b>56</b>	100%

**Source: Research Data (2020)**

#### **4.1.2 Reliability of the instrument**

**Table 4. 2: Variables Reliability Analysis**

<b>Variable</b>	<b>Number of items</b>	<b>Cronbach's Alpha</b>	
<b>Mobile Banking</b>	6	0.767	Reliable
<b>Data Security</b>	6	0.788	Reliable
<b>Agency Banking</b>	4	0.869	Reliable
<b>Automated Teller Machine</b>	4	0.822	Reliable
<b>SACCOs Performance</b>	12	0.818	Reliable

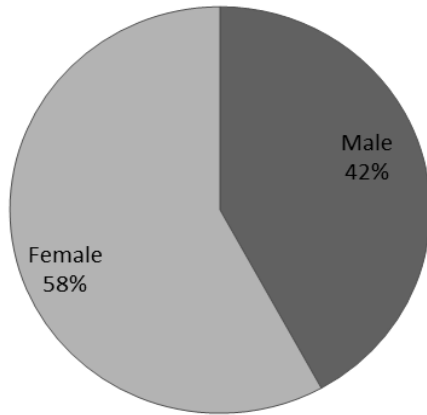
**Source: Research Data (2020)**

Cronbach's Alpha tests the internal consistency of the data collected, Cronbach's Alpha test done, the data returned a coefficient of between 0.767 and 0.869. This was after using the test- Retest reliability method in which the questionnaire was given to a few and chosen respondents, twice over some time, and results tallied. Peterson (1994) concluded that an average Cronbach's Alpha of above 0.77 is acceptable.

## 4.2 Respondents Characteristics

### 4.2.1 Respondents Gender

Figure 4.1 below represents the respondent's gender dispersal.



**Figure 4. 1: Respondents Gender**

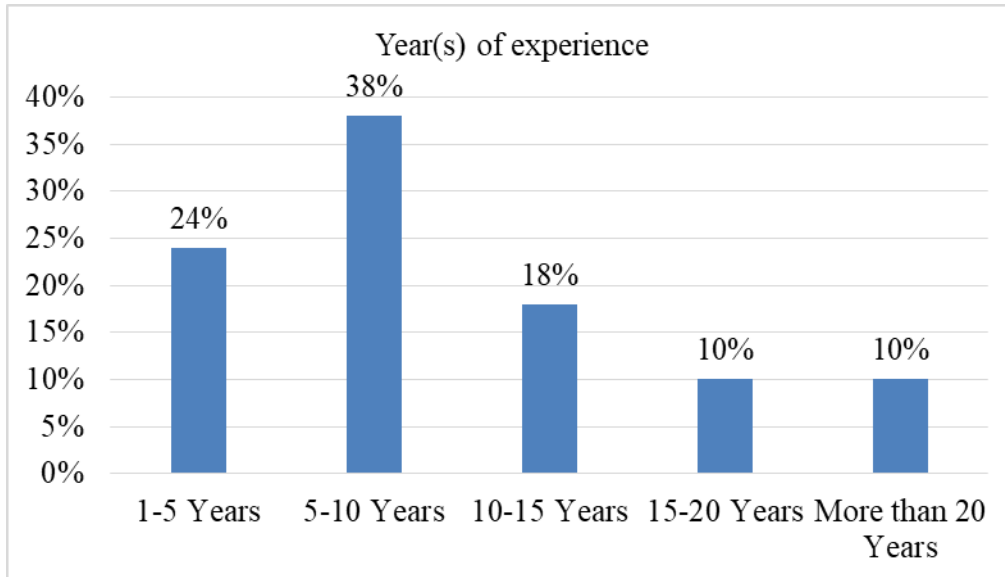
**Source: Research Data (2020)**

The results designated female respondents formed the largest number of respondents at 58% (29) compared to male respondents at 42% (21) of the sample. This stipulates that more females are taking up top-level management roles and are involved in the daily operations of DT Saccos. This is a result of a women empowerment campaign that is currently being implemented.

### 4.2.1 Duration of Employment

From the figure 4.2, it indicates that 24% have from 0 to 5 years experience with the Sacco, 38% of the respondents have worked in the DT-Sacco Between 5 years to 10 years, while (18%) has 10 to 15 yrs experience with the Sacco, 10% of the respondents have 15-20yrs experience with the Sacco and tie with those with more than 20 years period of employment. This shows that DT Saccos in Kiambu county have fair remuneration; 80% of the respondents have between 1-15 yrs

experience with the Saccos. This shows that there is low staff turnover. This further shows that the respondents were well experienced to fill In the questionnaires.



**Figure 4. 2:Duration of employment**

**Source: Research Data (2020)**

### **4.3 Descriptive analysis**

Here, the summary statistics are analyzed using mean and standard deviation. The study also measured the extent to which the performance of the Saccos was affected by various factors. A Likert scale of 5 to 1 with 5 being to a very great extent, 4 is to great extent, 3 is to moderate extent, 2 is too low extent and 1 is to no extent was used. Standard deviation was also used to measure the spread or dispersion of the data collected from the mean. When the standard deviation is below 1.0, then, the data distribution is close to the mean.

### **4.3.1 Mobile Banking**

With the arrival of smartphones, mobile applications, and the internet from the year 2010, DT Saccos have embraced mobile banking applications as a means to reach more prospective members, offer efficient service delivery channels, and earn incomes. As table 4.3 reveals, many of the participants agrees that mobile banking positively affect commission income of DT-Saccos. Mean of 4.32 and an SD of 0.587. The findings showed that the majority of the respondents agreed that mobile banking enabled new members to join to a very great extent (M= 4.74) This was in agreement with Musango (2018) who, while studying the inclusion of mobile banking services among the banks in the County of Nairobi, found the number of mobile transfer services usage in the banks had gone up because mobile money transfer enabled clients enrollment to mobile applications.

From the research data, mobile banking was found to have an average mean of 4.46. This shows that on aggregate the responders indicated to a very great extent that, transacting over the mobile positively influences the DT-Saccos performance. This was in agreement with a study done by (Kamau, 2018) who while investigating the effect of the use of ICT on firm performance of commercial banks in found that mobile banking expanded the income-generating potential of banks, lead to a positive increase of interest-based income and had a positive effect on commission fee-based incomes. Standard deviation indicates the degree of the distribution of data from the mean. With a standard deviation that is below 1.0, the distribution is very close to the mean.

**Table 4. 3: Mobile Banking**

	Items	Min	Max	Mean	Standard Deviation
Mobile banking has a positive effect on the commission-based income of the SACCO	50	3	5	4.32	.587
Mobile banking has enabled new members to join the SACCO	50	3	5	4.74	.527
Mobile banking has enabled Sacco to earn interest income from mobile-based loans	50	3	5	4.62	.602
Mobile banking has enabled members to access Saccos' services anywhere, anytime	50	3	5	4.58	.609
Mobile banking requires low maintenance costs as compared to their total cost of ownership	50	2	5	4.46	.646
Mobile banking enables Sacco to send custom made Marketing messages to members	50	1	5	4.02	.979
Valid N (listwise)	50				
<b>Mean</b>				<b>4.46</b>	<b>0.658</b>

**Source: Research Data (2020)**

### **4.3.2 Agency Banking**

From table 4.4 to a great extent, respondents agreed that agency banking has positively influenced the Saccos' commission-based incomes at a mean of 4.32, the Sacco has invested in Virtual/branchless operations to reach more members at a mean of 4.34 and the Sacco has enlarged the income-generating channels by adopting Agency banking at a mean of 4.10. However, agency banking was shown to save Sacco from opening more brick-and-mortar

branches to a great extent with a mean of 3.94. Muro *et al.* (2013) conclude that customers relate positively to brands within their reach such as access point of sale outlets.

On aggregate, agency banking had a mean average of 4.18. This shows the respondents indicated to a great extent that agency banking influence the overall performance of Saccos. The findings thus show that even though agency banking is relatively innovative it can be tapped to reduce capital expenditures while maximizing the income streams. This was in agreement with Kimingi (2010), who concluded that banks that employed various technological innovations such as ATM services, mobile transactions, point of sales terminals, and internet-based banking services led to improved financial performance.

**Table 4. 4: Agency Banking**

	Items	Min	Max	Mean	Standard Deviation
Agency banking has positively influenced the Saccos' commission-based incomes	50	1	5	4.32	.935
Agency banking saves the Sacco from opening more brick and mortar branches	50	1	5	3.94	1.236
The Sacco has invested in Virtual/branchless operations to reach more members	50	1	5	4.34	.917
The Sacco has enlarged the income-generating channels by adopting Agency banking	50	1	5	4.10	1.233
Valid N (listwise)	50				
<b>Mean</b>				<b>4.18</b>	<b>1.080</b>

**Source: Research Data (2020)**

### 4.3.3 ATM usage

ATM usage is among the earliest technological innovations in the financial sector. From findings, ATM cards were found to positively influence the commission-based incomes (M=4.24), Incomes from ATM usage was found to have a very great effect on income margins of the Sacco (M=4.12), this was in agreement with Dabwor and Ezie (2017) who studied how ICT adoption affected the competitive performance of banks in an emerging economy case of Nigeria, concluded existence of a positive connection between ICT and banks incomes in Nigeria. Implying that a marginal variation in the level of investment in ICT, such as ATMs and online transactions will have a ripple effect on performance. ATM was found to require low maintenance costs as compared to their total cost of ownership with a mean of 4.40. On average the ATM usage mean was 4.26. The respondents confirmed to a great extent that ATMs enhance mobility of services and income margins to the Saccos.

**Table 4. 5: Automated Teller Machine**

	Items	Min	Max	Mean	Standard Deviation
ATM cards positively influence the commission-based incomes	50	1	5	4.24	1.011
Incomes from ATM usage have a positive effect on income margins of the Sacco	50	1	5	4.12	.940
ATMs enhance the mobility of Saccos' products and services	50	1	5	4.26	.986
ATMs require low maintenance costs as compared to their total cost of ownership	50	1	5	4.40	.904
Valid N (listwise)	50				

<b>Mean</b>				<b>4.26</b>	<b>0.960</b>
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**Source: Research Data (2020)**

#### 4.3.4 Data security.

**Table 4. 6: Effects of ICT adoption on Data security.**

	Items	Min	Max	Mean	Standard Deviation
We have provided cybersecurity training, application of cloud and IoT, cybersecurity management, and Increased skills on employees with regards to ICT usage.	50	1	5	3.90	1.129
We have set up our Sacco users to feel safe while using Networks and internet services	50	2	5	4.22	.932
Our Sacco has elaborate Redundant data storage in data centers	50	1	5	3.54	1.129
The Sacco has logical and physical cybersecurity configurations to mitigate access by attackers in gaining crucial data from the sites.	50	1	5	4.08	1.027
Sacco uses the stored data to determine the members' financial behavior	50	2	5	4.22	.975
The Sacco has invested in disaster management and recovery	50	1	5	3.80	1.195
Valid N (listwise)	50				
<b>Mean</b>				<b>3.95</b>	<b>1.065</b>

**Source: Research Data (2020)**

From table 4.6 the respondents were interviewed on how safe as users they feel while using Networks and internet services; this was affirmed with a mean of 4.22. This was an agreement with Murigi (2014) who established that data access controls increases usage confidence of the systems and wards off unapproved access.

As table 4.6 indicates, the respondents indicated at a great extent (M= 3.54) that Saccos has elaborate redundant data storage in their data centers. Logical security is usually configured on various systems such as the use of a firewall. Password, access rights while physical security is usually configured on physical resources such as limited access to server rooms, use of biometric controls to access data centers. In this regard respondents strongly confirmed with a mean of 4.08 in agreement with Serianu (2018) who cited that Saccos need to set aside funds that may be used to curtail access by attackers in accessing crucial data from the sites through the deployment of logical and physical controls.

On average the respondents affirmed at a great extent (M=3.95) that Saccos need to use stored data to determine the member's financial behavior, stored data provide business intelligence to the financial institution to determine the creditworthiness of the individual member and evaluate the best-fit products and services for the various niche of membership. This corresponds to Mahboub (2018) who reviewed the influence of ICT investments on Lebanese banks performance and found the application of mobile banking, data analytics, and use of debit cards to consumers pointedly influences the performance of the banks in Lebanon. This is further confirmed by Chiteli (2013) who stated that stored data can be mined to deduce consumer behavior.

As a new technology, data security enables organizations to self-analyze to find sources of strength in rare resources that are valuable, and difficult for others to imitated, which can be through data analytics and business intelligence.

#### 4.3.5 ICT Adoption and Performance

**Table 4. 7: ICT adoption and Performance**

	Mean	Standard Deviation
The adoption of ICT is key in the improvement of SACCOs earnings	4.28	.573
The adoption of ICT has led to an improvement in the liquidity of SACCOs	4.40	.808
Internal operations have greatly improved via the usage of ICT technologies	4.40	.782
The Sacco turnover(Incomes) has been positively impacted by ICT	4.32	.892
ICT adoption has enabled Sacco to grow its membership and common Bond	4.26	.579
Members can easily access SACCOs products and services while using ICT channels	4.40	.904
Member savings have grown with the implementation of ICT platforms	4.50	.863
Members have an efficient medium to save their savings with the Sacco	4.40	.808
The Sacco can	4.34	.895

electronically store member savings and credit data for future access		
The Sacco can record and disburse credit facilities effectively	4.62	.530
ICT enabled savings and credit services has positively impacted the Sacco performance	4.66	.519
ICT platforms have enabled Sacco to monitor and recover credit facilities	4.68	.653
Valid N (listwise)		
<b>Mean</b>	<b>4.44</b>	<b>0.783</b>

**Source: Research Data (2020)**

From table 4.7, its widely held by the respondents who affirmed at a very great extent (M=4.28) that ICT adoption is key in the expansion of Sacco's earnings, increased commissions from different channels as well as the scalability nature of ICT. From the study, the respondents with a mean of 4.40 affirmed that ICT adoption led to an increase in the liquidity of SACCOs. This corresponds to Wesutsa (2012), whose conclusion was that adopting ICT had a positive effect on an organization's liquidity.

From the table above, respondents affirmed that internal operations had greatly improved via the usage of ICT with a mean of 4.40. This was in agreement with Alalade *et al.* (2014) who concludes that the financial institutions' management must ensure that ICT is part of the overall corporate strategy of the banking operations to ensure efficient and effective service delivery; this will further impact on performance.

From table 4.7, respondents showed that the Sacco turnover (Incomes) was positively impacted by ICT to a very great extent (M=4.32). This is further supported by Kimingi (2010) who found

that ICT adoption results in performance improvement by commercial banks in Kenya. Majorly from an increase in sales and profits. Ndubi (2013) concluded that ICT adoption has enabled financial institutions to cut operational costs while improving the overall revenue streams. DT Saccos rely on increasing numbers of membership. This further forms a large pool of consumers for products and services. From table 4.7, respondents showed ICT adoption has enabled Sacco to grow its membership and common Bond (M= 4.26).

DT Saccos depend on deposits and share capital as part of capital adequacy requirements by SASRA, in this regard the respondents were asked if Member savings had grown with the implementation of ICT platforms; the respondents revealed to a good extent with a mean of 4.40. This corresponds to (Kamau, 2015) findings which established that financial institutions ICT platforms such as POS, ATM, and mobile banking proved an affirmative effect on customer deposits to their bank by attracting depositors and enabled consumers to access their savings with simplicity. Having historical data of an entity comes in handy to determine product offering to the consumers, in this regard respondents were interviewed on how their Saccos can electronically store member savings and credit data for future access; the respondents affirmed (M=4.34).The data further affirmed to a very great extent (M= 4.62) that respondents from the Saccos can record and disburse credit facilities effectively. Similarly, the respondents agreed (M =4.68) that ICT platforms had enabled Sacco to monitor and recover credit facilities. Lastly, the table further deduced that to a very great extent (4.66) ICT enabled savings and credit services had positively impacted the Sacco performance. The finding shows that the respondents scored close to the mean with a standard deviation below 1.0. Therefore the data was normally distributed.

This is consistent with the conclusions of Keah (2014) who found that adopting ICT led to an improvement of Sacco's performance, and embracing of ICT translated to an improvement of turnaround time, resulting from new ways of delivering financial services electronically to consumers. Dawbor *et al.* (2017) further concluded the existence of a relationship that was positive between ICT adoption and banks performance in Nigeria. When the degree of ICT adoption changed, it resulted in proportionate growth in the performance levels.

#### **4.4 Inferential Analysis**

The inferential analysis permits the researcher to conclude a population-based on available data samples collected. This tests if the data can be used to explain widespread behavior about the broader population.

##### **4.4.1 Correlation Analysis**

Pearson's correlation was used to test the existence and extent of a relationship between the dependent and independent variables. Pearson's  $r$  for the analysis of mobile transactions and Sacco's performance resulted in 0.612. This proved a positive linear relationship between the variables. A 2 –tailed significance value for the variables was .003 that is below the 0.05 standard value of Alpha. Further showing that this relationship is statistically significant. The Pearson's  $r$  for the correlation between the data security practices and Sacco's performance was 0.705.

Showing there is a positive linear relationship between the independent and dependent variables. Meanwhile, the 2 –tailed significance value for the variables was .000 this is below the Alpha value of 0.05 which is the standard value. The analysis of Pearson's  $r$  between Agency banking and Sacco's performance was found to be 0.558, while the 2 –tailed significance value for the variables was .001. Lastly, the Pearson's  $r$  showing a correlation

between ATM usage and Sacco's performance was 0.534. The 2 –tailed significance value for the variables was .000.

**Table 4. 8: Correlation Analysis**

		MB	DS	AB	ATM	SP
MB	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	50				
DS	Pearson Correlation	.272*	1			
	Sig. (2-tailed)	.056				
	N	50	50			
AB	Pearson Correlation	.314*	.479**	1		
	Sig. (2-tailed)	.026	.000			
	N	50	50	50		
ATM	Pearson Correlation	.352*	.733**	.704**	1	
	Sig. (2-tailed)	.012	.000	.000		
	N	50	50	50	50	
SP	Pearson Correlation	.612**	.705**	.558**	.534**	1
	Sig. (2-tailed)	.003	.000	.001	.000	
	N	50	50	50	50	50
*. Correlation is significant at the 0.05 level (2-tailed).						
**. Correlation is significant at the 0.01 level (2-tailed).						

**Dependent variable;** Mobile Banking (MB), Data Security (DS), Agency Banking (AB), Automated Teller Machine (ATM)

**Independent Variable;** SACCOs Performance (SP)

**Source: Research Data (2020)**

#### 4.4.2 Diagnostic tests

The diagnostics test assesses the validity of a model. This study carried out diagnostics tests through examination of tolerance and the Variance Inflation Factor (VIF) which are two Collinearity diagnostic factors helpful in identifying multicollinearity symptoms as well as using

a scatterplot. Robert (1995) while interpreting the variance inflation factors concluded that it's acceptable to have a VIF of 1-10; in table 4.9, the VIF ranged between 1.154 and 3.381 which shows a moderate correlation between the variables. Tolerance in collinearity tests depicts if each individual variable is closely related to the other. Data Values less than 0.10 shows collinearity. From the table 4.9 below, the values ranges between .296 and .867. This shows that the variables are highly correlated.

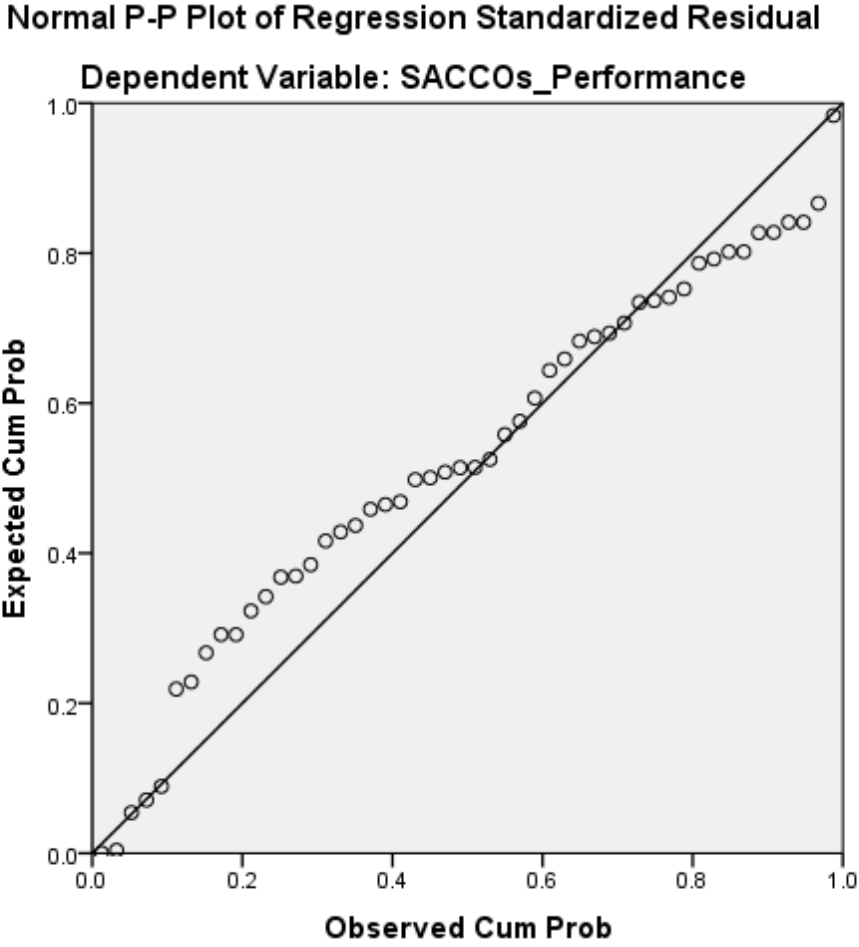
**Table 4. 9: Multicollinearity Test**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.463	.558		2.620	.012		
1 Mobile Banking	.288	.131	.231	2.193	.033	.867	1.154
Data Security	.426	.090	.685	4.730	.000	.459	2.178
Agency Banking	.183	.123	.067	1.495	.039	.497	2.014
Automated Teller Machine	.503	.164	.522	3.067	.006	.296	3.381

a. Dependent Variable: SACCOs Performance

**Source: Research Data (2020)**

From the graph shown below in figure 4.3, the slope plots upward from zero, proving the existence of a positive correlation between variables.



**Figure 4. 3: Normality test graph**

**Source: Research Data (2020)**

**4.4.3 Model Summary**

Table 4.10 illustrates that, with the other factors are being held constant, the coefficient of determination (Adjusted R Square) shows that Automated Teller Machine, Mobile Banking, Agency Banking, Data Security in the regression model explain 52.8 % of the variations in the

total performance of DT SACCOS in Kiambu County, Kenya. Other factors not put into consideration in this study could explanation for the remaining 43.3% of the variation in performance.

**Table 4. 10: Summary of the Model**

Model	R	R Square	Adjusted R Square	Std. error of the Estimate
1	.753 <sup>a</sup>	.567	.528	.31810

a. **Predictors:** (Constant), Automated Teller Machine, Mobile Banking, Agency Banking, Data Security

b. **Dependent Variable:** SACCOS Performance

#### 4.4.4 Analysis of Variance

In table 4.11, the ANOVA on the variables was used to show whether the model is acceptable for the data. The model was acceptable since the p-value (0.000) was lesser than the conventional probability of 0.05 significance level, thus the model was statistically significant in establishing the influence of automated teller machines, mobile banking, agency banking, data security on DT-Saccos performance in Kiambu County.

**Table 4. 11: ANOVA**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.958	4	1.489	14.720	.000 <sup>b</sup>
	Residual	4.553	45	.101		
	Total	10.511	49			

a. **Predictors:** (Constant), Automated Teller Machine, Mobile Banking, Agency Banking, Data Security

b. **Dependent Variable:** SACCOS Performance

#### 4.4.5 Regression Coefficients

**Table 4. 12: Regression Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.463	.558		2.620	.012
1 Mobile Banking	.288	.131	.231	2.193	.033
Data Security	.426	.090	.685	4.730	.000
Agency Banking	.183	.123	.067	1.495	.039
Automated Teller Machine	.503	.164	.522	3.067	.006

**Dependent Variable:** SACCOs Performance

**Source: Research Data (2020)**

In defining the correlation between the independent variables and the dependent variable this study used multiple regression analysis. The model therefore was;

$$YL = 1.463 + .067X_1 + .231X_2 + .685X_3 + .522X_4$$

The regression equation from table 4.12 revealed that at a 5% significance level and 95% confidence interval, mobile banking had 0.033 level significance, Data security had 0.000 level of significance, and agency banking had 0.039 level of significance while ATM usage had a 0.006 level of significance. Similarly, the performance of the Sacco's would rise by 1.463 units.

An increase of agency banking by a unit would enhance performance by 0.067 factors, an increase on mobile banking by a unit would influence performance by factors of 0.231, an increase on data security by a unit would influence performance by 0.685 and an increase of each unit in the usage of ATM result to positive increase of the Saccos' performance by 0.522.

Ireru *et al.* (2017) concluded that various ICT technologies such as usage of ATM systems improved the service delivery to customers and generated incomes for SACCOs and hence the performance. Similarly, Ngumi (2013) concluded that POS terminals have a high potential of

generating income as they gave customers the allowance to complete a broad array of financial transactions thus enabling the financial institutions to earn more and improve their return on assets.

## **CHAPTER FIVE: SUMMARY , CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

The summary and findings discussion, recommendations and conclusions in regard to the overall objective to determine ICT impact on DT-SACCOs performance in County of Kiambu, Kenya are contemplated in this chapter. Lastly, the researcher proposed areas of additional exploration.

### **5.2 Summary of the Findings**

DT-SACCOs play an important role to financial consumers who are left out by conventional banks. Diverse ICT innovations have been produced towards different sectors to spur growth while managing the costs. The study aimed to determine ICT impact on DT-SACCOs performance in County of Kiambu, Kenya. The researcher adopted descriptive research design on a population of 14 deposit-taking SACCOs licensed and operating in Kiambu, Kenya between the years 2010 and 2017. The researcher used the purposive sampling technique to pick 4 respondents, who were the Branch Manager, ICT, Operations, and Finance managers, per SACCO. The study sums up the four objectives as follows;

The majority of the respondents stated that ATM cards greatly influence the SACCOs' commission's level. Similarly, the respondents indicated that income margins are affected positively to a very great extent by the use of ATMs, this is by taking into account the cost of acquisition, operational costs, and the income generated per transaction. Over half of the interviewed respondents indicated that ATM usage enhances service mobility to a very great extent. From the research results, it was widely held by the respondents that their Saccos had implemented cybersecurity and training, Internet of things (IoT) as well as cloud computing greatly.

Respondents agreed extensively that Saccos had elaborate redundant data storage in their data centers. Cumulatively, the respondents felt safe as users while using Networks and internet services as well as affirming that Saccos uses stored data to determine the member's financial behavior. Lastly, the study exhibited to a great extent that DT Saccos has invested in Disaster recovery and management practices, to enable the Saccos to bear minimal disruptions during system failures. Data security measures are therefore necessary tools for securing computing resources as well as using IT as a service by utilizing cloud computing.

In total, the majority of the respondents affirmed that agency banking influenced positively the Saccos commission. This study established that the adoption of agency banking saves the DT Saccos from opening more brick-and-mortar branches and can therefore utilize the funds in other income-generating investments. In total, most of the respondents pointed out that adopting Agency banking has enlarged the income pool of the Saccos. It was further found that Saccos have been investing in virtual operations to scale up their coverage and outreach to a great extent. The use of mobile banking was found to; positively affect the income of the Sacco, enable a new member to join as well as have a convenient mode of accessing mobile loans. It was further found out that mobile banking systems allow Saccos to send custom marketing messages to their membership base; lastly, the respondents considered mobile banking as a tool to enable members to access Sacco services anywhere- anytime.

### **5.3 Conclusion.**

The conclusion of the study is that ICT adoption positively influenced DT- Saccos' performance this can be alluded to by the respondents agreeing that mobile banking positively influences incomes such as commission and mobile-based loans interest. The respondents further agreed that mobile banking enables new members to join and enabled the Saccos to send custom-made

marketing messages. Additionally, the study concluded that agency banking influenced the Saccos Performance by positively enlarging the income-generating channels. DT Saccos do not need to have physical branches as they can deliver services through virtual operations. The DT Saccos management should not deploy ICT systems due to regulatory requirements but roll out systems to support their daily operations, to realize the full potential of the technologies. Similarly, the management should incorporate ICT adoption as part of their corporate strategy as a key performance indicator.

The study further concludes that data security is a vital innovation in safeguarding the user's online presence, usage of cloud computing, and cybersecurity. The respondents agreed that data security measures and policies should be set up to mitigate cybercrimes and assure customers on the online safety. Having elaborate redundant storage and investment in disaster management ensures minimal interruptions in case of technological failures.

Lastly, it was widely viewed by the respondents that ATM usage enhances DT Sacco's performance. However, customers need frequent awareness of the ICT-enabled services to enable the SACCOs to recoup their investments in ICT systems.

#### **5.4 Recommendations.**

From the conclusions and findings, the study endorses that DT Saccos ought to deepen its investments in mobile banking platforms as it's the next frontier in ICT innovations. This will enable members to access the SACCOs services while not being limited by time or location. The SACCOs ought to revamp their Mobile banking applications to present a wide array of features to the members. This study found that the SACCOs can deliver services to members using agency banking without a capital outlay in brick and mortar branches. The study, therefore, recommends that SACCOs ought to carry out frequent and updated pieces of training for the agents. This will

ensure uniform services delivery across different service points. Data security is an essential part of the SACCO information systems. The SACCOs ought to ensure that the networks and data are well secured from unauthorized access through dual authentication, use of a password, redundant servers, firewalls, or cloud computing. The study further recommends that SACCOs ought to use business analytics tools to understand consumer behaviour and tailor-make products required by the membership, for instance the usage of ATMs has been on the decline on the backdrop of emergence of Mobile banking platforms. The DT-Saccos regulator (SASRA) ought to develop effective regulatory structures to monitor the adoption of ICT in various SACCOS to boost their efficiency and performance.

### **5.5 Areas for Further Research**

This project was engrossed on SACCOs in Kiambu County; the recommendations by this study, therefore, are that forthcoming researches need to be conducted in other rural areas to measure the adoption of ICT across the counties. The study suggests further research on other ICT perspectives, such as the impact of ICT adoption as a value addition to the consumer and the quality of ICT innovations being implemented by DT-Saccos. The study further recommends research on the sustainability of ATMs technology in the long term. Lastly, the study suggests research on the relationship between good practices of corporate governance and digital marketing in Sacco's overall performance.

## REFERENCES

- Alalade, S.Y, Omoniyi K., & Amusa B.O. (2014). Adoption of Information Technology and Banks Performance; A survey of selected Banks in Nigeria. *International Journal of Research in Commerce, IT & Management*.
- Alhaji A., & Rosmaini T. (2012). *The Impact of Information and Communication Technology on Banks' Performance and Customer Service Delivery in the Banking Industry*.
- Ashrafi, R., & Murtaza, M. (2008). Use and impact of ICT on SMEs in Oman. *Electronic Journal Information Systems Evaluation*, 11(3), 125-138.
- Balogun, E.O. (2016). Effects of Information Technology on Organizational Performance in Nigerian Banking Industries, *Research Journal of Finance and Accounting*, 7(3).
- Barney J. (1991). Firm Resources and Sustained Competitive Advantage, *Journal of Management*.
- Bulmberg, B., Cooper, D. R., & Schindler, P. S. (2011). *Business research methods*. McGraw-Hill/Irwin, Boston.
- Chiteli, N. (2013). Agent Banking Operations as a Competitive Strategy of Commercial Banks in Kisumu City. *International Journal of Business and Social Science*, 4(13).
- Cfsp. (2018). County Fiscal Paper. *Gok*, 1(1), 45.
- Cfsp. (2018). *Transforming Kiambu*. *Kiambu County*, 1(1).
- CBK Report. (2017). *Commercial Banks Published Financial Statements*.

- Dabwor, T. Dalis & Ezie Obumneke. (2017). Effect of ICT Adoption on Competitive Performance of Banks in an Emerging Economy: *The Nigerian Experience. IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 22(8), 2.
- Darling, S. (2012). IT Enabled Banking Services in the Globalized Era; *International Journal of Multidisciplinary Research*.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, Minneapolis (MN)*.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: *A comparison of two theoretical models. Management Science, Ann Arbor (MI)*, 35.
- Everett M. Rogers. (2003). *Diffusion of Innovations (Fifth Edition)*.
- Financial sector stability report. (2011). *Joint annual report by financial sector regulators*.
- Financial sector stability report, (2017). *Published by the Financial Sector Regulators Forum*, September 2018, 9.
- Gitau, J. (2013). The Effect of Information and Communication Technologies on the Competitive Advantage of Multinational Banks in Kenya (*Unpublished Thesis*). University of Nairobi.
- Gok. (2016). Department of Finance and Economic Planning. *Gok*, 1(1), 11-28.
- Ileri, K., & Idowu, P. (2017). Investigation of Effectiveness of Information Technology on the Operations of the Savings and Credit Cooperative Societies in Nairobi, Kenya. *International Journal of Financial Accounting*, 2(4), 1-18.
- Jeucken, M., & Bouma, J. J. (2017). *The changing environment of Banks in sustainable Banking*, 24-38.

- Kamau, C. (2014). Effects of Sacco Services on Investment by Households in Kiambu County, Kenya. *The University of Nairobi*, 1(1), 23-56.
- Kamau, D. (2013). *Effects of Technological Innovations on Financial Performance of Commercial Banks in Kenya (Unpublished Thesis)*. University of Nairobi.
- Kamau, J. (2015). *Information Communication Technology and Performance of Commercial Banks in Kenya*. University of Nairobi.
- Keah W. (2014). *The effect of ICT adoption on the financial performance of savings and credit co-operative societies in Nairobi County, University of Nairobi*.
- Kimingi. (2009). *The effects of Technological Innovations on the Financial Performance of the Commercial Banks in Kenya*.
- Kombe Kadzo & Kimani Wafula. (2015). Effects of Internet Banking on the Financial Performance of Commercial Banks in Kenya a case of Kenya Commercial Bank, *International Journal of Scientific and Research Publications*, 5(5).
- Laudon & Laudon. (2014). *Managing the Digital Firm, 13<sup>th</sup> Edition*.
- Manjusha G. (2013). Impact of Technology on Banking Sector in India. *International Journal of Scientific and Research*.
- Masenge Ouko. (2014). *Information and Communication Technology use and Performance of Small and Medium Enterprises in Kenya: Selected SME's in Kamukunji Sub-County*.
- Mpofu, K., & Mathys, L. (2011). Understanding ICT Adoption in the Small Firm Sector in Southern Africa. *Journal of Systems and Information Technology*, 13(2), 179-199.
- Mugenda, O. M. and Mugenda, A. G. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.

- Muro, M. B., Magutu, P. O., & Getembe, K. N. (2013). The strategic benefits and challenges in the use of Customer Relationship Management Systems among Commercial Banks in Kenya. *European Scientific Journal, Esj*, 9(13).
- Murigi, G. N. (2017). Information Technology Security Practices and Performance of Small and Medium Enterprises in Nairobi County, Kenya. *Unpublished MBA Thesis, Kenyatta University*.
- Musango, D. (2018). *Mobile Banking Services and Financial Inclusion among Commercial Banks in Nairobi City County, Kenya*.
- Mutua, R. W. (2013). Effects of Mobile Banking on the Financial Performance of Commercial Banks in Kenya. *Unpublished Mba Thesis, University of Nairobi*.
- Mwangi, D.N. (2017). *Evaluation of Competitive Strategies applied by Savings and Credit Co-Operatives in enhancing their Financial Performance: in Kiambu County, Kenya*.
- Mwaura, M.W. (2018). *Impact of Agency Banking on the Operation Efficiency of Saccos in Kiambu County, Kenya*.
- Ndegwa, H. (2011). Adoption and Utilization of ICTs by Savings and Credit Cooperative Societies in Kenya: A case of Tharaka Nithi Teachers Sacco Society Ltd. *Moi University, I(1)*, 20-35.
- Ndirangu, M.W. (2016). *Strategic Change Management Practices adopted by Savings and Credit Co-Operative Societies (Saccos) in Kiambu County of Kenya*.
- Ndubi, N. (2013). *Adoption of E-Commerce Payment Systems by Commercial Banks in Kenya*.
- Ngumi, P. (2013). *Effect of Bank Innovations on Financial Performance of Commercial Banks in Kenya*.

- Njau, J. (2015). Factors affecting the adoption of Information and Computer Technology in Small and Medium Enterprises in Kenya: A case of Matatu Saccos in Thika Town. *Journal of Business and Change Management*, 2(18), 343-368.
- Njoki, M. (2018). *Competitive Strategies and Performance of Deposit Taking Saccos in Muranga County, Kenya. Kenyatta University*, 1(1), 19-26.
- Okiro, K., & Ndungu, J. (2013). The impact of Mobile and Internet Banking on the Performance of Financial Institutions in Kenya. *European Scientific Journal*, 9(13).
- Okundaye, K., Fan, S., & Dwyer, R. (2019). Impact of Information and Communication Technology in Nigerian Small- to Medium-Sized Enterprises. *Journal of Economics and Finance*, 1(1).
- Otieno. (2015). *Factors influencing ICT Adoption and usage by Small and Medium-Sized Enterprises in Nairobi*.
- Patroba, M., Osoro, K., Nyagol, D., & Odoyo, D. (2016). Influence of Information Technology in Enhancement of Sustainable Competitive Advantage of Saccos in Kisii County. *Journal of Humanities and Social Science*, 21(3).
- Penrose, E., T. (1959). *The Theory of the Growth of the Firm. Oxford: Oxford University Press*.
- Peterson, R., A. (1994). A meta-analysis of Cronbach's Coefficient Alpha. *Journal of Consumer Research*, 21.
- Robert A., Stine. (1995). *Graphical Interpretation of Variance Inflation Factors*.
- R.M Mahboub. (2018). The Impact of Information and Communication Technology Investments on the Performance of Lebanese Banks, *European Research Studies Journal*, 21(4), 435-458.

- Serianu. (2018). Sacco Cybersecurity Report 2018: Demystifying Cybersecurity for Saccos. *Serianu*, 1(1), 5-19.
- SACCO supervision report. (2010). *Annual report on the operations and performance of Deposit-Taking Sacco Societies (Dt-Saccos) in Kenya*.
- Sasra Report. (2016). Annual report on the operations and performance of Deposit-Taking Sacco Societies (Dt-Saccos) in Kenya. *Sasra*, 1(1), 20-56.
- SACCO supervision report. (2017). *Annual report on the operations and performance of Deposit-Taking Sacco Societies (DT-Saccos) in Kenya*.
- Shirin, T. (2008). ICT Innovation and Firm Performance, *an Empirical Analysis at Firm Level*.
- Sevrani, K., & Bahiti, R. (2008). ICT in Small and Medium Enterprises (*Case of Albania*). *Icbs*, 1(1).
- Surendran, P. (2012). Technology Acceptance Model: A survey of the literature. *International Journal of Business and Social Research (Ijbsr)*, 2(4), 175-177.
- Venkatesh, V., Morris M. G., Davis G, B. & Davis FD. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 425-478.
- Vimala, V. (2015). The impact of Information Technology adoption on the Customers of Bank of India, Bangalore Urban, *IOSR Journal of Business and Management*, 17(3), 39-44.
- Wernerfelt, B. (1984). A Resource-Based View of the Firm. *Strategic Management Journal*, 5(2), 171-180.
- Wesutsa, J. (2012). *The impact of ICT adoption on Financial Performance of Commercial Banks in Kenya*, University of Nairobi.

## APPENDICES

### Appendix 1: Budget and Work plan

	yr 2018		yr 2019				yr 2020			
Activity	Jul y	Aug -Oct	Jan- march	Apr- June	July- Sept	Oct- Dec	Jan- March	Apr- June	July- Sept	Oct- Dec
1 Completed coursework										
2 Concept paper presentation and approval										
3 Literature review & proposal methodologies										
4 Final proposal presentation to the supervisor										
5 Presentation to graduate school for examination										
6 Amendments as per graduate school recommendations										
7 Presentation of amended proposal for approval										
8 NACOSTI permit application										
9 Data collection & analysis										
10 Thesis writing, presentation										



								<b>0</b>
	<b>Budget Total</b>							<b><u>111,665.</u></b> <b><u>00</u></b>
	<b><u>Budget notes</u></b>							
a	Yr1 and yr 2 was utilized on course work to an expense of kes 300,000							
b	local travel was formulated to meet respondents in the same geographical location, this saved on the travel costs							

### Appendix 3: Research Authorization



## KENYATTA UNIVERSITY GRADUATE SCHOOL

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 8710901 Ext. 57530

Website: [www.ku.ac.ke](http://www.ku.ac.ke)

Our Ref: D53/OL/CTY/32911/2016

DATE: 13<sup>th</sup> August, 2020

Director General,  
National Commission for Science, Technology  
and Innovation  
P.O. Box 30623-00100  
**NAIROBI**

Dear Sir/Madam,

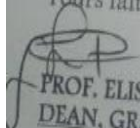
**RE: RESEARCH AUTHORIZATION FOR JULIUS WANJOHI NDUNG'U**  
**D53/OL/CTY/32911/2016**

I write to introduce Mr. Julius Wanjohi Ndung'u who is a Postgraduate Student of this University. He is registered for M.A degree programme in the Department of Management Science.


Mr. Ndung'u intends to conduct research for a M.B.A Project Proposal entitled, "Information Communication Technology Adoption and Performance of Deposit taking Savings and Credit Cooperative Societies in Kiambu County, Kenya".

Any assistance given will be highly appreciated.

Yours faithfully,

  
PROF. ELISHIBA KIMANI  
DEAN, GRADUATE SCHOOL

EK/nn

  
KENYATTA UNIVERSITY  
GRADUATE SCHOOL

E-mail: [dean-graduate@ku.ac.ke](mailto:dean-graduate@ku.ac.ke)

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P.O. Box 43844, 00100  
NAIROBI, KENYA  
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 13<sup>th</sup> August, 2020

TO: Julius Wanjohi Ndung'u  
C/o Management Science Dept.

REF: D53/OL/CTY/32911/2016

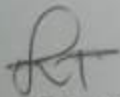
SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

We acknowledge receipt of your revised Project Proposal as per our recommendations raised by the Graduate School Board at its meeting of 20<sup>th</sup> May, 2020, Entitled, "Information Communication Technology Adoption and Performance of Deposit Taking Savings and Credit Co-operative Societies in Kiambu County, Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.



JULIA GITU  
FOR: DEAN, GRADUATE SCHOOL

C.c. Chairman, Department of Management Science

Supervisors:

1. Dr. Joshua Tumuti  
C/o Management science Dept.  
Kenyatta University



### Appendix 5: Questionnaire

My name is Julius Ndungu, a postgraduate final year student at K.U pursuing a MBA degree (MIS option). As a requirement of the program, am required to carry out a research of interest.

The project seeks to determine the influence of ICT adoption on DT-SACCO'S performance in Kiambu County. All the data collected will be utilised for academic aims only.

This Research is with regards to the influence of ICT adoption and performance of DT-SACCOs in the County of Kiambu. Kindly provide your responses with ultimate honesty.

#### Part A: General Information

1. Gender of the respondent

Female  Male

2. The duration of employment with the DT-Sacco

1-5years   
6-10yrs   
11-15 years   
16-20 years   
More than 20 years

#### Part B;

3. Effect of Mobile Banking on Saccos Performance in Kiambu County

To what extent do you agree with the following effects of mobile banking on SACCOs' performance in Kiambu County?

<b>Statement</b>	<b>Very great extent</b>	<b>great extent</b>	<b>Neutral</b>	<b>Low extent</b>	<b>No extent</b>
Mobile banking has a positive effect on the commission-based income of the SACCO					
Mobile banking has enabled new members to join the SACCO					
Mobile banking has enabled Sacco to earn interest income from mobile-based loans					
Mobile banking has enabled members to access Saccos' services anywhere, anytime					
Mobile banking requires low maintenance costs as compared to their total cost of ownership					
Mobile banking enables Sacco to send custom made Marketing messages to members					

#### **Effect of ICT Adoption on Data Security in Kiambu County**

**4.** How would you rate the extent of ICT adoption on Data Security in the SACCO?

<b>Statement</b>	<b>Very great extent</b>	<b>great extent</b>	<b>Neutral</b>	<b>Low extent</b>	<b>No extent</b>
We have provided cybersecurity training, application of cloud and IoT, cybersecurity management, and Increased skills on employees with regards to ICT usage.					
We have set up our Sacco users to feel safe while using Networks and internet services					
Our Sacco has elaborate Redundant data storage in data centers					
The Sacco has logical and physical cybersecurity configurations to mitigate access by attackers in gaining crucial data from the sites.					
Sacco uses the stored data to determine the members'					

financial behavior					
The Sacco has invested in disaster management and recovery					

### The effect of Agency Banking on Saccos Performance

5. To what extent does the SACCO make use of the following technological innovations in its operations?

<b>statement</b>	<b>Very great extent</b>	<b>great extent</b>	<b>Neutral</b>	<b>Low extent</b>	<b>No extent</b>
Agency banking has positively influenced the Saccos' commission-based incomes					
Agency banking saves the Sacco from opening more brick and mortar branches					
The Sacco has invested in Virtual/branchless operations to reach more members					
Sacco has enlarged the income-generating channels by adopting Agency banking					

**The effect of ATM Usage on Saccos Performance**

6. To what extent does the SACCO influence its performance by adopting ATMs?

<b>statement</b>	<b>Very great extent</b>	<b>great extent</b>	<b>Neutral</b>	<b>Low extent</b>	<b>No extent</b>
ATM cards positively influence the commission-based incomes					
Incomes from ATM usage have a positive effect on income margins of the Sacco					
ATMs enhance the mobility of Saccos' products and services					
ATMs require low maintenance costs as compared to their total cost of ownership					

**Part C:**

**Performance of Saccos**

<b>statment</b>	<b>Very great extent</b>	<b>great extent</b>	<b>Neutral</b>	<b>Low extent</b>	<b>No extent</b>

The adoption of ICT is key in the improvement of SACCOs earnings					
The adoption of ICT has led to an improvement in the liquidity of SACCOs					
Internal operations have greatly improved via the usage of ICT technologies					
The Sacco turnover(Incomes) has been positively impacted by ICT					
ICT adoption has enabled Sacco to grow its membership and common Bond					
Members can easily access SACCOs products and services while using ICT channels					
Member savings have grown with the implementation of ICT platforms					
Members have an efficient medium to save their savings with					

the Sacco					
The SACCO can electronically store member savings and credit data for future access					
The Sacco can record and disburse credit facilities effectively					
ICT enabled savings and credit services has positively impacted the Sacco performance					
ICT platforms have enabled Sacco to monitor and recover credit facilities					

**END**