



**UNIVERSITY OF NAIROBI**  
**DEPARTMENT OF COMPUTER SCIENCE**

**VIRTUAL BANKING ADOPTION BY SACCOs IN THE  
FACE OF COVID 19 PANDEMIC IN KENYA:  
A CASE STUDY OF NAIROBI COUNTY**

**BY**

**KEFAH JUMA OMWANDO**

**REG NUMBER- P54/35606/2019**

**SUPERVISOR:**


**CHRISTOPHER MOTURI**

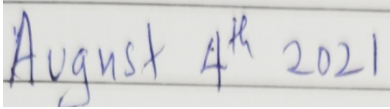
**A project report submitted in partial fulfillment of the requirements for the award of  
the Degree of Master of Science in Information Technology Management of the  
University of Nairobi, Department of Computer Science.**

**August 2021**

## DECLARATION

This research project is my original work and has not been presented for master's degree in any other university.

Signature 

Date: 

KEFAH JUMA OMWANDO

REG NUMBER- P54/35606/2019

This research project report has been submitted for examination for the award of Master of Science in Information Technology Management with my approval as the university Supervisor.

Signature



Last modified: 21:46

*Date: August 5, 2021*

Christopher A. Moturi

Department of Computer Science

University of Nairobi

## **DEDICATION**

I wish to dedicate this work in honor of my beloved children Grace, Brumley and Yens who will always be engraved in my heart, and to my dedicated wife for her selfless sacrifice and understanding throughout the course of this study.

## **ACKNOWLEDGMENT**

I sincerely thank my supervisor, Mr. Christopher Moturi, for his excellent supervision, understanding and unending support during the time of this research, and indeed for his invaluable input into this project. I also wish to appreciate all lecturers in the Master of Science in Information Technology Management for their effort of passing the knowledge to us. Many thanks to all my fellow students and friends for their support and encouragement. I cannot forget to thank two of my sponsors, the Gandhi Smarak Nithi Fund who paid a huge share of my tuition and the University of Nairobi Staff Development Fund that paid the rest of the fee. I would not have completed my studies without this funding.

Above all, I acknowledge God for His reward of grace, energy, and good health and especially during this COVID-19 Pandemic period.

## TABLE OF CONTENTS

<b>DECLARATION</b>	<b>ii</b>
<b>DEDICATION</b>	<b>iii</b>
<b>ACKNOWLEDGMENT</b>	<b>iv</b>
<b>LIST OF ABBREVIATIONS</b>	<b>x</b>
<b>ABSTRACT</b>	<b>xii</b>
<b>CHAPTER ONE</b>	<b>1</b>
<b>INTRODUCTION</b>	<b>1</b>
1.1. Background of the study	1
1.2 Statement of the Problem	4
1.3. The objectives of the study	5
1.4. Research questions	7
1.5. Significance of the study	7
1.6. Scope of the study	8
1.7. Limitation of the Study	8
1.8. Basic assumption of the study	9
<b>CHAPTER TWO</b>	<b>10</b>
<b>LITERATURE REVIEW</b>	<b>10</b>
2.0. Introduction	10
2.2. Electronic Delivery Channels	12
2.2.1. Branchless banking	12
2.2.2. Internet TV banking	12
2.2.3. ATMs	12
2.2.4. Electronic funds transfers (EFT)	13
2.2.5. Self-service (pc) banking	13
2.2.6. POS banking (credit and debit cards)	13
2.3. Factors Influencing Virtual Banking	13
2.3.1. Social Factors	14
2.3.2. Economic Factors	14
2.3.3. Technological Factors	14
2.4. Theoretical Frame Works and Models	15
2.4.1. The technology acceptance model (TAM)	15
2.4.2. Schumpeter's Theory of Innovation	16
2.5. Empirical Literature	16

Table 2: Different Research Studies Concerning adoption of Internet Banking	18
2.6. Conceptual Frame Work	20
<b>CHAPTER THREE</b>	<b>22</b>
<b>RESEARCH METHODOLOGY</b>	<b>22</b>
3.0. Introduction	22
3.1. Location of the study	22
3.2. Research design	22
3.2.1. Research methods	23
3.4. Target population	23
3.4.1. Study sample	23
3.5. Data collection methods	23
3.5.1. Type and sources of Data	23
3.5.2. Data Collection Instruments	24
3.5.4. Data Collection Procedure	25
3.6. Data Analysis and Presentation	25
<b>CHAPTER FOUR</b>	<b>26</b>
<b>DATA ANALYSIS AND INTERPRETATIONS OF THE STUDY</b>	<b>26</b>
4.1.0. Data Analysis	26
4.1.1. Response Rate	26
<b>CHAPTER FIVE</b>	<b>65</b>
<b>CONCLUSION AND RECOMMENDATIONS</b>	<b>65</b>
5.0. Introduction	65
5.1. Achievements	65
5.2. Conclusion	68
5.3. Recommendation	69
5.4. Further Research	70
<b>REFERENCES</b>	<b>71</b>
<b>APPENDIX I</b>	<b>74</b>
<b>APPENDIX II</b>	<b>74</b>
<b>APPENDIX III</b>	<b>75</b>
<b>APPENDIX VI: QUESTIONNAIRE</b>	<b>75</b>
<b>APPENDIX V: LETTER OF INTRODUCTION</b>	<b>84</b>
<b>APPENDIX VI</b>	<b>85</b>

## LIST OF TABLES

Table 1: Objectives	6
Table 2: Different Research Studies Concerning adoption of Internet Banking	18
Table 3: Gender of Respondents	26
Table 4: Age Brackets	26
Table 5: Level of Education	27
Table 6. The banking sector was faced with various problems such as application for loans taking weeks	27
Table 7: Banking industry has a good number of models which are being adopted with Virtual banking	29
Table 8: In today's world, new business models that are more customer-focused, have lower cost and are more efficient.	29
Table 9: Does the customer conduct financial transactions through a mobile phone instead of at the Sacco's branches.	29
Table 10: Would you say the customer account relationship rests with the Bank?	30
Table 11: Does the bank have a role in the day-to-day account management?	30
Table 12: Non-Bank Agent Becomes the Deep Depository Entity.	31
Table 13: The account ownership and transaction management purely rest telecommunication company	31
Table 14: Where does the account ownership and transaction management purely rest.	32
Table 15. Summary of Survey Findings Regarding Most Important Factors	33
Table 16: Information Technology effectively eases loan approvals and disbursement	34
Table 17: The introduction of electronic banking reduces staff-customers interface in service delivery	34
Table 18: Adoption of information technology enables customers to access services at any location	35
Table 19: Customer complaints are reduced as a result of the e-Banking services	35
Table 20 CUSTOMERS CAN LAUNCH QUERIES ANYTIME	37
Table 21: Adoption of technology in operations lowers the cost of making withdrawals	37
Table 22: Older Generation Has Not Adopted New Technology.	39
Table 23: Customer Usage of Virtual Banking Is Influenced by Absolute Prices and Also by The Way a Service Is Priced	39
Table 25: Security is a threat which can prevent data transactions or allow unauthorized	

access to the accounts through network attacks or hacking etc?	41
Table 26: Convenience and flexibility in terms of location and time play a vital role in the adoption of internet banking?	43
Table 27: Customer-oriented privacy policy of the banks leads to the adoption of internet banking?	44
Table 28: Branchless Banking Is a Channel Strategy Distribution Used Without Other Branches	44
Table 29: Virtual banking shows a Trend in the Outgrowth of Pc Banking	45
Table 30: Automated Teller Machines can be Called Cash Machine	46
Table 31: Which features of virtual/internet banking do you use?	46
Table 32: Electronic Exchange Involve the Transfer of Money from One Account to the Other by the Use of a Computer Based System	46
Table 33: Virtual Banks are financial service providers from the Fitch Sector offering banking services exclusively online	47
Table 34: Use of Virtual banking Is Time Saving	48
Table 35: Virtual Banking Is Complicated to Use	48
Table 36: Use of Virtual Banking Is Not Reliable	49
Table 37: Virtual Banking Applications Quite Pleasant	50



## LIST OF FIGURES

Fig1: Conceptual framework	21
Fig2: Respondents' Internet/virtual Banking Usage Frequency	28
Fig 3: Agent Contact with Customers	31
Figure 4: Fraudulent practices Have Stopped in the Banking since the Introduction of E-Banking	36
Figure 5: Transaction Errors Due Personnel Have Reduced.	36
Figure 6: Amount of Time Taken to Receive Feedback Has Significantly Reduced.	38
Figure 7: Channels Have Aided in The Reduction Communication.	38
Figure 8: Navigation Is Important in The Adoption of Banking.	40
Figure 9: Security Plays Role in Virtual Banking.	41
Figure 10: My Trust in Virtual is Not Strong as Trust in Offline Services Provided by The Bank.	42
Figure 11: Unique, Integrated and Customized Finance Services Are Very Important in The Adoption of Virtual Banking.	43
Figure 12: Types of Channel You Prefer to Use	45
Figure 13: Virtual Banking Makes My Transaction Very Fast	47
Figure 14: Virtual Banking Does Not Demand a Lot of Effort	49
Figure 15: Quality of Service in Virtual Banking Is High	50
Figure 16: Virtual Banking Gives Me Control over My Transaction	51
Figure 17. Sacco virtual banking adoption model (TAM-COVID)	57

## LIST OF ABBREVIATIONS

<b>ACCs</b>	Acceding and Candidate countries
<b>ASARECA</b>	Association for Strengthening Agricultural Research in Eastern, Central Africa
<b>ATMs</b>	Automated Teller Machines
<b>BIAN</b>	Banking Industry Architecture Network
<b>CBK</b>	Central Bank of Kenya
<b>CBS</b>	Core Banking System
<b>CRM</b>	Customer Relationship management
<b>DTPB</b>	Decomposed Theory of planned Behavior
<b>EFTPOS</b>	Electronic Funds Transfer at Point of Sale
<b>FAQS</b>	Frequently asked Questions
<b>FOSA</b>	Front Office Services Activities
<b>ICT</b>	Information Communication and Technology
<b>IMF</b>	International Monetary Fund
<b>KUSCCO</b>	Kenya Union of Savings and Credit Cooperatives
<b>KEPSS</b>	Kenya Electronic Payment and Settlement System
<b>KNFC</b>	Kenya National Federation of Co-Operatives
<b>MIRA-B</b>	Microsoft Industry Reference Architecture for Banking
<b>NEFT</b>	National Electronic Funds Transfer
<b>POS</b>	Point of Sale
<b>RTGS</b>	Real Time Gross and Settlement System (RTSS)
<b>RTGS</b>	Real-Time Gross Settlement
<b>SACCO</b>	Savings and Credit Cooperative Organization
<b>TALC</b>	Technology Adoption Life Cycle
<b>TAM</b>	Technology acceptance model
<b>VPN</b>	Virtual Private Network

## DEFINITION OF SIGNIFICANT TERMS

**Electronic Funds transfer** is a method of moving funds from between same bank or multiple institutions by use of computerized system without any intervention by the bank.

**Innovative technological services** is the design and publicizing of new financial institutions, markets, instruments, and technologies

**Internet banking** Is an approach to banking where transactions are performed electronically through the bank's website

**Adoption** – implementation of technological solutions allow customers to take part in a rapidly changing business world in which technology dictate almost every aspect of human life. According to Bridges (2012), those reluctant to embrace new technology limit their capability to reap the convenience and financial benefits that accompany technological development.

**Relative advantage** – is the level to which a new technology is considered superior and attractive to the current one (More & Bombast, 1991).

**M-banking** – is the use of a mobile network or device to deliver financial solutions

## ABSTRACT

The outbreak of COVID-19 pandemic saw overwhelming effects on consumers' buying behavior globally, with economic productive activities shifting from offline to online. As a result, many business leaders were left with no option other than adopt the use of Information Technology to ensure business operations continuity, enhance efficiency as well as sustainability. In Kenya, unlike most commercial banks, Saccos have largely been left behind in embracing new banking technologies such as agency banking, internet banking, or mobile banking. Therefore, the use of paperwork, physical and in-person meetings to conduct business has remained widespread amongst many Saccos in the country, and the onset of COVID-19 has forced Saccos to shift to virtual banking as an effective alternative toward addressing their customers' needs while ensuring safety. This study aimed at examining the adoption of Mobile Banking models and Virtual Banking technologies and innovations to establish the factors influencing their adoption by potential users. The study also explores the adoption of Virtual banking amongst Saccos in Kenya, investigating the electronic delivery channels used, and their suitability. The study objectives were accomplished through an exploratory and descriptive approach and the data used collected from SACCO-based respondents who included Sacco ICT officers, managers, and members using questionnaires. Data analysis was done using the Statistical Package for Social Sciences (SPSS). The study established that most Saccos were found to favor the **Joint venture model** and the **non-bank-driven model** as Mobile Banking models and technologies to realize virtual banking adoption. The extent of adoption of virtual banking amongst Sacco clientele was found to be influenced by social, economic, and technological factors. The study did not direct to a specific virtual-banking system, so for a specific e-banking system, it should be better to carry out a questionnaire survey or interview sessions to analyze factors that influence the individual adoption of e-banking services. The study recommends that Saccos should consider sharing information and technologies across various networks as this is likely to lead to much more gains in adopting technologies that would improve their sustainability as while fostering better customer experience.

# CHAPTER ONE

## INTRODUCTION

This section provides the background and general introduction of the research area, purpose of the study, statement of the problem, objectives and research questions used, and justification for the study.

### 1.1. Background of the study

The global outbreak of COVID-19 pandemic has remained overwhelming, taking by storm many countries across the world, including Kenya. The pandemic has strained the global healthcare system with spilling effects on consumers' buying behavior both nationally and globally. Economic productive activities have witnessed a downward trend due to imposition of various containment measures such as quarantine, lockdowns, curfews, and social distancing. This has forced people to alter their usual behavior to remain proactive and hence cope with the unplanned disturbance and deviation from the norm. A significant shift of normal activities to online platforms has compelled many people, for instance, to work remotely.

Amidst all the turmoil associated with year 2020, one positive trend that has emerged is the increased adoption of digitalization to socialize, learn, work, and shop while observing safety regulations in the daily routine. To stay afloat, organizations have been compelled to search for convenient tools and solutions for working remotely to manage in virtual terms, time, planning and tracking their progress. Some of technologies being implemented include virtual private networks (VPN), voice over INTERNET, virtual meetings, and cloud technology, among others that have impacted greatly for instance virtual banking (ASARECA, 2019).

In Kenya, unlike most commercial banks, the Sacco movement is yet to adapt to the new banking technologies such as agency banking, internet banking, or mobile banking (Ngure et. al, 2017). Saccos are still using paperwork in their service delivery, physical meetings with members at branches to communicate information on products and policies, with most Sacco customers doing their transactions in person (Kwara, 2020). The "KWARA" catalyst fund portfolio company developed software to assist Saccos operating in remote areas to digitize their products. This followed a survey among 166 Sacco revealing high prevalence in the use of manual service delivery amongst many Saccos, with the most affected being customer services. Currently, many Saccos have embraced digital technologies in loan applications,

communication with members and customer's intelligence Kwara (2020).

The ongoing business in Saccos still requires members to fill out loan application forms scan them and take them to loan officers, and in some cases they have been using motorcycle messengers. In fact, numbers of members have appeared in office to apply for loans and to be accessed by the credit officer. The guarantor name must be listed in the form, verified and notified through a phone call but the guarantor's part must be completely signed by the guarantor. This process is very cumbersome, hence the need for Sacco to urgently integrate collateral management, and additional credit scoring to their business on notifications to alert their members about their ongoing progress on the loan application Anaad (2020).

Saccos also highlighted customer intelligence as a very important area of opportunity, in order to track potential leads member queries. Most Saccos are unable to see customer information in one place, nor it is not easy to aggregate customer analytics, as most of the information is being managed across various systems, and record keeping process is very poor with no sense of how everything should be put together Anaad (2020).

Virtual banking, the adoption of new technologies with overall effects on the organizations' remittance and mobile banking, Mobility (2019), stands as an effective alternative, toward addressing the challenges posed by the Covid19 pandemic. Internet banking is a well-known common innovation used by Sacco to link their ledgers and allow easier comparability of data. It reduces remittance costs between Sacco thus aiding in realizing revenue. Mobile banking allows Saccos to make basic transactional services like cash deposit and withdraws easily accessible to their clients. Mobile banking allows Saccos to transfer money between individuals; this has allowed Sacco to carry out transactions within the required time and allows individuals to use security protocols to prevent unauthorized access of information Mook et al., (2015).

Pytkowska & Korynski, (2017) define financial technologies as all innovations in financial solutions that lead to the use of electronic tools, resources, and devices that alter business models to generate more value-adding opportunities and revenues. Some of the benefits arising from the adoption of digital technologies by financial institutions include predictive models that enhance overall customer experience, cheaper operating costs enhance electronic analytics, enhance service provision, and better profit margins.

According to Odun & Utulu, (2016), the current turbulent environment has made organizations to adapt to the new technological revolutions taking place across the globe.

Specifically, the technological advancements have made it possible for information to be transmitted easily and at a faster rate than before. As a result, traditional methods of marketing have been overtaken by new forms of digital advertising which has led to increase of consumer awareness due to the access of internet services.

The understanding of the importance of the adoption of the new technologies in every aspect of business is still a new concept to some Saccos. Some shy away from adopting the technology owing to the heavy financial implication it will have on the financial capability of the company. On the other hand, some companies have experienced resistance to change by their employees as some perceive the adoption of the technologies as a way of replacing their services. The realization of the benefits accrued from the adaptation of the technological innovation can only be realized if the players involved are well informed of the overall good of the new change Gondat, (2014).

Digital payments have been keeping many countries in the vivid by reducing contact with the virus. The move by China to introduce cash-less-life community assisted to maintain quarantines and helped in curbing the degree of transmission. As from 2019 Chinese non-bank online payments system yielded about \$ 35 trillion USD, and being the leading innovator of online payments, China has been able to survive her financial transactions as other countries still struggle to cope with new technologies Marous, (2020).

In Africa only 25% of the population currently use INTERNET for banking transactions and with such a very low penetration, the continent still needs to invest deeply in her ICT sector. This in turn requires better legal and regulatory frameworks on cyber security, personal data protection and privacy. Private partnerships therefore particularly important to develop the ICT sector policies to adopt digital technologies ASARECA (2019).

In Africa only 25% of Africans are currently using INTERNET with a very low penetration, the continent still needs to invest deeply in ICT sector, however the sector can only get better if the legal and regulatory frameworks on cyber security, personal data protection and privacy are worked on, support from private sector partnership will be very important to develop the ICT sector policies to adopt digital technologies ASARECA (2019).

## **1.2 Statement of the Problem**

Unlike most commercial banks in the country, Saccos have largely been left behind in embracing new banking technologies such as agency banking, internet banking, or mobile banking (Ngure et. al, 2017). Therefore, the use of paperwork, physical and in-person meetings to conduct business has remained widespread amongst many Saccos in the country. Today, most SACCOs conduct their transactions via the conventional branch-based retail banking. But the advent and increased uptake of virtual banking technology, following the new normal ushered by the Covid19 pandemic, has seen many Saccos left with no option other than altering their financial solutions to meet their customer needs as well as stay afloat. Now, Saccos in the country are coming up with electronic systems run online to reduce transactional costs and improve their operations. However, even in a few Saccos who have adopted the technology meant to develop better and easier i-banking platforms, customers barely notice these systems thus making them underutilized despite their availability. This has led to most Sacco customers still doing most of their transactions in person despite endangering their safety (Kwara, 2020).

Therefore, there exists a need to generate reliable and realistic data on the current adoption of technologies in banking amongst Saccos in Kenya. This paper presents a study aimed at obtaining knowledge on the available m-banking models that other Saccos can utilize toward adopting the technology, understand users' preference of the electronic delivery channels for virtual banking, as well as the desire to pinpoint factors that influence their intent to utilize virtual banking among Saccos in Nairobi County in the face of COVID-19 to drive decision making. This is important as the results of the research provides valuable information for aiding the Sacco sector to come up with mechanisms for adoption of virtual banking as well as their marketing approaches to spur emerging forms of internet banking platforms in years to come.



### **1.3. Objectives**

The overall objective of this study was to assess the adoption of Virtual Banking among Saccos in the face of COVID-19 pandemic for fact driven decision making.

1. Examine the Mobile Banking models available for Virtual Banking among Saccos in Nairobi County in the face of COVID-19 to drive decision making.
2. Discover factors that influence use of virtual banking technologies by potential users in SACCO industry in Nairobi County in the face of COVID-19 pandemic for fact driven decision making.
3. Determine the most digitally competitive electronic delivery channels used by Saccos in Nairobi County in the face of COVID 19 pandemic for fact driven decision-making.
4. Establish a suitable framework used to explore the adoption of Virtual Banking among Saccos in the face of COVID-19 for data driven decision making.

**Table 1 objectives table**

Objective	How objective will be achieved	Deliverable
Examine the Mobile Banking models available for Virtual Banking among Saccos in Nairobi County in the face of COVID-19 to drive decision making.	<ul style="list-style-type: none"> <li>• Review of the available literature on the adoption of Virtual Banking</li> <li>• Review of literature on the effectiveness of existing implementation models</li> <li>• Undertake interview sessions or a questionnaire survey</li> </ul>	<ul style="list-style-type: none"> <li>• Recommend available proven virtual banking models and technologies that can be utilized for adoption.</li> </ul>
Identify the factors influencing adoption of virtual banking technologies by potential users in SACCO industry in Nairobi County in the face of COVID-19 pandemic for fact driven decision making.	Review of the available literature on the implementation/adoption of Virtual Banking  Undertake interview sessions or a questionnaire survey	Factors that influence successful adoption of the available and proven virtual banking technologies in SACCO sector.
Investigate the most digitally competitive electronic delivery channels used by Saccos in Nairobi County in the face of COVID 19 pandemic for fact driven decision making.	<ul style="list-style-type: none"> <li>• Review of the available literature on the Electronic Delivery Channels in Virtual Banking, and</li> <li>• Undertake interview sessions or a questionnaire survey</li> </ul>	Recommend the most digitally competitive electronic delivery channels
Establish the suitability of the framework used to explore the adoption of Virtual Banking among Saccos in the face of COVID-19 for data driven decision making.	Analysis of data on successful implementation/adoption of Virtual Banking in Sacco	Recommend reliable and realistic data on the current adoption of Virtual banking technologies amongst Saccos in Kenya.

#### **1.4. Research questions**

1. Which are the mobile banking models used to realize virtual banking adoption by Saccos in Nairobi County in the face of COVID-19?
2. Which are the factors influencing adoption of virtual banking in Saccos in Nairobi County amidst the corona virus pandemic?
3. Which are the most digitally competitive electronic delivery channels being utilized by Saccos in the face of COVID-19 pandemic in Nairobi County?
4. What suitable framework can be used to explore the adoption of Virtual Banking among Saccos in the face of COVID-19?

#### **1.5. Significance of the study**

This examination will offer solutions on how members will be able to access SACCO products/services like loans online, by recommending suitable Mobile Banking models and scaling out of the available proven Virtual Banking technologies and innovations among Sacco since the world economy will be increasingly driven by digital technologies. To ensure inclusion, both private and government partnerships will be critical in developing ICT policies to implement digital technologies with a view to accelerating the socio-economic transformation in Kenya.

The study findings will inform management on the delivery channels that are preferred by the customers and the challenges that members encounter while accessing the delivery channels and take corrective action thus improving quality to customers which will improve service delivery standards in de-congesting banking halls by giving customers a wide range of access to financial services using transactions over the telephone.

The findings will facilitate recommendations to the management to improve customer satisfaction, and those who would like to investigate more about factors that influence/constrain members to/from making use of technology to access banking services.

The study will provide background information to other future investigators to discover influences of implementation of countless technologies during this health crisis period. Knowledge of such factors can inspire policy makers in developing proper measures to

encourage many customers to make good use of online services hence cutting on physical visits to the banking halls. More so, the study findings may serve as a reference value to increase knowledge as regards the implementation and spread of research work in third world countries.

The study will change the Attitude towards banking adoption with both Convenience and improved Security being some of the factors that will stimulate services and increase supervision leading to Digital transformation.

The study assists the government in achieving the national millennium goal if the measures recommended are adopted, as it facilitates the sustainability and future survival of an institution which is crucial for employment creation and poverty alleviation. From the government service report by 2006, 46% or 16.5 million of the 35.5 million population lived below the poverty line which indicated that more Kenyans were living generally a better life today than they did six years ago which needs to be reduced further.

#### **1.6. Scope of the study**

This examination was undertaken in Nairobi County, the capital city of Kenya. The researcher targeted 150 officials of Saccos and 150 Members/clients of Saccos. A total of three hundred respondents were targeted for this study.

#### **1.7. Limitation of the Study**

This study was limited only in Nairobi County thus the results (Findings) may not be generalized to other areas since they may not have the same characteristics as the study was confined to Nairobi County alone.

The study examined the general virtual banking network. Therefore, there is need to conduct interview sessions or a questionnaire survey to determine influences of individual implementation of the specific e-banking services.

In gathering primary data, there was limited time to build a trust relationship in order to motivate the respondents to give information that really reflected the situation as it really obtained. There was also in some respondents' lack of first hand contextual knowledge leading to some of them filling out only the demographic items located at the beginning of the questionnaire and not responding to the additional items.

One thing for sure is that corona virus pandemic will be curbed in near future so will consumers' purchasing behaviors keep changing. For this reason, a longitudinal study should monitor the evolutionary implementation of online business and try to improve the model for future unplanned for events.

### **1.8. Basic assumption of the study**

In this study, the following assumptions were held:

1. All the respondents provided honest and clear information.
2. It was assumed that the Saccos chosen for the research would be willing to divulge information for the purpose of the research.
3. It was also assumed that all counties face similar challenges regarding adoption of virtual-banking.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

This chapter contains main theories and concepts collected from articles to provide a form of theoretical structure in this study.

#### **2.1. Mobile Banking Models**

Banks are vital in the financial markets' management since they act as the main mediators while doing large financial activities. A relationship struck between a client and a bank mainly depends on the exchange of information and financial resources; all businesses were based on the innovation through development of business model Kristic & vukasovic (2018).

The banking sector was faced with various problems such as application for loans taking weeks for processing. According to Andy (2016), persons lacking credit history could not be given access to services in the bank. Moreover, finance access was made expensive and very difficult after there was no credit information from medium and small enterprises.

Banking industry has a good number of models which service providers of mobile banking are using; they determine the person in charge of customer relationship establishment and the one legally in charge of deposits, in regard to business model. If the aim is to attract many customers from rural areas, an agent of banking determines a model of business (porteous, 2005).

In today's world, new models of business that focus more on customers, which are efficient and cost cheaper compared to traditional banking, have emerged. Most organizations have been using resources to the fullest, latest technology, spending low on payout rations, using improved efficiency to rebuild capital base, using analytics and looking for other new models.

In **Joint Venture model**, customers do not use banks' branches to carry out their financial transactions but instead use mobile phones. Therefore, this model uses different channel, which is a customer's mobile phone, to boost financial services. This is because this method is cheaper compared to using the traditional banks. Also, the target market is big and distinct. This model can be put into place when a bank and an agent not of the bank make

correspondent arrangements. Relationship of customer account is rested upon the bank. Some examples of usage of this model include M-Kesho offered by Equity bank, M-banking services offered by the Co-operative Bank of Kenya, Hello Money offered by Barclays Bank, M-Shwari offered by the Commercial Bank of Africa, SIM-plea banking offered by the National Bank of Kenya, Mobi-bank offered by the Kenya Commercial Bank and Mobile Banking offered by Standard Chartered Bank Vita et.al (2016).

A **non-bank-led model** is a situation where banks perform limited operations in the everyday management of the accounts and sometimes may not even do any operation at all, as the non-bank agents do all transactions. Typically, roles of banks in this type of model are few, for example, keeping safely of funds that are surplus. This is because the management of accounts is done by non-bank agents who have direct contact with customers. Safaricom's M-pesa uses this model to allow customers to withdraw money from their M-pesa accounts at some bank ATMs. The other mobile service providers are also expected to adopt this model in offering the same service as they are yet to roll them out Raza et al., (2017).

The **non-bank driven model** is where the non-bank agent effectively becomes the depository entity through the issuance of e-money. Account ownership and transactions management is done purely by the telecommunication companies. This model is used by Orange Money of Orange, M-Pesa of Safaricom and Airtel Money of Airtel through their contracted agents Raza et al., (2017).

According to Network Banking Industry Architecture (2014), Core banking system was identified as the first virtual banking. Of recent a good number of companies have presented models to develop the systems. However, many companies are using the BIAN AND MIRA-B reference models which have been given attention in this largely technologized world with reference to banking system. BIAN was developed in 2008 while the last final changes on the model in 2015. Special applications are given a common framework by BIAN, which has 42 countries as members including SunGard and Microsoft. Its objective is making sure programs highly interact to improve the relationship between financial institutions and banks. It addresses service operations using service domain solutions. The services are further categorized into service visions, there being a possibility for set of services. The main three tools that are dominant include glossaries, complementary documents, met models, and design instructions.

According to Microsoft Corporation (2012), using MIRA-B (Microsoft Industry Reference Architecture for Banking) to bank architecture provide credit institutions with logical architecture to be used in purposes of design. It can be compatible with BIAN in a less or more way by adopting its technology on MIRA-B; there is a wider architecture of banking in Microsoft.

## **2.2. Electronic Delivery Channels**

### **2.2.1. Branchless banking**

In the banking industry branchless banking is a strategy of channel distribution that delivers financial services on its own, not involving other banking branches, it allows branch networking by providing clients with a variety of options to access financial services, it is a strategy that forgoes other branches, for example, automated teller machines (ATM's), internet, mobile phones and POS devices. Every technology gives different services, but they inform an overall distribution channel strategy international monetary fund (2016).

### **2.2.2. Internet TV banking**

Internet banking also called online banking, shows a trend in the pc banking outgrowth, its delivery channel is the internet which is used to pay bills, transfer funds, view cheques and save account balance. Customers do access accounts through computer software browser that run the bank programs. The banks' browser is found on the world's largest web server. This kind can be given many names like net, virtual, and net or web banks (enable telecommunication 2016).

### **2.2.3. ATMs**

Known as an automated teller machine (ATM) can also be called cash machine, this is a telecommunication device that is computerized, it ensures customers have access financial activities. Transaction do take place with absence of a cashier, outside a bank, to access one has to enter personal identification number (PIN) clients can do cash withdrawal, credit card advances etc.

### **2.2.4. Electronic funds transfers (EFT)**

This channel delivery where the exchange is electronic; it involves money transfer from one



account to the other by use of a system of computers from one institution to the other without the involvement of paper money, the term referred to as electronic funds transfer (EFT), the most used type of this system deposit direct, whereby a payroll is directly deposited to a worker's account. Also, it can be used to transfers credit, for example, payrolls payment and transfer debit, for example, payment of mortgage.

### **2.2.5. Self-service (pc) banking**

This type of banking targeting business with minimum input in their firms, assist them to access the services at home by telephone, this type of banking is also termed as pc banking or online banking, and it provides customers with a variety of services that are convenient, by making transactions between accounts, checking balances, paying bills, and determining If they are qualified for credit or mortgage (IMF 2017).

### **2.2.6. POS banking (credit and debit cards)**

According to Gerlach (2017), it is a system, where a computer is a located in one central place at the shopping joint, substituting cash from funds transferred electronically, drafting or chequeing to purchase goods, payment of sales, data and venue the transaction has occurred. For example, transacting on a debit or credit card passes the payment details to the payment processor or financial institution.

## **2.3. Factors Influencing Virtual Banking**

Virtual banks provide financial services mainly online from the Fitch Sector. Therefore, there are no physical institutional branches as everything is done online. This concept does not ride on brick and mortar but harnesses available technology to offer financial services to customers. Technology in today's world presents limitations in different areas; they have different innate characteristics depending on the customer and the company, on relative advantage Rogers (2013)

### **2.3.1. Social Factors**

Even after online banking having numerous advantages, 48% of the population has not adopted it. This is mainly because most of the clients are used to traditional form of banking.

Therefore, marketers need to find more convincing ways to lure clients to adopt online banking from the traditional way of banking. Donner Tellez (2018) Attitude changes toward what one used to do affect banking adoption. People's personal characteristics determine adoption decisions, users encourage the great ease and convenience of managing their wealth, clients who accept the technology have higher probability of being in full control of their finances and with time they can easily adopt virtual banking. At the same time technology does not easily get used with old people, it has been concluded that older people are reluctant or rigid (Monitise, 2018).

### **2.3.2. Economic Factors**

There are several factors that affect the way customers use virtual banking. These factors include service pricing, prices that are absolute, for example, during the trailing of money transactions, some of the branches may offer deposit-free services therefore making online banking save and cheap. The cost of a transaction is very vital since a customer will be able to determine how much it will cost them to access and carry out actual transaction (Rosenberg, 2010).

### **2.3.3. Technological Factors**

According to Ombati et al., (2011) electronic banking explains the universal term for how a customer performs transaction electronically without being present at a brick and mortar, the process mainly involves the INTERNET; it also refers to the use of ATMs, telephone banking and electronic money transfers.

Handset operability is how easy a handset device can be accessible to banking services. A good number of mobile devices exist with different ways of operation but they perform the same role, this can affect the customer when the user can't perform some device because probably the type of character required may not be found by the mobile device, this has been forcing the banking sector to have problems to implement virtual banking due to the type of device by customers, some of these devices can only upload Java ME and other support SIM application Toolkit, only SMS, or WAP browser., it also can take almost five months for any new client using a handset to find the full package on the handset, it is a problem some of the customers cannot access some services , they don't know how to access Munities, (2018).

## **2.4. Theoretical Frame Works and Models**

Here, we use a number of intention models and concepts of theories to help us have a deeper meaning of the adoption of technology. These concepts have led to new other concepts ,for instance, Theory of Planned Behavior(TPB) Ajzen (1991), Technology Acceptance Model (TAM) Davis (1989),and many more. The models have largely helped in knowing predictions of acceptance behaviors of clients'-commerce may involve perceived ease of use (PEOU) perceived usefulness (PU), perceived behavior control (PBC) and subjective norm (SN) Awa et al., (2015).

### **2.4.1. The Technology Acceptance Model (TAM)**

According to Rainier Et al., (2014), this model was developed by Davis (1986) to establish behavior technology of a user computer, the model however was found from Reasoned Action theory, which intends to describe human behavior in general in the adoption of computer, and has two main variables, "Perceived Usefulness" (PU) and "Perceived Ease of Use" (PEU). This Technology Acceptance Model (TAM) showcases a connection between, ease of use, perceived usefulness system design features, actual usage behavior and attitude towards using.

According to Davis (1989), ' Perceived usefulness (PU) involves a potential user having in mind the thoughts that using certain systems may improve their performance in a work area. Usefulness is derived from useful meaning having an advantage of using specific IS. On the other side, perceived ease of use (PEOU) involves a potential user having in mind the thoughts that using certain systems will be effort-free. 'Ease' means, having no hardship at all or any form of difficulty. Conclusively, Ease of Use means 'user-friendliness' of IS.

Researcher Keven Katesh & amp; Davis (2000) improved on the model to create TAM2 that contained, processes of social influence( image, norm, and voluntariness) and congestive instruments to all processes(result demonstrability, job relevance, and perceived ease of use, output quality), this model offers a lot of knowledge , in explaining that which drives the user towards technology adoption.

The problem with TAM is that it doesn't consider policies of organization that regulates the use of the system, but according to a study by Dinga & amp; Er (2018), the core arguments is that staff IT proficiency increases the skills and experience which adds to output in the

organization. The use of ICT is not based on perceived ease of use but towards organization culture to train the staff to adopt knowledge, and to be in the know of the latest technology influenced by the staff Raza et al., (2017).

According to Zahid et al (2013) who advanced an argument showing that Tam did not involve education and age as external factors, but rather the willingness and acceptance of technology, and went further saying that it is not easy to measure behavior, this study however will inquire with TAM on the use of technology, and also the motivating factors that will force the employees to excel.

#### **2.4.2. Schumpeter's Theory of Innovation**

Schumpeter (1939) in his "equilibrium destruction" theory explains innovation as being creative or excellent. This theory describes innovation as being a vital factor of economic dynamics and competitiveness which incessantly do away with the old order and give birth to new ones, its end advantageous for employment, investment and growth (Śledzik, 2013). This theory identifies causative factors of change; the entrepreneur (innovator), change in the circular flow and how the innovator interacts in the flow with the forces. The emergent process of development is described as a form of business that is in form of a wave that is specific (Paul, 1943). Independent thinkers in huge firms opened advantages for new 11 profits and benefits through their innovations. In the long run, the theory noted, profit margins from the innovation as a result of investment and activity by imitators. To equilibrate the economy, a new innovation or even set of the same could come out and the business cycle begins again. The causative factor, according to Schumpeter, is innovation, but did not address the outcome of innovation (Śledzik, 2013).

#### **2.5. Empirical Literature**

Ugwuanyi (2017) assessed the impact of communication technology and information on the economic activities of societies which are cooperative.. The research used employed primary data collected in interviews, questionnaires, and focus group discussion. The findings using descriptive statistics overall confirmed a positive association between information and technology and performance of cooperative societies.

Ngando (2017) evaluated the contribution of the technology advancement on improving the virtual banking in Sacco in Tanzania. Data was collected through design questionnaires for

300 respondents. Findings concluded that there have been significant challenges among people as recognized and proved by an increase in income employment level, hence increase in savings and asset ownership to them in which case Technology should play a key role in harnessing the benefits.

Wichita et al., (2014) did a study on ICT adoption impact, product and size diversified on financial virtual banking. Research designs that were descriptive were used on a target group of non-deposit and deposit Sacco in the county of Nairobi, resulting to 44 and 999 respectively. Another technique, Purpose Sampling technique was implemented on 40 Sacco and secondary data that was gathered from the financial statements. Findings indicated that the higher the ICT adoption, the higher the Sacco virtual banking. Adopting ICT resulted to better payments, reduced service time and faster processing due to the improved technology used in delivering services. Unfortunately, restrictions and regulation requirements became major obstacles in this strategy, Thus seconding previous findings by Ochieng'(2017) who observed that approximately 79% Sacco had fallen short of the regulations and requirements needed in the 2008 Societies Act.

Muchangi et al., (2018) investigated the impact the services of mobile communication had on virtual banking on Sacco that was taking deposits in the country. Explanatory and descriptive methods of research designs were used in both qualitatively and quantitatively to collect, analyses and report data. The research used 85 Sacco that were taking deposits from a target population of 109, all the Sacco had licenses from the Societies Regulatory Authority as by the end of December 2011. Questionnaires given to two managers .one from a finance department and the other from the information technology. The results showed that there was a positive impact of mobile communication on Sacco that took deposits.

### **Different Research Studies Concerning Virtual Banking Adoption**

Many authors have used various e-business models to research about the relationship of customers using internet banking. The table below gives a summary of this research done by the authors.

**Table 2: Different Research Studies on Internet Banking Adoption**

Article	Author	Factors/ Findings	Model
Effect of ICT adoption, size and product diversification on the financial virtual banking of Sacco	Wichita et al., (2014)	ICT adoption resulted in the improvement in processing, reduction in service time, payments, due to latest technology used.	TAM
Effect of Mobile Communication Services on Performance of Sacco in Kenya. European Scientific Journal. 14(30): 46-62.	Dinga & Er (2018)	staff IT proficiency increases the skills and experience which adds to output in the organization	TAM
Determinants of users acceptance of Internet banking	Wang et al. (2003)	<ul style="list-style-type: none"> <li>● Trust/Perceived</li> <li>● Credibility,</li> <li>● Perceived Usefulness</li> <li>● Ease of use,</li> <li>● Computer self-efficacy,</li> <li>● Intention</li> </ul>	Technology Acceptance Model
A theoretical extension of the technology acceptance model	Wke,Ven Katesh & Davis(2000)	● social influence processes(image,norm,voluntariness) and congestive instrumental to all processes( output quality, job relevance, perceived ease of use, and result demonstrability)	TAM2
Factors Influencing the adoption of	Tan and Teo (2000)	<ul style="list-style-type: none"> <li>● Relative advantages,</li> <li>● Compatibility with values,</li> </ul>	Theory of Planned

Internet Banking		<ul style="list-style-type: none"> <li>● Internet experiences,</li> <li>● Banking needs,</li> <li>● Complexity,</li> <li>● Risk,</li> <li>● Self-efficacy,</li> <li>● Government support,</li> <li>● Technology support,</li> <li>● Social norms</li> </ul>	Behavior and Diffusion of Innovation
Effect of information and communication technology on the economic activities of cooperative societies	Ugwuanyi (2017)	A positive association between information and technology and performance in Sacco	TAM
The contribution of the technology advancement on improving the virtual banking in Sacco in Tanzania	Ngando (2017)	Significant challenges among people as recognized and proved by an increase in income employment level, in which case Technology should play a key role in harnessing the benefits.	TAM
Technology and service quality in Banking industry; Importance and performance of various factors considered in Electronic Banking services. African Journal of business	Ombati et al., (2011)	Use of ATMs, telephone banking and electronic money transfers.	INTERNET

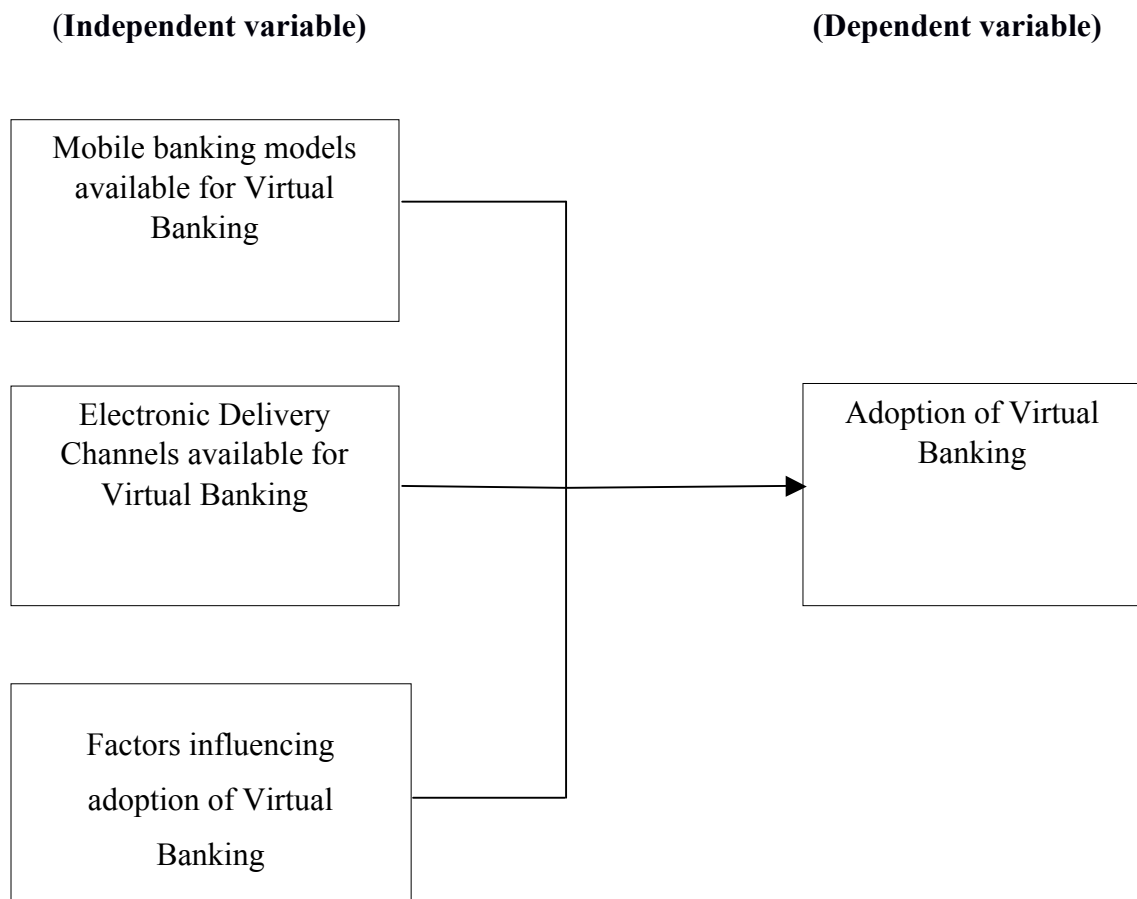
management. 151 – 164.			
<i>Electronic money</i> ”, Pc magazine,5 September	Monitis, (2018).	Handset operability is how easy a handset device can be accessible to banking services	
<i>Technological guide past and innovation avenues</i> ”, Research policy, volume 14, 1985, pp. 61 – 82.	Rosenberg (2010),	Customers using virtual banking are price-aware as they value the price the service costs and also price absoluteness.	



## 2.6. Conceptual Frame Work

This area tests the relationship between dependent and independent variables by analyzing the factors resulting from the literature. It mainly points out the determinant factors which will be allocated to adopting the virtual banking in Sacco. The explanatory factors are; Mobile banking models available for virtual banking, Electronic Delivery Channels available for virtual Banking, and Factors influencing/constraining adoption of virtual banking.

Adoption of virtual banking: Mobile banking models available for virtual banking, Electronic Delivery Channels available for virtual Banking, and Factors influencing/constraining adoption of virtual banking.



**Figure 1. Conceptual Frame Work**

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

This chapter presents the research methodology and the reason for choice of this study approach.

#### **3.1. Location of the study**

The inquiry was undertaken within the City of Nairobi (the capital city) in Kenya. Saccos in the City of Nairobi were purposively targeted for the study for the reason that being the capital city it has the model structures for financial institution-SME interactions. Moreover, Saccos found in the city would possibly give a good spread for all categories that the study targeted.

#### **3.2. Research design**

A descriptive design approach was used to obtain details concerning a phenomenon that is being studied from a selected number of respondents. An exploratory descriptive approach was utilized to assess how to improve access to credit through relationships between Sacco and their clientele in Kenya. Citing Robson (2000), Saunders et al (2003) argued that this research design is appropriate for getting new information as well as posing questions to analyze a concept from different angles. The exploratory survey design was relevant for this study since it intended to unveil the existing SME-SACCO relationships and their implications for Sacco in improving access to credit to her members in Kenya. This research design was able to seek new insights when respondents were asked questions on how they access virtual banking services by Sacco in the face of COVID-19 pandemic. Explanatory research was used through a well-designed structured questionnaire, this design being appropriate for this study since it unveiled the existing challenges faced by the SACCO banking industry in adopting virtual banking (Robson 2002 cited in Saunders et al., 2003)

##### **3.2.1. Research methods**

According to Saunders et al (2003), a researcher's study philosophy is dependent upon how one thinks as regards knowledge development. Gill & Johnson (2002) argue that we may discriminate between different research methods by putting emphasis on deduction or induction in terms of data and forms of explanations they create. There however appears to be

no straight forward rules in matching a strategy, method or means of data collection to a particular circumstance or research project. Remenyi et al (1998) posit that a good study approach is dependent upon the study problem, available skills, time for target completion, and cost. Both quantitative and qualitative data was utilized. First, a qualitative study was conducted, relying on the existing literature to discover the antecedents that contributed to the implementation of virtual-banking. Thereafter, a quantitative study was undertaken through the use of structured online questionnaires developed using Google forms, with a few guided interviews using the same questionnaires that were administered to the rest of the respondents online.

### **3.4. Target population**

This study targeted banking Sacco officials and Members in Nairobi county which has over 167 Saccos. The study only sampled a total of 150 Sacco officials and 150 Sacco Members.

#### **3.4.1. Study sample**

This examination targeted a total of 300 SACCO officials and Members. Participants for major players in the SACCO institutions were selected through purposive sampling approach. According to Jankovicz (2000), this sampling technique is appropriate for selecting respondents with relevant opinions pertaining to the subject matter. Purposive sampling approach was relevant to the current inquiry as it allowed the investigator to choose SACCO institutions that possess relevant information to generate value for the inquiry.

### **3.5. Data collection methods**

This section outlines instruments that were utilized to collect field data.

#### **3.5.1. Type and sources of Data**

Both primary and secondary data was utilized. The researcher should be careful when relying on secondary sources to gather information, paying specific emphasis on format of data, validity and reliability, and personal bias (Kumar, 2005).

Data was gathered mainly through semi-structured interviews and questionnaires. This ensured that relevant data was collected for the specific research problem.

### **3.5.2. Data Collection Instruments**

Saunders et al (2003) proposed questionnaire as the commonly used approach in collecting data, particularly from a large sample size before performing data analysis. Remenyi et al (1998) supported this idea by arguing that questionnaires are useful for gathering data that cannot be directly observed but can be applied in the testing, description, and explanation of hypotheses in study. The major challenge with relying on questionnaires is the amount of time required to design and pilot the question guide. An effective questionnaire must take into consideration of the effectiveness of either closed or open-ended questions, must have a clear purpose, as well as pose valid and relevant questions. More so, questionnaire may be subject to personal bias from the participants who might not provide factual information.

Email (Google forms) was utilized to administer questionnaires. Emails were preferred in getting the question guides back within short time. The question guides comprised multiple choice, Likert scale (in which participants are asked to rate items on a level of agreement), as well closed-and open-ended questions.

Through open-ended questions, the respondents had freedom to express their opinions and views. On the other hand, participants gave specific responses via the closed-ended questionnaires. The major challenge with relying on open-ended questions is that the participants must articulative enough and be ready to expend much of their time in answering the questions as correct as possible (Remenyi et al 1998). A sliding scale with a numerical indicator was used to design the Likert scale questions.

### **3.5.3 Interviews**

According to Kumar (2005) in-depth personal interviews are preferred during complex situations and in gathering detailed information. They are based on the premise that individuals can reveal information about their actions, behavior, and practices when asked to. The advantage of using interviews is that the respondents have the opportunity to clarify their responses. But the only challenge is the huge cost and time involved. Semi- structured interviews allow the interviewer to develop appropriate performance standards.

### **3.5.4. Data Collection Procedure**

For the physical interviews, the researcher made prior appointment with the various Sacco

head officials' staff at least a week before the actual visit. Thereafter, the researcher conducted door visits to different Saccos and assured the participants of the confidentiality of the information shared before administering the questionnaires. This helped in alleviating any fear they had regarding the information to be provided thus increasing their willingness to participate. On the Google forms questionnaires, the researcher made a humble introductory request to members to fill the forms.

### **3.6. Data Analysis and Presentation**

Data analysis refers to the process of reducing the total unprocessed data to manageable sizes, summarizing it, using statistical tools, as well as looking for patterns (Chandler et al., 1998). In the current study, analysis of data was done both quantitatively and qualitatively. Both Microsoft Excel programmers and SPSS version 26.0 were employed in analyzing the data collected. Table format was used to analyze questionnaires that had set columns for priority (nominal or ordinal scales) as well as those with Yes or No responses. Due to its ability to manage a huge amount of data, SPSS prove efficient in analyzing the data for this inquiry. Also, this software has a broad array of statistical approaches tailored to certain topics in social sciences.

## CHAPTER FOUR

### DATA ANALYSIS AND INTERPRETATIONS OF THE STUDY

This chapter focuses on data analysis, presentation and discussion and discussing findings of the research.

#### 4.1. Data Collection and Analysis

Qualitative and quantitative methods of data analysis were used to carry out this research. The statistical methods of analyzing data were used which involved Microsoft Excel and Statistical Package for Social Sciences (SPSS). Out of 300 subjects who participated 250 filled and returned the questionnaire which was 83% and was deemed adequate for the study.

#### 4.2 Demography Information

This area shows results recorded from the respondents who participated in the survey of adoption of Virtual Banking among SACCOs in the face of COVID-19. They included Sacco ICT officers, Sacco managers, and Sacco Members from Nairobi County.

**Table 3: Gender of respondents**

VARIABLE	FREQUENCY	PERCENT
Male	158	63.2
Female	92	36.8
<b>Total</b>	<b>250</b>	<b>100</b>

This study shows the respondents general information including their genders. This information has been summarized on the table above. 250 respondents in total were involved in the study, 158 (63.2%) males while 92 (36.8%) females. The study concluded that a larger section of respondents was male.

**Table 4: Age brackets**

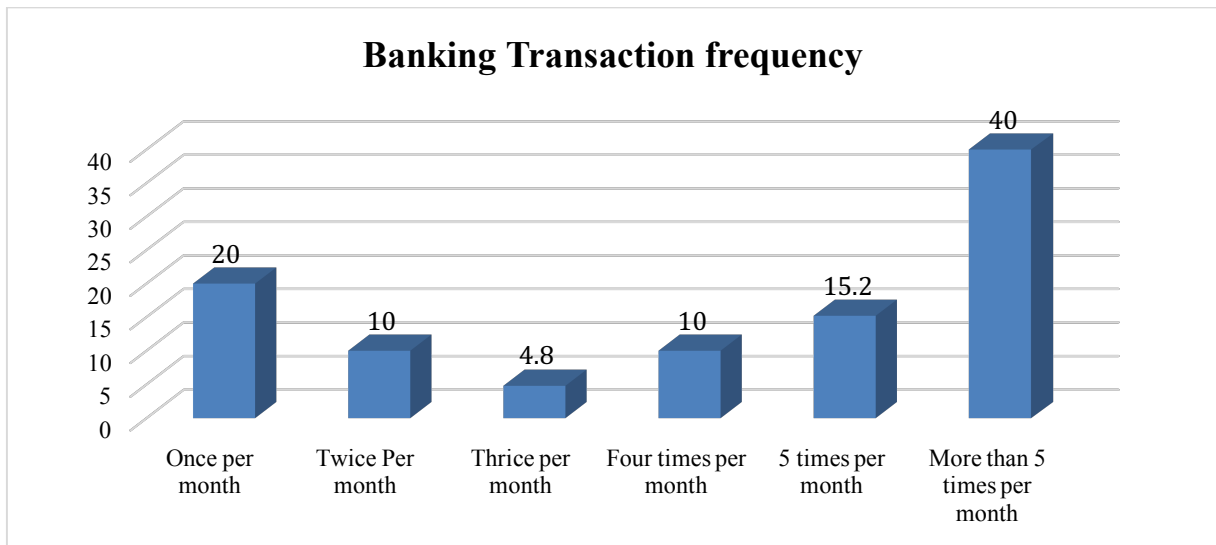
VARIABLE	FREQUENCY	PERCENT
18 - 30	19	7.6
31 – 40	121	48.4
41 - 50	69	27.6
51 – 60	41	16.4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The table above shows various age group users of virtual-banking. From the study, it is evident that older age group users were more responsive. Users believe what brought about the situation is COVID 19 pandemic measures enforced to contain the virus which saw enforced lock-down, curfews and social distancing. These measures compelled users to adapt the change in their daily routines, making them more aware of their surroundings and thus being able to manage the immediate situational change. The online mode was adopted more to come up with the changing times as the offline mode slowly died since more people were working remotely, and especially the older generation who were more vulnerable. The results from the research survey showed that 121 (48.4%) respondents aged 41 – 50, 69 (27.6%) respondents aged 51 – 60, 41 (16.4%) respondents aged 31 – 40, and 19 (7.6%) respondents aged 18-30. Therefore, on average, respondents are aged above 40. The study also concluded that the Sacco industry is largely dominated by the older age sets.

**Table 5: Level of Education**

VARIABLE	FREQUENCY	PERCENT
Secondary	2	0.8
Diploma	86	34.4
Undergraduate	122	48.8
Masters	30	12
PhD	10	4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The table shows various levels of education of virtual banking users. The results show that users with education level of Undergraduate and Diploma were more responsive. The findings above in table 4 indicate as follows; 122 (48.8%) indicated undergraduate and 86 (34.4%) indicated diploma, 30 (12%) had masters and 10 (4%) among the respondents had PHD, implying that largely the respondents are educated.



**Fig2: The Frequency by which Respondents use virtual Banking/Internet**

The frequency by which respondents uses virtual banking or internet is represented in the table and bar chart above. Of the total 250 individuals that took part in the research survey, 100 (40%) of them use virtual banking more than 5times a month, 38 (15.2%) individuals use up to five times a month, 25 (10%) individuals use four times a month, 12 (4.8%) individuals use three times a month, 25 (10%) individuals use two times a month, and 50 (20%) individuals use once in a year. Figure 3 above clearly shows that a large portion of the respondents (40%) have been using Virtual banking transaction more than 5 times per month, however a good percentage 20% of the respondents occasionally make use of the virtual banking. This research summarizes although most of the participants have utilized virtual banking more than 5 times a month, there is still a sizable number who utilize virtual-banking occasionally.

### 4.3 Banking Models

**4.3.1 Table 6: Problems Facing Banking Sector before virtual banking**

VARIABLE	FREQUENCY	PERCENTAGE
YES	189	75.6
NO	61	24.4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

In summary, the complete responses collected from virtual banking users amounted to 250 in number. As per table 5 above, respondents indicated as follows: 189 (75.6%) indicated YES, while 61 (24.4%) indicated NO. The findings showed that most of the participants felt the



sector of the bank was faced with various problems such as application for loans taking weeks before the adoption of virtual-banking and had a high negative impact on the accessibility of the banking services as 189 (75.6%) indicated YES rating it high, while 61 (24.4%) of the respondents indicated No, rating it low. Conclusively, bringing into play Virtual banking introduced a positive impact in banking sector.

#### 4.3.2 Table 7: Banking Industry Has Good Models Being Adopted

This research study main objective is to know the awareness rate of members in the virtual banking so as to determine whether there are still many individuals who have not taken up this option.

VARIABLE	FREQUENCY	PERCENTAGE
NO	63	25.2
YES	187	74.8
<b>TOTAL</b>	<b>250</b>	<b>100</b>

Results summarized showed that most of the participants, about 74.8%, preferred existence of a good number of models being adopted for virtual banking. This clearly means that most of the clients and users know about the models of virtual banking, while 25.2% of the respondents were not sure of the availability of such models.

#### 4.3.3 Table 8: New Business Models Have Lowered Cost and Are More Efficient

VARIABLE	FREQUENCY	PERCENTAGE
NO	169	67.6
YES	81	32.4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

From the results of the research survey, most of the participants feel new models that focus on customers are cheap and more efficient as 169(67.6%) concurred with Yes while, 81(32.4%) indicated No. This implies that the adoption of business models that are more customer focused had positive impact on the Sacco-banking sector.

#### 4.3.4. Table 9: Conducting Transactions through Mobile Phone Instead Of Sacco's Branches.

VARIABLE	FREQUENCY	PERCENTAGE
YES	113	45.2
NO	137	54.8
<b>TOTAL</b>	<b>250</b>	<b>100</b>

Results showed that 137 (54.8%) indicated YES and 113(45.2%) indicated NO. The results further showed that most participants are customers who prefer to conduct financial transactions through a phone rather than branches of a bank, a clear indication it is a joint venture model, increasing the outreach of the financial services by another form of delivery channel, a phone. However, 45.2% of the respondents do not conduct transactions through mobile phone instead they transact through Sacco’s physical branches.

**4.3.5 Table 10: Customer Relationship with the Bank**

VARIABLE	FREQUENCY	PERCENTAGE
NO	191	76.4
YES	59	23.6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

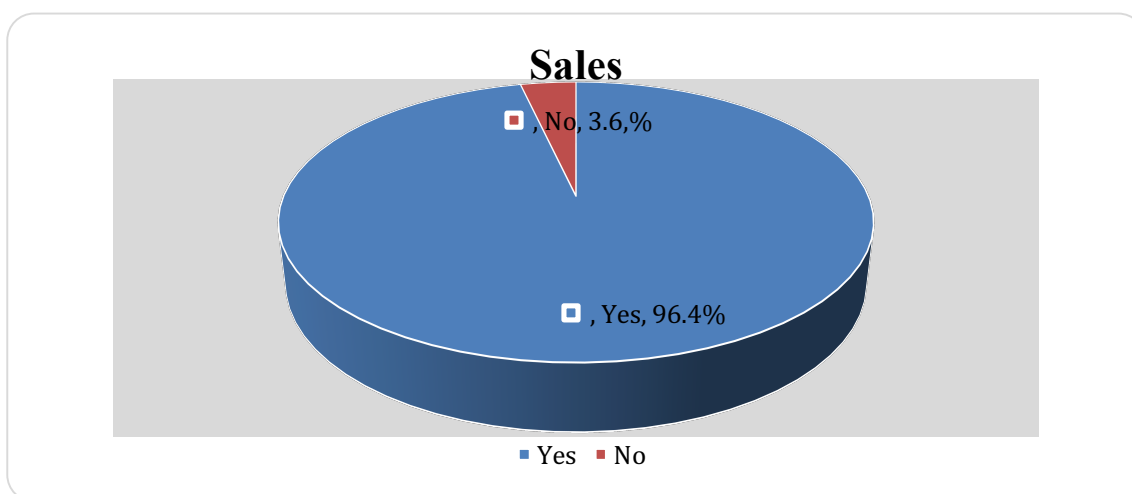
The results show that 191 (76.4%) of the respondents indicated YES, while 59 (23.6%) indicated No when responding on Customer relationship with the Bank. These results mean that most people have accepted the model where customer account relationship rests with the bank, a pointer to existence of a **joint venture model**. However, the 23.6% of the respondents indicated No a pointer to existence of another model where the customer account relationship rests with a non-bank agent.

**4.3.6 Table 11: Role of the Bank in Day-To-Day Account Management Variable:**

VARIABLE	FREQUENCY	PERCENTAGE
NO	199	79.6
YES	51	20.4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results revealed the following; on the role of the Bank in day-to-day account management, respondents indicated as follows 199 (79.6%) indicated YES and 51(20.4%) indicated NO. The researcher concluded that largely Sacco have not adopted non-bank-led model whereby banks can only operate in specific roles in the everyday management of accounts and sometimes may not even come into the picture, and the non-bank agent performs all the transactions.

### 4.3.7 AGENT CONTACT WITH CUSTOMERS



**Fig 3: Agent Contact with Customers**

As per figure 3 above 241(96.4%) of the respondents indicated YES, while 9 (3.6%) indicates NO. The study concluded that functions of managing accounts are performed by the Sacco since it directly deals with clients, a pointer to the existence of a joint venture model.

### 4.3.8 Table 12 Non-Bank Agent Becomes The Depository Entity.

VARIABLE	FREQUENCY	PERCENTAGE
YES	199	79.6
NO	51	20.4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

Statistics from the survey shows that most participants agree that there are cases where the non-bank agent effectively becomes the depository entity through the issuance of e-money with 199 (79.6%) confirming while 51 (20.4%) of the respondents seemingly not aware of such existence, in conclusion, most people have adopted non-bank-driven model banking due to the introduction of virtual banking.

### 4.3.9 Table 13: Account Ownership and Transactions Management Purely Rest With Telecommunication Company

VARIABLE	FREQUENCY	PERCENTAGE
NO	180	72
YES	70	28
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results indicate that majority agree that there are cases where the account ownership and transaction management purely rest with the telecommunication company with 180 (72%) confirming while 70 (28%) of the respondents seemingly not aware of such existence, in conclusion, most people have adopted **non-bank-driven model** banking due to the introduction of virtual banking.

**4.3.10 Table 14: Core Banking System That Your Sacco Uses To Support Virtual Banking**

VARIABLE	FREQUENCY	PERCENTAGE
BIAN	0	0
MIRA-B	100	40
NAVISION	129	51.6
ANY OTHER	21	8.4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results show that most of the participants chose NAVISION(architecture explained below) as their most preferred Core Banking system to support virtual-banking, with 129(51.6%) indicating it as their preferred choice, while 100(40%) indicated MIRA-B and 21 (8.4%) indicated ANY OTHER.

Architecture of the Virtual core banking system

**User Interface:** includes all touch points of virtual bank with customers that could be implemented through channels such as internet and mobile.

**Customer operation:** this part of virtual bank includes sales and services and CRM systems. Sales and services covers commercial, personal, micro and corporate banking and CRM covers internal system and customer relationship management with social customers

**Banking operations:** this part covers counter, bank treasury, IT development, regulations management, customer validation, data transformation, ledger operations, customer information, payments and transactions and dashboard and report maker which are briefly defined.

**Analysis systems:** this part of virtual bank addresses a bank supervision activity which, according to academic definitions, is a software module that uses data analysis tools such as business intelligence to control bank activities, Maryam Marefati & Seyyed Mohsen Hashemi, (2012)

#### 4.4 Factors Influencing/Constraining Adoption

This section presents findings on the factors constraining/influencing adoption of the available and proven virtual banking technologies by potential users in SACCO industry in Nairobi County during this pandemic of COVID 19.

##### Survey Summary on Vital Factors

This study has been carried out in view of the vital factors on adoption of banking, for instance, factors frequently cited by various authors. There are seven most important factors.

**Table 15: Summary of Survey Results on Vital Factors**

Factors	Research question points
Web usability	<ul style="list-style-type: none"> <li>• Navigation and aesthetics</li> <li>• Ease of use of banking website and mobile banking devices are important in the adoption</li> </ul>
Security	<ul style="list-style-type: none"> <li>• E-banking has minimized frauds in the banking sector</li> <li>• Security is important in the virtual-banking adoption</li> <li>• When there is a breach in security, transactions are largely affected and may stop until security is good.</li> </ul>
Trust	<ul style="list-style-type: none"> <li>• Technology has lowered the cost of making withdrawals</li> <li>• Many people trust in offline services more than they do in internet banking.</li> </ul>
Service quality	<ul style="list-style-type: none"> <li>• Customized financial services, unique and integrated.</li> <li>• Staff it proficiency increases the skills and experience which adds to output in the organization</li> <li>• Electronic banking has minimized the level of interaction between customers and staff.</li> <li>• Information technology eases loan approvals and disbursement</li> <li>• Customer experience has improved as complaints reduced due to e-banking.</li> <li>• Transaction errors due to the Sacco personnel have significantly declined</li> <li>• Time taken to receive feedback has significantly reduced</li> </ul>
Privacy	<ul style="list-style-type: none"> <li>• The automatic privacy policy of customers in the Sacco makes them adapt.</li> </ul>
Convenience and flexibility	<ul style="list-style-type: none"> <li>• Convenient location and flexible time are vital in making customers adopt.</li> <li>• Customers can launch queries anytime</li> <li>• Information technology enables customers to access services at any location</li> </ul>
Attitude	<ul style="list-style-type: none"> <li>• Older generations are reluctant to adopting new technology</li> <li>• Price on a service and absolute prices impact the way customers use virtual banking.</li> </ul>

**4.4.1 Table 16: Information Technology Eases Loan Approvals and Disbursement:**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	100	40
Agree	50	20
Neutral	70	28
Disagree	15	6
Strongly disagree	15	6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

From the table 16 above, the result show that most of the participants were satisfied that Information Technology effectively eases loan approvals and disbursement. 60% of the respondents believe that Information Technology effectively eases loan approvals and disbursement. Among the 60% of the respondents, 40% strongly agreed, while 20% agreed. However, only 12% of the respondents believed differently, whereas 28% were neutral. On whether Information Technology effectively eases loan approvals and disbursement majority strongly agree implying that Information Technology effectively eases loan approvals and disbursement.

**4.4.2 Table 17: Electronic Banking has minimized the interface of staff and Customers while Delivering of services.**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	98	39.2
Agree	70	28
Neutral	52	20.8
Disagree	25	10
Strongly disagree	5	2
<b>TOTAL</b>	<b>250</b>	<b>100</b>

According to table 17 above, most of the participants think agree with the fact that electronic banking has minimized the interface between staff and customers while delivering services. 67.2% of the respondents believe that electronic banking has minimized the interface between staff and customers while delivering services. Among the 67% of the respondents, 39.2% strongly agreed, while 28% agreed. However, only 12% of the respondents believed differently, whereas 21% were neutral.

#### 4.4.3 Table 18: Technology makes services accessible to customers at any location.

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	110	44
Agree	100	40
Neutral	25	10
Disagree	5	2
Strongly disagree	0	0
<b>TOTAL</b>	<b>250</b>	<b>100</b>

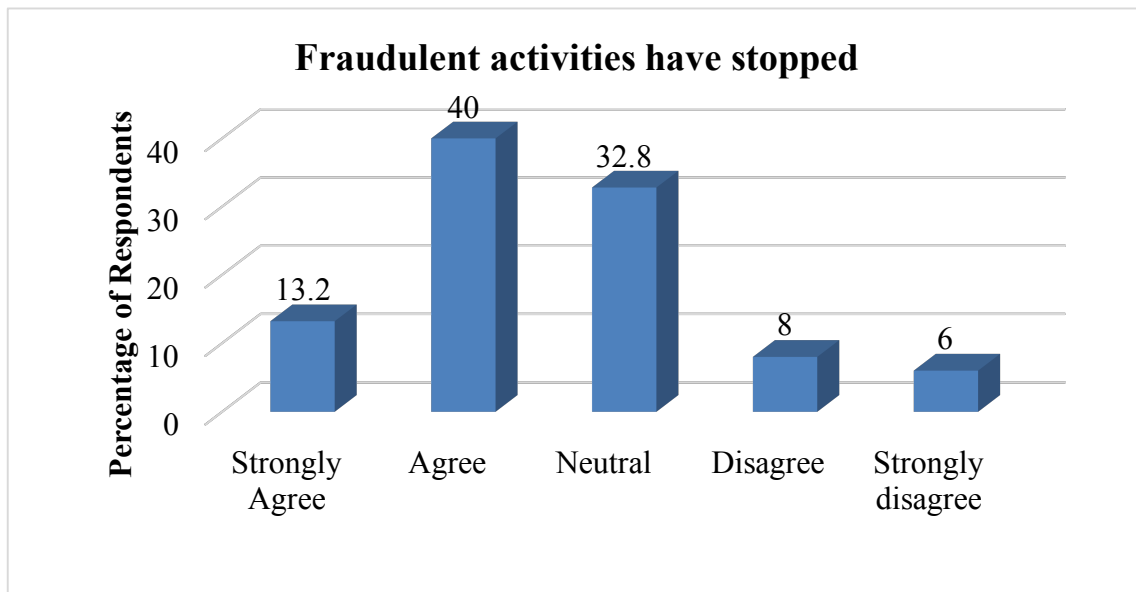
From the results, 88% of the respondents believe that adoption of information technology makes services accessible to customers at any location bringing since services become more flexible and convenient hence promoting virtual banking. In a total of 88% participants, 44% STRONGLY AGREED, and 44% AGREED that adoption of information technology enables customers to access services at any location. However, 2% of participants believed otherwise. The results conclude adoption of information technology enables customers to access services at any location playing a vital role in virtual banking, as the majority 84% of the respondents believed so.

#### 4.4.4 Table 19: E-Banking has minimized customer complaints

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	13	5.2
Agree	32	12.8
Neutral	81	32.4
Disagree	70	28
Strongly disagree	54	21.8
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results show that most of the participants concluded that e-banking has minimized customer complaints since most transactions are system based and systems keep experiencing downtime. 49.8% of the respondents don't believe that e-banking has minimized customer complaints. In a total of 49.8% respondents, 21.8% strongly disagreed, while 28% disagreed that e-banking has minimized customer complaints. However, only 18% of the respondents believed differently, whereas 32.4% were neutral.

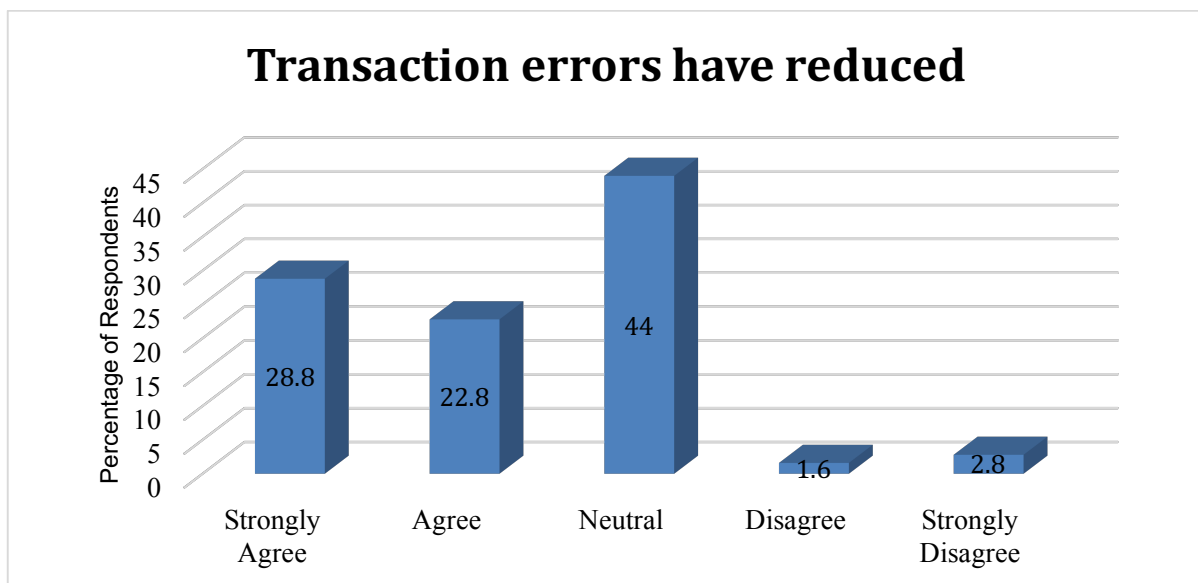
#### 4.4.5 E-banking has minimized frauds in the banking sector.



**Figure 4: Fraudulent practices have stopped in the Banking since the Introduction of E-Banking**

The results show that 53.2% of participants believe adoption of virtual banking has helped seal loopholes for fraud. Among the 53.2% of the respondents, 13.2% strongly agreed, while 40% agreed that E-banking has minimized frauds in the banking sector. However, 14% of the respondents believed differently, whereas 32.8% were Neutral. Most participants agree that e-banking has minimized frauds in the banking sector because most of the ways that could lead up to frauds have been sealed.

#### 4.4.6 Transaction Errors Due Personnel Have Reduced.



**Figure 5: Transaction Errors Due Personnel Have Reduced.**



The results show that most participants agreed that transaction errors due to the Sacco personnel have significantly declined since most of the transactions are system based. 51.6% of the respondents believe that transaction errors due to the Sacco personnel have significantly declined with the introduction of Virtual banking. In a total of 51.6% participants, 28.8% strongly agreed, 22.8% agreed the transaction errors due to the Sacco personnel have significantly declined. However, only 4.4% of the respondents believed differently, whereas 44% were neutral.

**4.4.7 Table 20: Customers Can Launch Queries Anytime**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	61	24
Agree	72	28.8
Neutral	88	35.2
Disagree	13	2
Strongly disagree	29	12
<b>TOTAL</b>	<b>250</b>	<b>100</b>

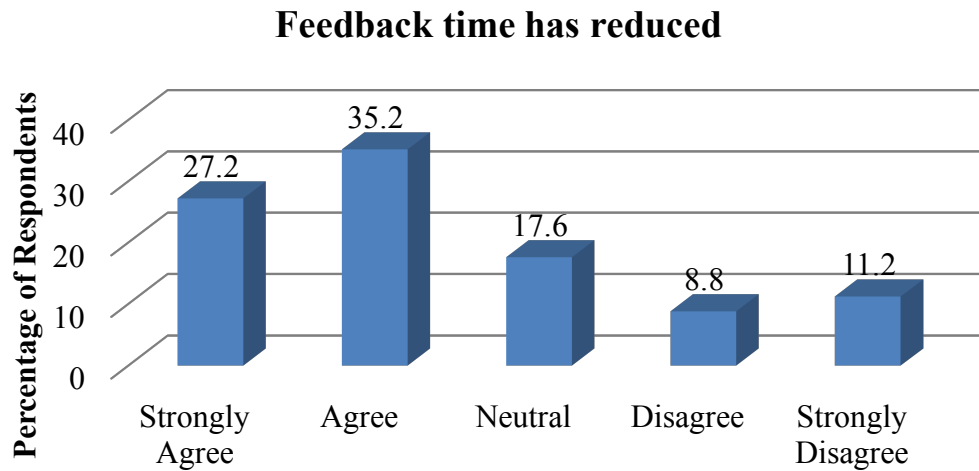
From data collected as shown in the above table, 52.8% of the respondents believe that with virtual banking, Customers' can launch queries anytime. Among the 52.8% of the respondents, 24% strongly agreed, while 28.8% agreed that Customers' can launch queries anytime. However, only 14% of the respondents believed differently.

**4.4.8 Table 21: Adoption of technology in operations has lowered the cost of making withdrawals**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	45	18
Agree	87	34.8
Neutral	37	14.8
Disagree	43	14.2
Strongly disagree	38	15.2
<b>TOTAL</b>	<b>250</b>	<b>100</b>

As per the results, 52.8% of the respondents believe that Adoption of technology in operations has lowered the cost of making withdrawals. Among the 52.8% of the respondents, 18% strongly agreed, while 34.8% agreed that Adoption of technology in operations has lowered the cost of making withdrawals. However, only 29.4% of the respondents believed differently.

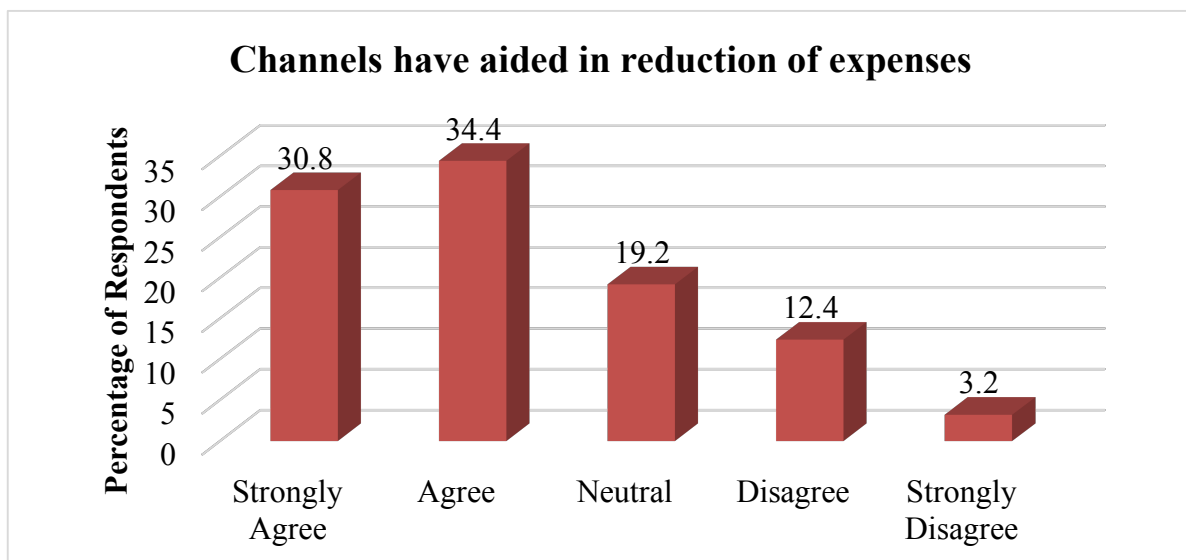
#### 4.4.9 Reduced amount of time to get feedback



**Figure 6: Amount of Time Taken to Receive Feedback Has Significantly Reduced.**

The above graph represents the survey statistics regarding time taken to receive feedback. According to the results, 62.4% of the respondents who make a majority believe that the Reduced amount of time to get feedback implying that Amount of time one gets feedback is much less with adoption of virtual banking. However, only 20% of the respondents believed otherwise.

#### 4.4.10 Channels have aided in the Reduction of Communication expenses



**Figure 7: Channels Have Aided in The Reduction Communication.**

The above graph and table represents the survey statistics regarding whether Modern communication channels have aided in the reduction of communication expenses. According

to the results, 65.2% of the respondents who make a majority believe that Modern communication channels have aided in the reduction of communication expenses. However, only 15.6% of the respondents believed otherwise.

**4.4.11 Table 22: Older Generation Has Not Adopted New Technology.**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	90	36
Agree	60	24
Neutral	54	21.6
Disagree	31	12.4
Strongly disagree	15	6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results shows that 60% of the participants believe older generations are reluctant to adopting new technology as compared to the young. Among the 60% participants, 36% strongly agreed, 24% agreed older generations are reluctant to adopting new technology as compared to the young. However, only 18.4% of the respondents believed differently.

**4.4.12 Table 23: Absolute prices and price of a service impact how customers use virtual banking**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	21	8.4
Agree	31	12.4
Neutral	54	21.6
Disagree	60	24
Strongly disagree	84	33.6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The above table represents the survey statistics regarding how customers use virtual banking being, affected by price of a service and absolute prices. 57.6% of the respondents who make a majority don't believe that Absolute prices and price of a service impact how customers use virtual banking, implying that there are other more determining factors like the prevailing COVID 19 Pandemic, pushing people to adopt virtual-banking. Among 57.6% of the respondents, 33.6% strongly disagreed, while 24% disagreed. However, 20.8% participants believed otherwise. The research results negate Absolute prices and price of a service impact

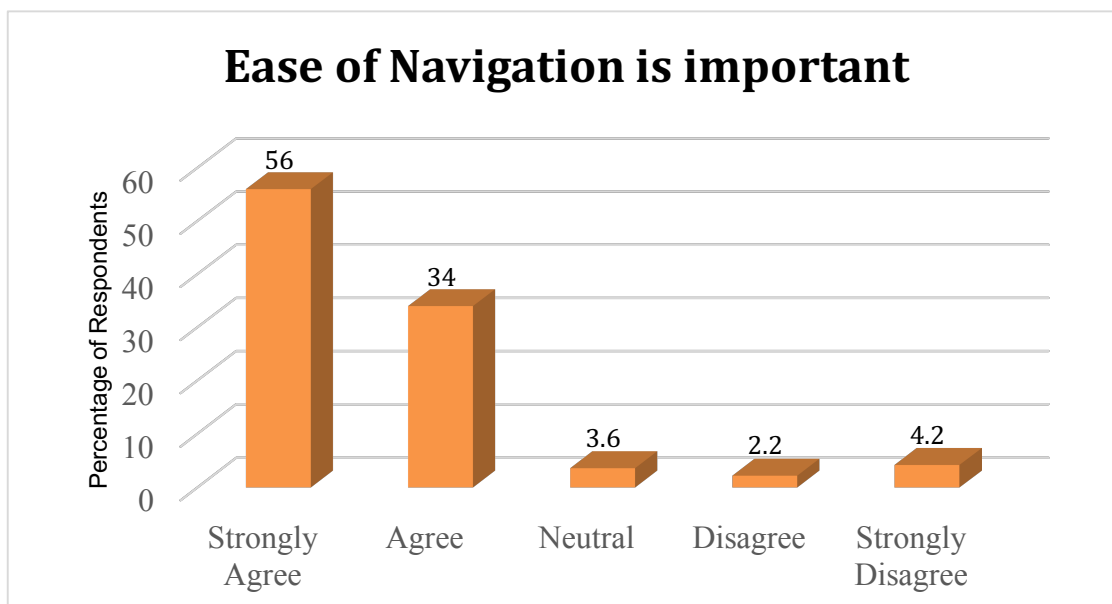
how customers use virtual banking.

**4.4.13 Table 24: Staff IT proficiency increases the skills and experience which adds to output in the organization**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	57	22.8
Agree	116	46.4
Neutral	27	10.8
Disagree	50	20
Strongly disagree	0	0
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The table represents survey statistics regarding Staff IT proficiency. The results show 69.2% participants believe staff IT proficiency increases the skills and experience which adds to output in the organization. Among 69.2% participants, 22.8% STRONGLY AGREED, while 46.4% AGREED. However, 20% participants believed otherwise. The results show staff IT proficiency increases the skills and experience which adds to output in the organization and helps in the adoption of Virtual-banking.

**4.4.14 Navigation (ease of use) is vital in adopting internet banking**

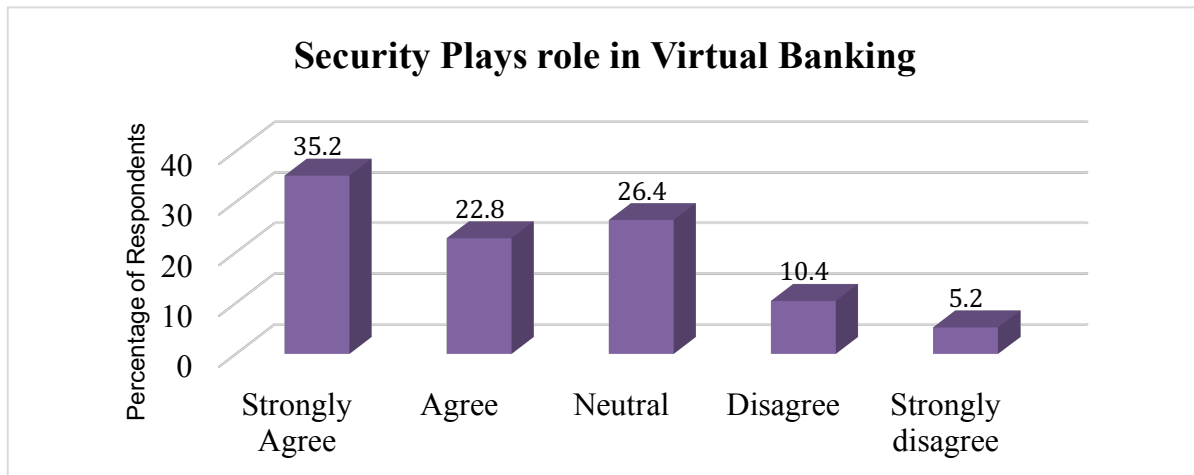


**Figure 8: Navigation Is Important in The Adoption of Banking.**

The results show that 90% participants believe that navigation is vital in adapting internet banking. In a total of 90% participants, 56% STRONGLY AGREED, 34% AGREED navigation (ease of use) is vital in adopting internet banking. On the other side, 10%

participants believed otherwise. The results further show very important central aspect in the adoption of virtual-banking. Technology Acceptance Model (TAM) and perceived ease of use is a major boost in helping customers to embrace systems of information. Therefore, Navigation (ease of use) is vital in adopting internet banking.

#### 4.4. 15. Security is Vital in Adopting Virtual Banking Services.



**Figure 9: Security Plays Role in Virtual Banking.**

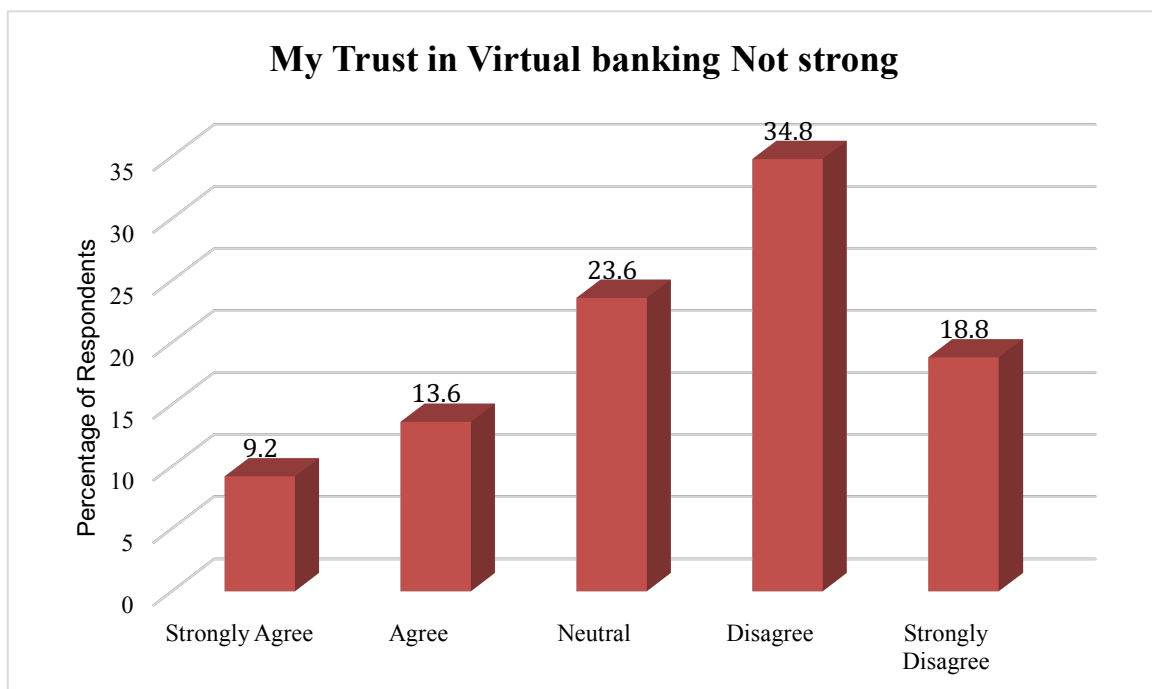
The results show that majority of the participants in the survey; about 58% belief Security is Vital in Adopting Virtual Banking Services. In a total of 250 participants ,35.2% STRONGLY AGREED,22.8% participants AGREED Security is Vital in Adopting Virtual Banking Services.However,15.6% participants believed Security is not Vital in Adopting Virtual Banking Services. In summary, Most of the participants believed Security is Vital in Adopting Virtual Banking Services. Therefore, the Technology Acceptance Model (TAM) and perceived usefulness (PU) all play a major function in helping customers adopt the system of information.

#### 4.4.16 Table 25: Security Can Prevent Data Transactions to Allow Authorization Access to Hacking.

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	113	45.2
Agree	100	40
Neutral	6	2.4
Disagree	20	8
Strongly disagree	11	4.4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results show that most of the participants, 85.2%, believe security can also be used to stop data transactions and give way to hacking which lead to loss of data and money. In total of 85.2% participants, 45.2% STRONGLY AGREED, 40% AGREED that security can also be used to hack and steal useful data and even money. 12.4% participants believed otherwise as they did not see security as a threat to virtual banking. The results show us virtual banking is prone to security threats therefore making it risky. This is because they perceive security as a threat. Conclusively, threats of virtual banking resulting from security breach do not go along with perceived usefulness or Technology Acceptance Model (TAM).

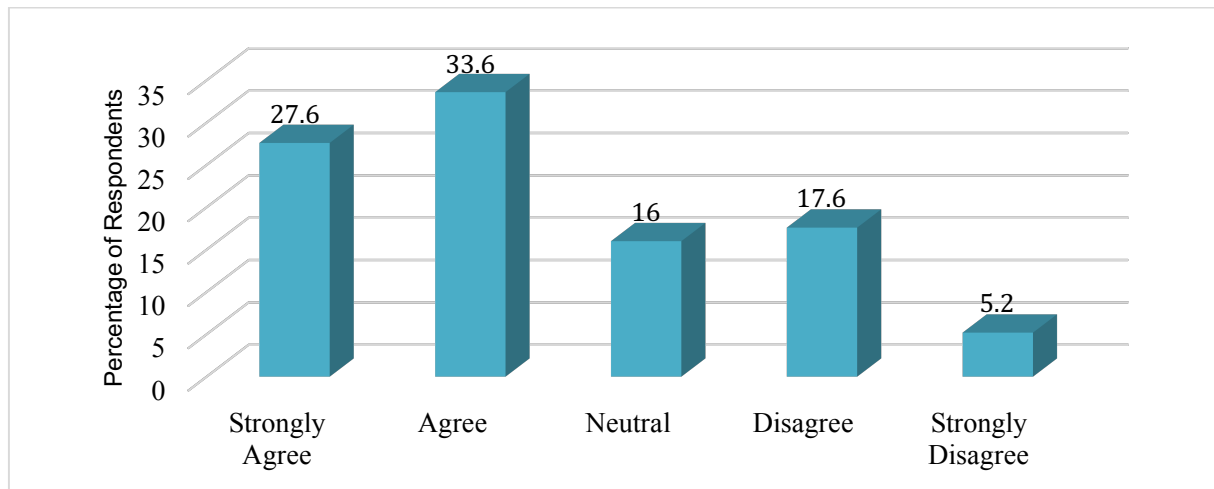
#### 4.4.17 I trust more in offline services compared to online services of banks



**Figure 10: I trust more in offline services compared to online services of banks.**

The results shows that the majority of participants, 53.6% disagree they trust more in offline services compared to online services of banks. This clearly shows that most of the participants prefer to use the virtual banking system compared to offline traditional system 18.8% strongly disagreed, 22.8 % agreed that they trust more in the offline services compared to the online virtual services. In summary, 53.6% trust the online banking system since they see more advantages in the online banking system. Therefore, the results disagree most people trust more in offline services compared to online services of banks.

**4.4.18 Integrated, Unique and Financial Services that are customized are vital in virtual banking.**



**Figure 11: Integrated, Unique and Financial Services that are customized are vital in virtual banking.**

The results show 61.2% participants believe Integrated, Unique and Financial Services that are customized are vital in virtual banking. In the total of 61.2 participants, 27.6% STRONGLY AGREED, 33.6% AGREED Integrated, Unique and Financial Services that are customized are vital in virtual banking. However, 22.8% participants believed otherwise. Hence, from the research study, it is conclusive to say that Integrated, Unique and Financial Services that are customized are vital in virtual banking. This is because most of the participants, 61.2% supported the idea. Thus, integrated services are vital since customers can be able to keep track of their finances without having to use much effort. Therefore, Perceived usefulness and perceived use of TAM can greatly aid in the embracing of the virtual banking.

**4.4.19 Table 26: Time and Location are majorly involved in improving virtual banking.**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	110	44
Agree	77	30.8
Neutral	23	9.2
Disagree	20	8
Strongly disagree	20	8
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results shows 74.8% participants believe time and location are majorly involved in

improving virtual banking. In total of 74.8% participants, 44% STRONGLY AGREED, 30.8% AGREED time and location are majorly involved in improving virtual banking. However, 16% participants believed otherwise. The results of the research survey conclude time and location are majorly involved in improving virtual banking. Moreover, time and flexibility increases effectiveness and efficiency in handling transactions in the virtual banking sector. Also, services can be accessed throughout thus making it a good advantage for customers and improving customer experience. Thus, .perceived ease of use (PEOU) and Technology Acceptance Model (TAM) and usefulness (PU), can greatly aid in the embracing of the virtual banking sector.

#### 4.4.20 Table 27: Customer Privacy Policy Promotes Adoption of Virtual Banking

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	73	31.4
Agree	84	58.6
Neutral	22	3.8
Disagree	59	3.6
Strongly disagree	12	2.6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results shows 90% participants believe that Customer Privacy Policy Promotes Adoption of Virtual Banking. In total of 90% participants, 31.4% STRONGLY AGREED, 58.6% AGREED Customer Privacy Policy Promotes Adoption of Virtual Banking. Needless to say, 6.2% participants believed otherwise. The results clearly conclude Customer Privacy Policy Promotes Adoption of Virtual Banking since most of the participants supported the idea. Thus, .perceived usefulness and perceived ease of use of TAM can greatly aid in the embracing of the virtual banking sector as it ensures customers' information is confidential.

### 4.5 Electronic Delivery Channels

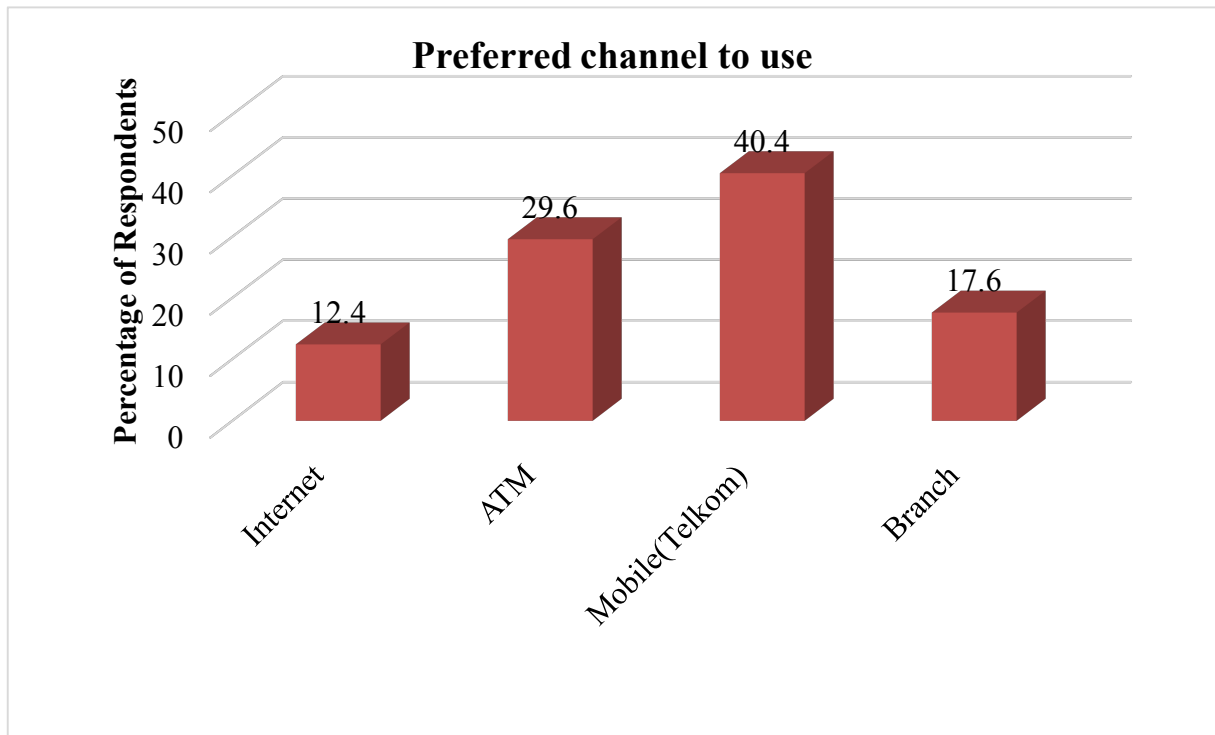
#### 4.5.1 Table 28: Branchless Banking Is a Channel Strategy Distribution Used Without Other Branches

VARIABLE	FREQUENCY	PERCENTAGE
Yes	138	55.2
No	112	44.8
<b>TOTAL</b>	<b>250</b>	<b>100</b>



The results show most of the participants felt branchless banking was dominant in making the services available in the banking sector as 138 (55.2%) who indicated YES rated it high, while the 112 (44.8%) of the respondents indicated NO. These results conclude that branchless banking contributed positively on the banking industry.

#### 4.5.2 Types of Channel You Prefer to Use



**Figure 12: Types of Channel You Prefer to Use**

The results show 82.4% participants believe location and time are more convenient and flexible therefore playing an important function in choosing a delivery channel, as from the study findings, 12.4% of the respondents prefer internet, 29.6% ATM, 40.4% Mobile and only 17.6% of the respondents would prefer physical branch. Therefore a large percentage 40.4% preferred mobile while 29.6% preferred ATM. The study concluded that Mobile and ATM are the most digitally competitive preferred delivery channels

#### 4.5.3 Table 29: Virtual banking shows a Trend in the Outgrowth of Pc Banking

VARIABLE	FREQUENCY	PERCENTAGE
Yes	143	57.2
No	107	42.8
<b>TOTAL</b>	<b>250</b>	<b>100</b>

Data from the above table shows that 143(57.2%) indicated YES and 107 (42.8%) indicated NO. The 57.2% of the respondents who agreed that Virtual/Internet banking also called online banking shows a trend in the outgrowth of pc banking clearly present a support base for the internet banking, meaning more people are embracing the technology with time.

**4.5.4 Table 30: Automated Teller Machines can be Called Cash Machine**

VARIABLE	FREQUENCY	PERCENTAGE
Yes	240	96
No	10	4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The study finding shows 240(96%) indicated YES while 10(4%) indicated NO implying that a majority of the respondents may have used the service of the ATM to access cash. The researcher concluded that automated teller machines can be called cash machine.

**4.5.5 Table 31: Which internet/virtual banking features do you use?**

VARIABLE	FREQUENCY	PERCENTAGE
Pay the bill	70	28
Check the accounts	60	24
Transfer and sale of foreign exchange	34	13.6
Stock transaction	31	12.4
Requesting credit card / credit transaction	55	22
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The findings as per table 36 were as follows, 70 (28%) of the respondents indicated pay the bills and 60(24%) check the account, 34 (13.6%) indicated Transfer and sale of foreign exchange, 31 (12.4%) indicated Stock transaction. From the research findings, Pay bill is the most used virtual/ internet banking service.

**4.5.6 Table 32: Electronic Exchange Involves Money Transfer from an Account to Another by the Use of a Computer Based System**

VARIABLE	FREQUENCY	PERCENTAGE
Yes	151	60.4
No	99	39.6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The research findings indicated as follows 151 (60.4%) yes while their remaining counter

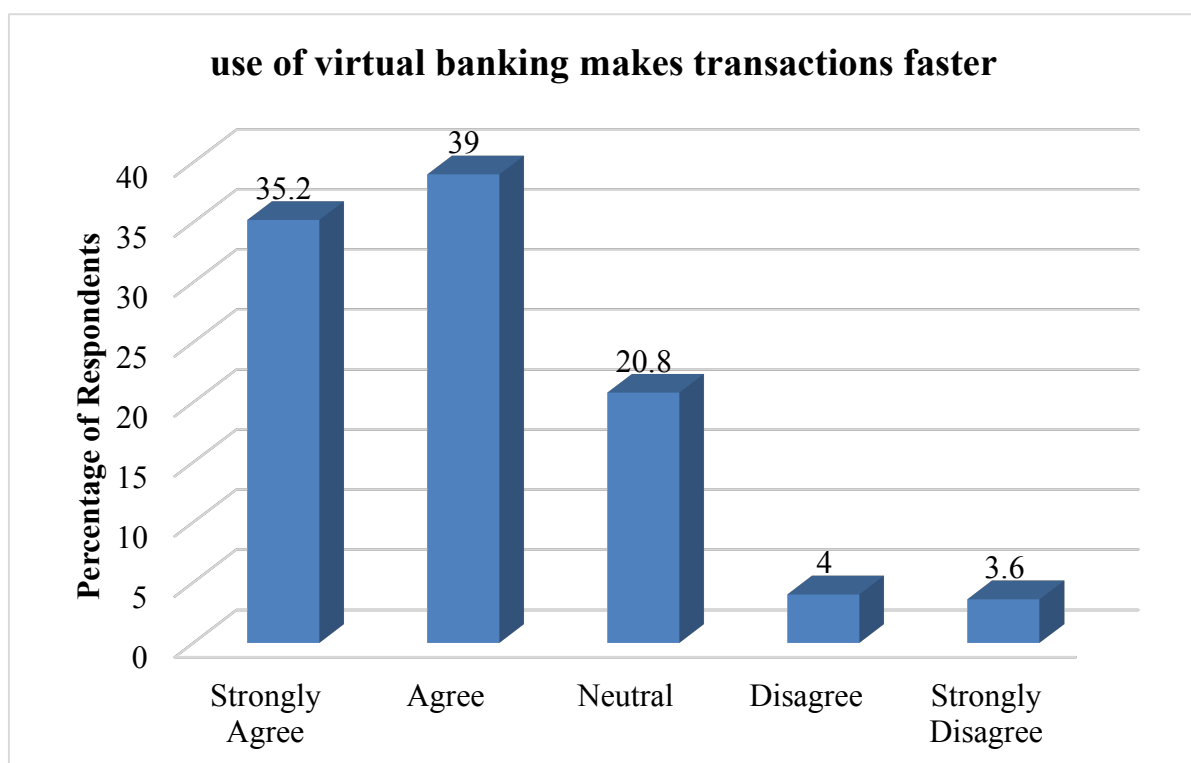
parts 99 (39.6%) indicated no. The study concluded that electronic exchange involves money transfer from an account to another by the use of a computer based system.

**4.5.7 Table 33: Virtual Banks are providers of financial services that offer banking online services and are from the Fintech Sector**

VARIABLE	FREQUENCY	PERCENTAGE
Yes	150	60
No	100	40
<b>TOTAL</b>	<b>250</b>	<b>100</b>

From above table, the research findings indicated as follows 150 (60%) YES while their remaining counter parts 100 (40%) indicated no. The study concluded that a majority of the respondents are aware that Virtual Banks are providers of financial services that offer banking online services and are from the Fintech Sector.

**4.5.8 Virtual banking speeds my transactions**



**Figure 13: Virtual Banking Makes My Transaction Very Fast**

From the above graph, Respondents indicated as follows, 91 (39.4%) indicated agree and 88 (35.2%) indicated strongly agree, 52 (20.8%) indicated Neutral, 10 (4%) indicated and 9

(3.6%) indicated strongly disagreed, implying that the speed of delivery is improved with Virtual banking. The results shows online banking has a big role in making customer have good experience. Perceived usefulness is main since it determines if internet ease will result to more use of the internet banking.

**4.5.9 Table 34: Online banking saves time**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	110	44
Agree	40	16
Neutral	30	12
Disagree	60	24
Strongly disagree	10	4
<b>TOTAL</b>	<b>250</b>	<b>100</b>

From the above table, Respondents indicated as follows, 110 (44%) indicated strongly agree, 60 (24%) indicated disagree, 40 (16%) indicated agree. Majority of the respondents agree that use of virtual-banking is time saving, among Sacco members in Kenya. The results shows online banking has a big role in making customer have good experience. Perceived usefulness is main one since it determines if internet ease will result to more use of the internet banking, hence making the process of transaction faster.

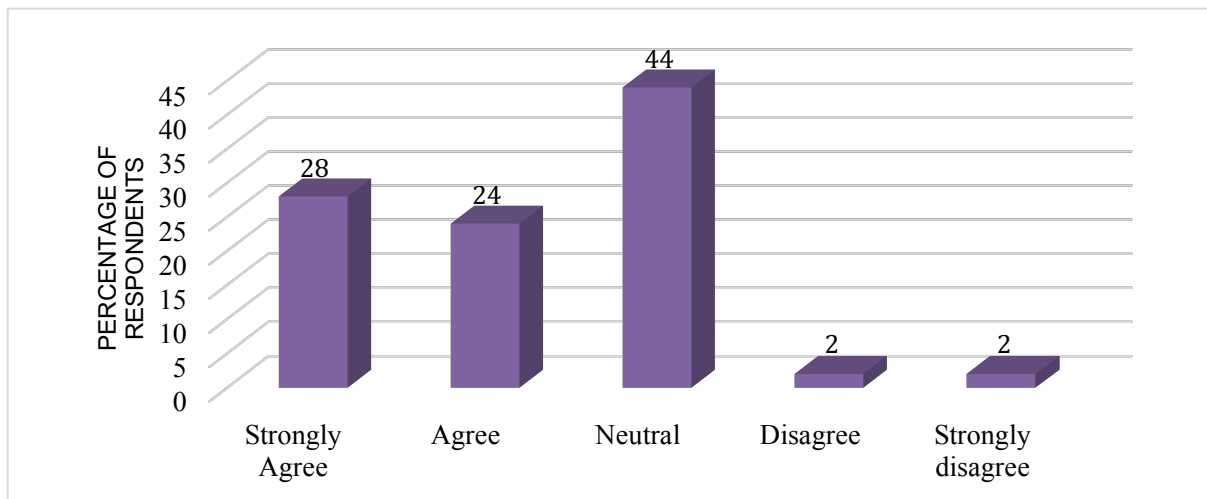
**4.5.10 Table 35: Virtual Banking Is Complicated to Use**

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	40	16
Agree	30	12
Neutral	81	32.4
Disagree	59	23.6
Strongly disagree	40	16
<b>TOTAL</b>	<b>250</b>	<b>100</b>

On virtual banking being complicated the respondents indicated as follows, 59(23.6%) indicated disagree and 81(32.4%) indicated neutral; while another section of responds 40(16%) both indicated strongly agree and strongly disagree. The study concluded that there is a balance between ease of use and the mirth that the service is complicated to use implying that some people don't use the service because they just think it is complicated to use. The results are in support of initial research study that did find connection between perceived ease

of use, computer self-efficiency and generally to virtual banking.

#### 4.5.11 Virtual Banking Does Not Demand a Lot of Effort



**Figure 14: Virtual Banking Does Not Demand a Lot of Effort**

From the above table and graph, Respondents indicated as follows, 110 (44%) indicated neutral and of 70 (28%) indicated strongly agree, 60 (24%) indicated agree, 5 (2%) both indicated disagree and strongly disagree. The researcher concluded that virtual banking do not require strained effort among the Saco members. The results show that these factors play a major function in the embracement of internet banking. This clearly means a customer satisfaction and experience are what makes a customer trust a service or a product of a specific industry as it makes them loyal to the services of the particular industry. Moreover, when less effort is used to get the best and quality services, it encourages a customer, especially where sensitive information is required.

#### 4.5.12 Table 36: Use of Virtual Banking Is Not Reliable

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	42	16.8
Agree	70	28
Neutral	59	23.6
Disagree	40	16
Strongly disagree	39	15.6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results shows 70 (28%) indicated agree and 59 (23.6%) indicated neutral, 42(16.8%)

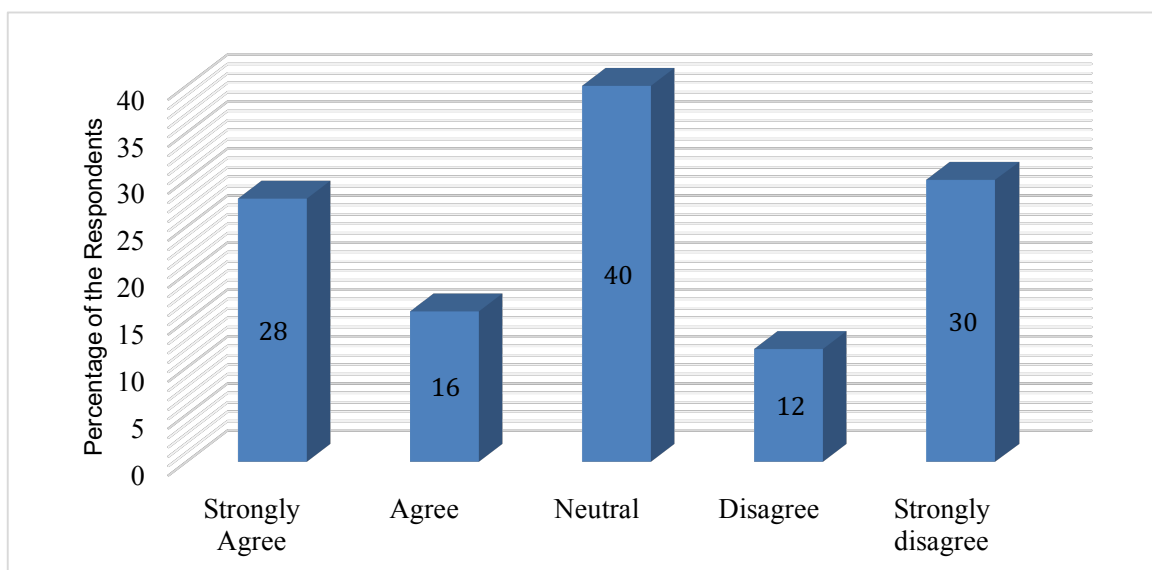
supported strongly agree, another section of respondents 40(15%) concurred with disagree. The researcher concluded that there is a balance between those who agree on the reliability of virtual banking and those who argue otherwise. The results shows the impact of various variables of individuals ,for example, self-efficiency of a computer on intentions of behavior to perceived reliability, perceived ease of usefulness and perceived ease of use.

#### 4.5.13 Table 37: Virtual Banking Applications Quite Pleasant

VARIABLE	FREQUENCY	PERCENTAGE
Strongly Agree	0	0
Agree	151	60.4
Neutral	74	29.6
Disagree	10	4
Strongly disagree	15	6
<b>TOTAL</b>	<b>250</b>	<b>100</b>

The results shows that 151 (60.4%) indicated agree and 74(29.6%) indicated neutral, 15(6%) indicated strongly disagree, 10(4%) indicated disagree. The study concluded that users largely agree that Virtual banking application is quite pleasant to use. Initial experience of banking, prior experience of computer, and prior experience of technology and computer attitudes largely impact the behavior and attitude towards internet banking.

#### 4.5.14 Quality of Service in Virtual Banking is high

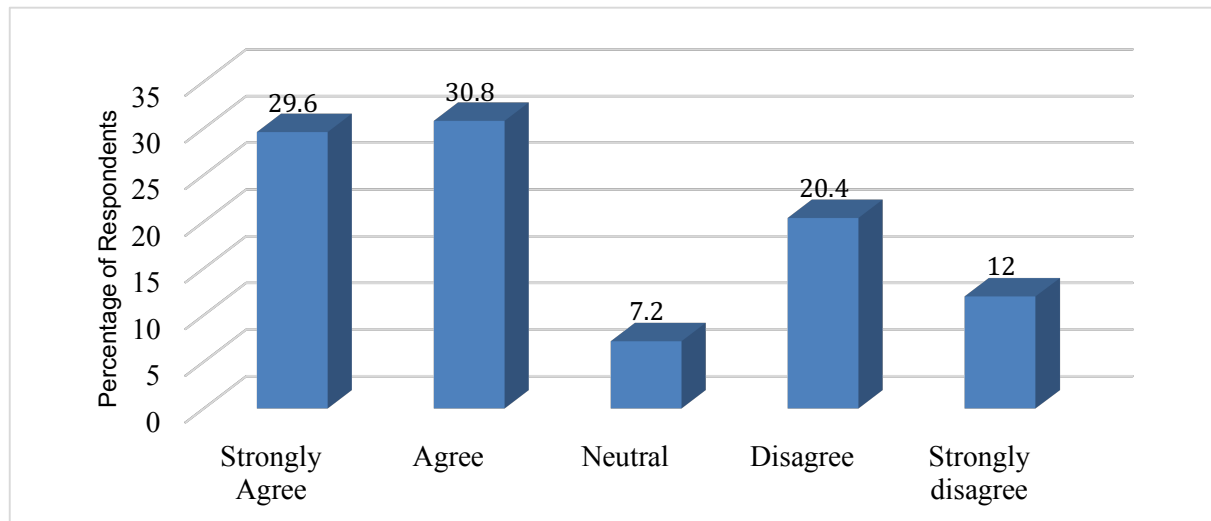


**Figure 15: Quality of Service in Virtual Banking Is High**

Data from the above indicated that 81 (32.4%) agree and 70 (28%) indicated strongly agree,

57 (22.8%) concurred with neutral, 23 (9.2%) agree with disagree the researchers concluded that quality of service in virtual banking is high in Kenya. Mainly, a critical relationship was found between attitude and individual banking experience.

#### 4.5.15 Virtual Banking Gives Me Control over My Transaction



**Figure 16: Virtual Banking Gives Me Control over My Transaction**

On the variable above respondents indicated as follows, 77 (30.8%) indicated agree and 74 (29.6%) indicated strongly agree, 51(20.4%) of the responds indicated disagree, another section 30(12%) concurred with strongly disagree. The study concluded that Virtual banking gives users control over their transactions. The results revealed perceived control promoted embracing of the virtual banking. In particular, confidences in using such services had a lot of influence on pushing customers and clients to adopt internet banking.

#### 4.6 Findings Summary

This research study was motivated by the need to assess the adoption of Virtual Banking among Sacco in the face of COVID-19 pandemic for fact driven decision making, factors that led to adoption, models of mobile banking, electronic delivery channels being utilized and identifying a suitable framework to guide adoption of virtual banking. The survey results revealed perceived control behaviors had a large impact on the promotion of the internet banking among Sacco users. In particular, respondents yielded that Virtual banking gives users control over their transactions, quality of service in virtual banking is high, and initial experience in technology, initial experience in computer, individual banking experience, perceived reliability, trust, customer perception of the usefulness of ease and computer

attitudes largely affects the way a person perceives virtual-banking. The survey result shows that ease of use plays a key role in the process of adopting internet banking. These has been shown in the research how largely these factors aid in the virtual or internet banking process. The study concluded that there is a balance between ease of use and the mirth that the service is complicated to use implying that some people don't use the service because they just think it is complicated to use. The results revealed perceived control promoted embracing of the virtual banking. In particular, confidences in using such services had a lot of influence on pushing customers and clients to adopt internet banking

The survey results clearly indicate that customer-oriented privacy policy of the banks leads to the adoption of virtual-banking because a huge percentage of respondents believed so. According to Technology Acceptance Model (TAM), perceived usefulness (PU) is a key belief which is important for customers' adoption of information systems. So virtual-banking will only be 'useful' for customers if Sacco ensures that customers' personal financial information will be kept confidential.

The results also show that privacy policies of customers promote the virtual and internet banking since customers are self-motivated to adopt virtual banking. From the research, the results clearly showed a majority of the participants come into agreement with the fact that customer privacy policies promoted virtual banking. This is useful in condition that the Sacco keep the customer information confidential. The results clearly conclude Customer Privacy Policy Promotes Adoption of Virtual Banking since most of the participants supported the idea. Thus, .perceived ease of use (PEOU) and Technology Acceptance Model (TAM) and usefulness (PU), can greatly aid in the embracing of the virtual banking sector as it ensures customers' information is confidential.

The results further shows that time and location are also very important in the banking industry as it provides flexibility to customers and convenience in adopting the internet banking sector. This is proved in the study after most of the participants were in agreement that location and time promoted virtual banking.

The results shows that integrated, unique and services that are customized also play an important role in the virtual banking. It is also worth noting that the survey results clearly show that staff IT proficiency increases the skills and experience which adds to output in the



organization and helps in the adoption of Virtual-banking.

The results show us virtual banking is prone to security threats therefore making it risky. This is because they perceive security as a threat. Conclusively, threats of virtual banking resulting from security breach do not go along with perceived usefulness or Technology Acceptance Model (TAM).

Respondents also largely agreed that adoption of technology had among other issues had in operations lowered the cost of making withdrawals, that transaction errors due to the Sacco personnel had significantly declined, e- banking had minimized fraud in the virtual banking sector by sealing loopholes, Complaints from customers had gone down due to the adoption of the internet banking, since most transactions are system based, had reduced staff-customers interface in service delivery, effectively eases loan approvals and disbursement, makes services accessible at any location bringing flexibility and convenience into play hence playing a major role in internet banking.

Survey statistics demonstrate that users are aware that banking industry has a good number of models which are being adopted with mobile banking service providers with the most used models by Sacco being **Joint venture model** and **non-bank-driven model**. The results show most participants knew that virtual banks provide online banking financial services and are from the Fintech sector.

The study findings also found out that Mobile and ATM are the most digitally competitive preferred delivery channels. From the research findings, the introduction of the branchless banking had positive impact on the banking sector, and it was established that Pay bill was the most used virtual/ internet banking service.

# CHAPTER FIVE

## CONCLUSION AND RECOMMENDATIONS

This chapter contains the achievements, conclusion and recommendations from the study.

### 5.1. Achievements

*Objective 1: Examine the Mobile Banking models available for Virtual Banking among Saccos in Nairobi County in the face of COVID-19 to drive decision making.*

The research was carried out so as to establish the available mobile banking models in the implementation of virtual banking. Following a review of the existing literature about online banking, the study obtained data which propose various mobile banking models that can be utilized in the implementation of virtual-banking. M-banking banking models available for virtual banking adoption were identified to be **Joint venture model** and **non-bank-driven model**-. These were the ones mostly used by many Saccos. The core banking system being utilized by many Saccos had the following functionalities;

Architecture of a core Virtual banking system

**User Interface:** includes all touch points of virtual banking with customers that could be implemented through channels such as internet and mobile.

**Customer operation:** this part of virtual bank includes sales and services and CRM systems. Sales and services covers commercial, personal, micro and corporate banking and CRM covers internal system and customer relationship management with social customers

**Banking operations:** this part covers counter, bank treasury, IT development, regulations management, customer validation, data transformation, ledger operations, customer information, payments and transactions and dashboard and report maker which are briefly defined.

**Analysis systems:** this part of virtual bank addresses bank supervision activities which, according to academic definitions, is a software module that uses data analysis tools such as business intelligence to control bank activities

***Objective 2: Discover influences of adoption of virtual banking technologies by potential users in SACCO industry in Nairobi County in the face of COVID-19 pandemic for fact driven decision making.***

The research was carried out so as to establish the influences of implementation of online banking. Following a review of the existing literature about online banking, the study obtained data which propose various factors that influence users to adopt virtual-banking. But some researchers mentioned a number of factors several times showing how important those factors are in the implementation of online banking. The influences of the adoption of virtual banking technologies in Saccos were identified to be technical factors, economic factors and social factors. In specific, they included privacy, flexibility and convenience, web usability, service quality, attitude, security, and trust. Given these factors, a research was conducted in Nairobi county Saccos to gather first-hand information via questionnaires. The study findings were analyzed based on two common beliefs about Technology Acceptance Model that is perceived usefulness (PU) and perceived ease of use (PEOU). This is because the dual beliefs are critical in the implementation of IS. From the findings, it was uncovered that virtual banking platforms ought to be appealing and very easy to use it goes along way into facilitating the implementation of banking technology. Security is another crucial consideration; virtual banking can be adopted with much ease if the virtual banking sites are believed to be secure. When there are security issues that accompany online banking, then the aforementioned perceived usefulness belief is violated and this could lead to the system being rejected. Furthermore, trust on SACCOs is a critical determinant in the implementation of online banking. It is only by trusting the Saccos that people will be able to adopt virtual banking and make good use of it. Put simply, Saccos must first build customer trust if they wish to make customers feel that virtual banking is useful. Service quality adds to the list of most important factors behind the implementation of virtual banking. 60% of the participants believe that customized, unique, and integrated solutions are critical in the implementation of i-banking. The role of integrated services in helping customers monitor their financial details at one point should not be understated as it increases its usefulness. Besides, integrated services mirror ease of use belief of tech acceptance model as customers do not encounter any problem while moving from one platform to another by use of online banking solutions. Additionally, as per the study outcomes, convenience as regards place and time mirrors the ease of use and is a major determinant of the implementation of virtual banking. It is when the Saccos take into consideration the privacy issues that virtual banking will be deemed useful

for customers. Lastly, attitudes towards computer, personal banking experience, perceived reliability, prior computer experience, customer view of the ease of use and usefulness, and prior knowledge experience greatly influence the behavior and attitudes towards online banking.

The perceived usefulness and the perceived ease of use (the major beliefs concerning Technology Acceptance Model) are critical variables in the implementation of IS. Therefore, important factors derived from the extant literature and analyzed through the study tools must mirror usefulness and ease of use to help customers in effective implementation of virtual banking.

***Objective 3: Determine the most digitally competitive electronic delivery channels used by Saccos in Nairobi County in the face of COVID 19 pandemic for fact driven decision making.***

The research was carried out so as to establish the most digitally competitive electronic delivery channels in the implementation of virtual banking. Following a review of existing literature as regards the implementation of virtual banking, the study obtained data that reveals that many electronic delivery channels in the implementation of virtual banking exist. The most digitally competitive electronic delivery channels used by Saccos were identified to be **Mobile** and **ATM**. It was also established that Pay bill was the most used virtual/ internet banking service.

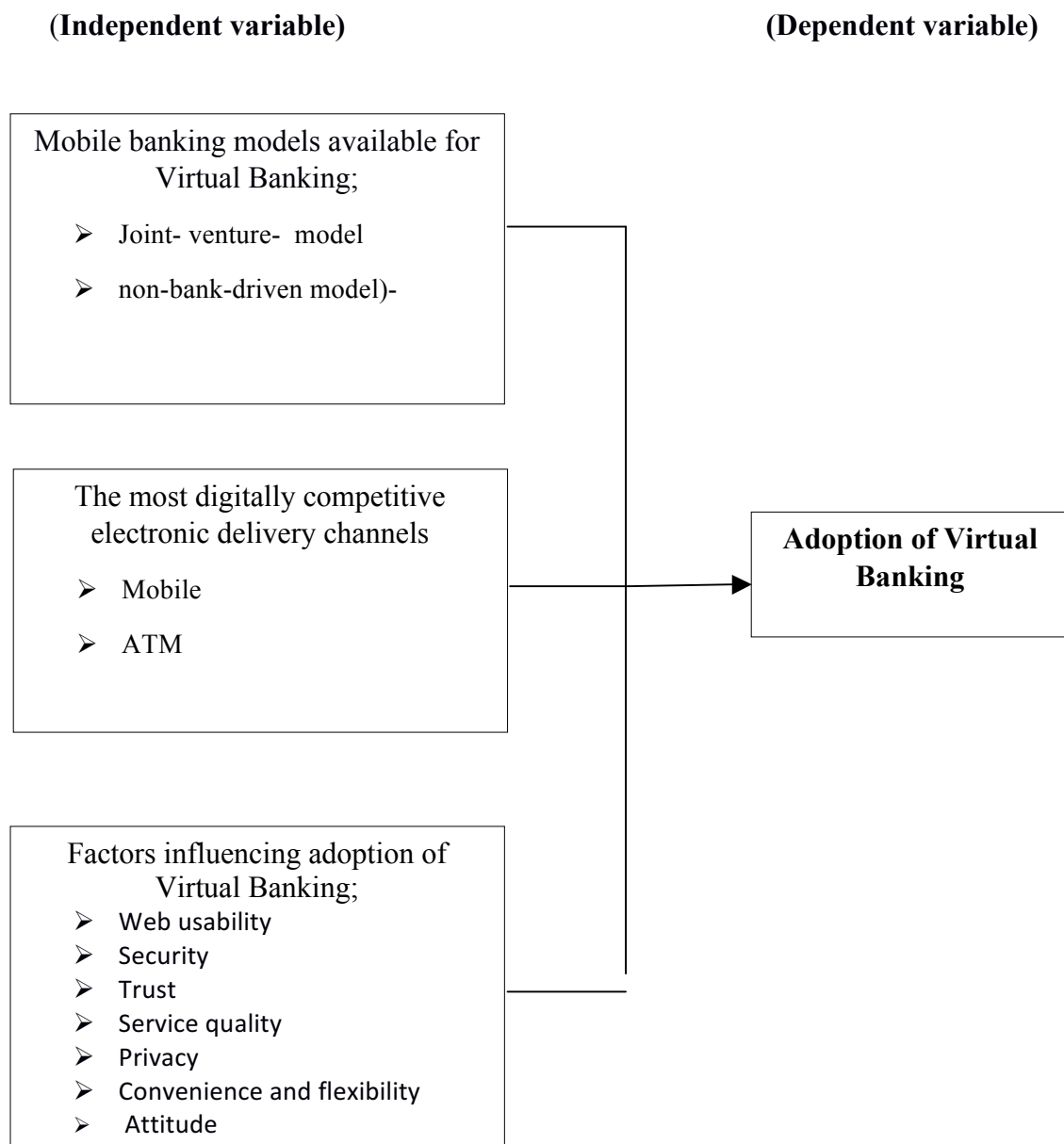
***Objective 4: Establish the suitability of the framework used to explore the adoption of Virtual Banking among Saccos in the face of COVID-19 for data driven decision making.***

The framework below was established as a suitable framework to explore the adoption of virtual-banking among Saccos to drive decision making. The study found out that some of the factors within the variables immensely influenced the adoption compared to others. Thus Adoption of virtual banking was found to be a function of factors influencing adoption (web usability, Security, service quality, personal banking experience- component of convenience and flexibility in terms of time, trust, attitude-customer view of the ease of use and usefulness, digitally competitive electronic delivery channels used by Saccos being Mobile and ATM, and the mobile banking models available for virtual banking adoption being **Joint venture model** and **non-bank-driven model**).

### 5.1.2 Contributions of the Study

The findings from this study contribute greatly to all areas of Sacco IT implementation and usage, practice, and research. The contribution is the formulation of a conceptual framework that predicts and explains the factors which impact the acceptance and adoption of virtual banking technology; and its application in the Sacco sector in the country.

The resulting adoption model (TAM-COVID) is thus as shown in fig.17 below



**Figure 17. Sacco virtual banking adoption model (TAM-COVID)**

## **5.2. Conclusion**

This research study showed that there were two main available mobile banking frameworks which could be utilized for the implementation of virtual banking; Joint venture model and non-bank-driven model. It also showed that there were two most digitally competitive electronic channels, ATM and Mobile that were being utilized. From the study findings, it was acknowledged that trust and technological issues are critical in improving the behavioral intention of the customers to do online financial transactions. The dual beliefs of technology acceptance model-perceived usefulness and ease of use, combined with trust-based issues are a pair of factors that greatly influence the behavioral intent to utilize virtual banking, with each exerting a substantial impact on the intent to utilize via various mediating factors like subjective norm, attitude, as well as perceived behavioral control. Therefore, while designing online banking websites, attention should be given to this combination of factors to appeal to many customers to use virtual banking. Also, as aforementioned, customers tend to rely on trust more than they do on perceived ease of use and perceived usefulness to shift their attitude towards online banking. This means that just like perceived usefulness and perceived ease of use, trust-based issues do influence customers' view and attitude towards utilizing online banking. Unauthorized access, privacy protection, and accuracy of declaration among other things are some of the major trust-based issues that affect the adoption of online banking.

## **5.3. Recommendation**

Based on findings and conclusion of the study, the outcome of this study has three practical implications and recommendations for Saccos.

1. Saccos should consider using effective presentations of all kinds of media advertising like websites, leaflets, and brochures meant to educate and inform potential users regarding the pros of virtual banking to influence their perception and hence behavior and attitude towards online banking.
2. Sacco assistants at branches and Sacco tellers should provide information about virtual banking to help reach out to many adopters. While providing this information, reference should be made to "time saving", "convenience" every time everywhere, "low costs", and "information availability". Besides, Saccos need to provide

information beyond banking solutions and design their websites as effective delivery channels.

3. There is need to foster cooperation among Saccos to provide shared technological services and a set of other instruments to facilitate shared services. Some Saccos do not have the financial muscle to have own standalone system or access to some services. When one activity is paired with others both within Saccos and with external customers, suppliers, and channels, the value of virtual banking is increased.

#### **5.4. Further Research**

The study analyzed the most important constructs of establishing an adoption framework. But in the process of conducting the research, other factors like Sacco reputation emerged and were believed to influence the use of virtual banking. The study recommended further research in this area. The study also recommends a look on factors influencing the use of virtual banking solutions in Kenya to include corporate clients. Thereafter, a comparison can be made between factors influencing corporate and individual customers as regards the type of services and products believed to be useful, their adoption decisions, as well as the procedure for selecting a virtual banking service.

## REFERENCES

1. Anaad, A. (2020). *Innovation management*, Oxford university press. 2020.
2. Andy, F, (2016). *Ladis international conferences E- society*, PP: 179 – 180.
3. Asougu, A.S, (2017). *The application of information systems in the Jordanian Banking sector. A study of the acceptance of the internet university of Wollongong thesis.*
4. ASARECA, (2019). *Soil health critical in attainment of sustainable development Annual Corporate Report.*
5. Aboelmaged, M.G., & S.M., Gebba, T.R., (2013). *Mobile banking adoption: an examination of tam and theory of planned behaviour. International Journal of Business Research and Development*, 2(1), 35-50.
6. Al-Jabri, I.M., & LP., Sohail, M.S. (2012). *Mobile banking adoption: application of the diffusion innovation theory. Journal of Electronic Commerce Research*, 13(4), 379-391.
7. Biwott, M. & LP.,. (2017). *Efficiency and Productivity of Deposit Taking Rosenberg, J. (2010). Access to Finance, Customer Adoption, Innovation and Mobile Banking.*
8. *Cooperatives in a Regulatory Transition: Evidence from Kenya. International Journal of Economics, Commerce and Management* 5 (11); 436-447.
9. *Combat, L.P., (2011). The Contextual Environment. Many banks in Kenya have in the recent past adopted electronic banking as a way of offering banking Journal of Electronic Commerce Research*, 13(4), 379-391.
10. *Courbe, J. (2016). Financial Services Technology 2020 and Beyond: Embracing disruption. PwC's Annual Global CEO Survey.*
11. *Gerlach, D. (2017). Money in, the real and virtual world; E-Money, C Money, and demand for CB – Money, netnomics, (i) 25 – 50.*
12. *Garg, G. & S.M.,; (2014). Research Methodology. Methods and Techniques. New Delhi: New Age International Publishers.*
13. *Has; F. (2014). Towards A strategy implementation framework, international journal of comtemporary hospitality management* 13, 327 – 338.
14. *IMF, (2017). Finances National Survey Nairobi, Kenya; FDS Kenya.*
15. *Kumar, R. (2005) Research Methodology: A step-by-step guide for beginners. 2 Editions. London. Sage Publications.*



16. Kwara, P (2019) digital banking software for Sacco at risk during corona virus pandemic, Cynthia *wandia press release*.
17. Kristic, R.D. (2018). Strategic management concepts; the resource based view (RBV). *Journal management*, 17(1), 191 – 211.
18. Kanimichi, S. L. (2017). Exclusive: Econet finally opening up full USSD level mobile money to the banks. *Retrieved December 28*.
19. Karachi, J. (2010). Access to Finance, Customer Adoption, Innovation and Mobile Banking
20. Maryam Marefati and Seyyed Mohsen Hashemi, “Business Intelligence System in Banking Industry Case Study of Samam Bank of Iran”, *Software Engineering Research, Management and Applications Studies in Computational Intelligence Volume 430*, 2012, pp 153-158.
21. Monitise, M.P. (2018) “Electronic money”, *Pc magazine*, 5 September.
22. Muchangi, M. D., Muathe, S.M.A, Waithaka, S.T. (2018). Effect of Mobile Communication Services on Performance of Sacco in Kenya. *European Scientific Journal*. 14(30): 46-62.
23. Mobility (2019). Money in, the real and virtual world; E-Money, C Money, and demand for CB – *Money, netnomics*, (i) 25 – 50.
24. Mook, R., (1986). “Innovation: The Attacker’s Advantage”, *Summit Books*, New York.
25. Microsoft Industry Reference Architecture for Banking (MIRA-B). Microsoft Corporation, 2012 [Online].  
<http://download.microsoft.com/download/C/5/F/C5FCCA52-1056-427B-B29C-9F00A28180C5/Microsoft%20Industry%20Reference%20Architecture%20for%20Banking%20-%20March%202021.pdf>.
26. Ngando, K. (2017). Effects of Technology Innovation on Commercial Bank Performance in Tanzania. *International Journal of Finance and Accounting*. 1(2); 14-29.
27. Ngure, F. K., Kimani, E. M. Kariuki, S. (2017). Product Innovations and Financial Performance of Savings and Credit Co-Operatives Societies in Kirinyaga County, Kenya. *International Academic Journal of Human Resource and Business Administration*,. 2(3), 166-178. ...
28. Network Banking Industry Architecture, 2014 [Online].

29. Ocheing'F.L., (2017). Strategic Factors Affecting Compliance with the Sacco Act of 2008 by Deposit Taking Savings and Credit Cooperatives in Nairobi County. *Strategic Journal of Business & Change Management*, 4(2):1-5. .
30. Remenyi, D., Williams, B., Money, A. and Swartz, E. (1998) Doing Research in Business and Management. An Introduction to Process and Method. London. *Sage Publications*. .
31. Rogers, E.M. (2013). Diffusion of Innovations. New York, NY: *Free Press*.
32. Raza , J. (2017) “A valid and reliable measurement scale for the perceived service quality of banks, *international journal of bank marketing*, Vol 18 No.2 pp – 84 – 91. .
33. Śledzik, K. (2013). Schumpeter’s view on innovation and entrepreneurship: Management Trends in theory and practice, (Ed.). *University of Zilina & Institute of Management*.
34. Schumpeter, J. A. (1939). Business cycles. *McGraw-Hill*: New York. .
35. Telecommunication union, (2019). “Online banking; strategic and management challenges, *long Range planning*, vol. 30, No. 6.
36. Vila, J.A., Serna-olvera, J; Fernandex, L, Madina, N, & S fakianakis, A. (2013). A profession views on E-Banking auto notification challenges and recommendations *international conferences on information assurance and security (IAS)* doi: 10; 1109 /isais 2013. 694773. .
37. Wachira, D.M., Muturi, P.N. & Jerotich, S. (2014). An Evaluation of the Perceived Effect of ICT’s on the Performance of Sacco’s in Kenya *Case of Licensed Sacco’s, Nairobi County*. *Information and Knowledge Management* 4(12):61-77. .
38. Zahid, R.D. (2018). Strategic management concepts; the resource based vien (RBV). *Journal management*, 17(1), 191 – 211.

## APPENDIX I: QUESTIONNAIRE

Virtual banking adoption by Saccos in the face of COVID-19 pandemic in Kenya. A case study of Nairobi County.

### SECTION I: RESPONDENT'S BACKGROUND INFORMATION

1. What is your gender?  
Male  female
2. In which of the following age brackets does your age fall?  
18-30 years  31-40 years  41-50 years  above 50
3. State your highest level of education  
a. No formal education  b. Basic Education  c. Secondary  d. Certificate  e. Diploma  f. Undergraduate  I. Masters  j. PhD
4. Length of Virtual/internet banking usage
  - a) Less than a year
  - b) between 1-3 years
  - c) between 4-6 years
  - d) More than 6 years
5. Frequency of Virtual/internet banking transaction
  - A. once per month
  - B. twice per month
  - C. thrice per month
  - D. Four times per month
  - E. 5 times per month
  - F. More than 5 times per month
6. In which areas has your Sacco undertaken automation in the last 5 years?
  - a) BOSA
  - b) FOSA
7. For how long have you been applying modern technology and internet in conducting daily operations in your organization?  
Past 1 Year  2-3 Years  5 Years

### SECTION II BANKING MODELS

**PLEASE INDICATE YOUR OPINION TO THE QUESTION BELOW BY INDICATING YES or NO**

The banking sector was faced with various problems such as application for loans taking weeks    YES    (    )    NO    (    )    If    No    please    state    why \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

1. Banking industry has a good number of models which are being adopted with Virtual banking YES ( ) NO ( ) If No please your answer why\_\_\_\_\_

2. In today's world, new business models that are more customer-focused, have lower cost and are more efficient. YES ( ) NO ( ) If No please explain your answer why\_\_\_\_\_

3. Joint-Venture-model

a) Does the customer conduct financial transactions through a mobile phone instead of at the Sacco's branches? YES ( ) NO ( ) If No, please explain your answer why\_\_\_\_\_

b) Would you say the customer account relationship rests with the Bank? I mean, does the Bank establish the customer relationship? YES ( ) NO ( ) If No, please explain your answer why\_\_\_\_\_

4. Non-Bank-Led-model

a) Does the bank have a role in the day-to-day account management? YES ( ) NO ( ) If No please explain your answer why\_\_\_\_\_

b) Does a non-bank agent conduct account management functions? YES ( ) NO ( ) If No, please explain your answer why\_\_\_\_\_

c) Does the non-bank agent have direct contact with customers? YES ( ) NO ( ) If No, please explain your answer why\_\_\_\_\_

5. Non-Bank-Driven model

a) Is there a case where the non-bank agent effectively becomes the depository entity through the issuance of e-money? YES ( ) NO ( ) If No, please explain your answer why\_\_\_\_\_

b) Is there a case where the account ownership and transaction management purely rest with the telecommunication company? YES ( ) NO ( ) If No, please explain your answer

why \_\_\_\_\_

6. Core banking system Which core banking system does your Sacco use to support Virtual-banking? Select

- a) BIAN model
- b) MIRA-B model

### SECTION III FACTORS CONSTRAINING ADOPTION

What is your level of agreement with the following statements? 5- Strongly Agree (SA) 4- Agree (A) 3- Neutral (N) 2- Disagree (D) 1- Strongly Disagree (SD).

		SD	D	N	A	SA
		1	2	3	4	5
1.	Information Technology effectively eases loan approvals and disbursement. The introduction of electronic banking has reduced staff-customers interface in service delivery					
2.	Digitization has contributed to short queues at the Sacco Premises.					
3.	Adoption of information technology enables customers to access services at any location Customer complaints have reduced as a result of the introduction of e-Banking services					
4.	Digitization of Sacco operations has enhanced loans Reconciliation processes.					
5.	Fraudulent practices have stopped in the Banking since the introduction of E-Banking					
6.	Transaction errors due to the Sacco personnel have Significantly declined.					
7.	Customers' can launch queries anytime.					
8.	Adoption of technology in operations has lowered the cost of making withdrawals					
9.	Amount of time taken to receive feedback has significantly Reduced.					
10.	Modern communication channels have aided in the Reduction of communication expenses..					
11.	Older generations are reluctant to adopting new technology as compared to the young					

12.	Customer usage of virtual banking is both influenced by absolute prices and also by the way a service is priced staff IT proficiency increases the skills and experience Which adds to output in the organization?					
13.	Navigation (ease of use) is important in the adoption of Virtual banking?					
14.	Security plays a vital role in Virtual-banking adoption and continued use?					
15.	Security is a threat which can prevent data transactions or allow unauthorized access to the accounts through network attacks or hacking etc?					
16.	Trust on the Sacco plays an important role in the adoption of Virtual banking services?					
17.	My trust in Virtual-banking services is not as strong as compared to trust in offline services provided by the bank?					
18.	Unique, integrated and customized financial services are important in the adoption of Virtual-banking?					
19.	Convenience and flexibility in terms of location and time play a vital role in the adoption of Virtual-banking?					
20.	Customer-oriented privacy policy of the banks leads to the adoption and continued use of Virtual banking					

#### SECTION IV: ELECTRONIC DELIVERY CHANNELS

- In the banking industry branchless banking is a channel strategy distribution used for delivering financial services without other branches  
YES ( ) NO ( )
- Which Banking Channel do you prefer using?  
internet  
ATM  
Mobile (Telephone)  
Branch
- Virtual/Internet banking also called online banking, shows a trend in the outgrowth of pc banking, it uses Internet as a delivery channel by which to do banking activities  
YES ( ) NO ( )
- Automated teller machine (ATM) can also be called cash machine,  
YES ( ) NO ( )
- Which features of virtual/internet banking do you use?  
Pay the bills  
Check the account  
Transfer funds between accounts  
Purchase and sale of foreign exchange  
Stock Transactions

Requesting credit card and credit card transactions

6. This channel delivery is the electronic exchange; it involves the transfer of money from one account to the other by the use of a computer based system

YES ( ) NO ( )

7. Self-service banking targeting business with small input in their firms, assist them to access the services at home by phone

YES ( ) NO ( )

8. Virtual Banks are financial service providers from the Fitch Sector offering banking services exclusively online

YES ( ) NO ( )

9. Speed of Delivery

Comment on a scale from 1 (strongly disagree) to 5 (Strongly & quot; agree) The use of Virtual-banking makes my transactions very fast 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( ) The use of & quot; Virtual-banking time saving 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

10. Ease of use

Comment on a scale from 1 (strongly disagree) to 5 (Strongly & quot; agree)

a) Virtual-banking is complicated to use 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

b) The wording of Virtual-banking is unclear 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

c) Virtual-banking does not demands a lot of effort 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

11. Reliability

Comment on a scale from 1 (strongly disagree) to 5 (Strongly & quot; agree)

a) The use of virtual-banking can lead to errors in transactions 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

b) The use of virtual-banking is not reliable 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

12. Pleasure

Comment on a scale from 1 (strongly disagree) to 5 (Strongly & quot; agree)

a) Virtual-banking is nice to use 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

b) The use of virtual-banking is fun 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

c) Virtual-banking is interesting to use 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

13. Satisfaction

Comment on a scale from 1 (strongly disagree) to 5 (Strongly&quot; agree)

a) My expectations before the use of virtual-banking have been met with this current experience 1( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

b) I find the virtual-banking application quite pleasant 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

c) I am completely satisfied with the virtual-banking application 1 ( ) 2 ( ) 3( ) 4 ( ) 5 ( )

14. Quality of service

Comment on a scale from 1 (strongly disagree) to 5 (Strongly & quot; agree)

a) The level of quality of service I receive through the virtual-banking is high 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( ) b) The quality of service I receive through the virtual-banking is excellent 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5 ( )

15. Control Comment on a scale from 1 (strongly disagree) to 5 (Strongly & quot; agree)

a) The use of virtual-banking gives me control over my transaction 1( ) 2( ) 3( ) 4( ) 5 ( )

b) The use of virtual-banking means transaction will be made as I wish 1( ) 2( ) 3( ) 4( ) 5 ( )

**APPENDIX II: LETTER OF INTRODUCTION**

Kefah Juma,

P.O Box 30197-00100,

Nairobi.

Date:.....

To the Branch Manager,

XYZ SACCO Limited,

P.O Box ....., Nairobi.

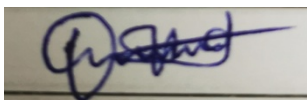
**RE: REQUEST TO BE ALLOWED TO CARRY OUT RESEARCH WITH YOUR STAFF**

Dear Sir/ Madam,

I am a master’s student in Information Technology Management at the University of Nairobi. I hereby kindly write to request your office to allow me to carry out the above said brief interview on virtual-banking with your staff. This will include brief interview sessions with them, administering of questionnaires and brief discussions in groups with the concerned personnel in the e-banking departments. My sessions, if request is granted will not interfere with the normal Sacco operations as I will fit into your schedules. It will run for a maximum of one hour a day within the business working hours. Looking forward to your positive response.

Thanking you in advance,

Yours sincerely,



Kefah Juma



## APPENDIX III



### UNIVERSITY OF NAIROBI

#### COLLEGE OF BIOLOGICAL & PHYSICAL SCIENCES SCHOOL OF COMPUTING AND INFORMATICS

Telephone: 4446543 or 4442014/15/16 Ext. 2007

P. O. Box 30197

Telegrams: "Varsity" Nairobi

Nairobi, Kenya

Email:

Date: April 30,

2021

#### TO WHOM IT MAY CONCERN

#### KEFAH JUMA OMWANDO – P54/35606/2019

The above named is a student in the MSc in Information Technology Management of the University of Nairobi. As part of the requirements of the programme, the student is required to undertake a research project and write a dissertation. The project title for the student is: **Virtual banking adoption by Sacco in the face of COVID-19 pandemic in Kenya.**

Any assistance regarding data collection accorded to the student, who is under my supervision, will be highly appreciated.

A handwritten signature in blue ink, appearing to read 'Chris A. Moturi'.

CHRISTOPHER A. MOTURI

SENIOR LECTURER

SCHOOL OF COMPUTING AND INFORMATICS