

EFFECT OF MOBILE AND INTERNET BANKING ON THE FINANCIAL PERFORMANCE OF DEPOSIT TAKING – SACCOS IN MERU COUNTY, KENYA

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Abstract: *The Kenyan Fintech industry has made great gains toward providing high-quality banking services in a safe environment, enabled by modern information and communication technology. This study sought to understand how, mobile and internet banking affect the financial performance of deposit taking Savings and Credit Cooperatives (SACCOs) in Meru County, Kenya. This study was informed by three key theories; Theory of diffusion of innovation, asymmetric information theory, and resource – based view theory. The study secondary data sources to look into the specific impacts of Fin Tech on the financial health of deposit-taking Sacco's. The study data was analyzed from 19 Deposit taking saccos that are licensed by Sasra within Meru county. Both mobile banking and internet banking show an increasing trend in usage over the years, as indicated by the coefficients for the year variable in the linear equations. The R² values for both mobile banking and internet banking indicate that the linear equations can explain a moderate to strong proportion of the variance in usage. The R² values suggest that the linear equations provide a reasonable level of predictability in both mobile banking and internet banking usage based on the year. The study therefore concludes that the use of mobile banking technology has the potential to enhance the operational efficiency, expand the customer outreach, and elevate the level of member contentment for Saccos. It is imperative for financial institutions to maintain a constant vigilance in detecting and identifying fraudulent activities, adopt sophisticated fraud prevention mechanisms, and impart knowledge to their clientele regarding prevalent fraudulent schemes and scams.*

Keywords: *Deposit taking, mobile banking, internet banking, SACCO*

1.0 INTRODUCTION

The entry of financial technology into the financial sector has led to major disruptions which affected the stable business environment. Given that Financial technology regulations are underdeveloped in many developing countries (Le, T. D. 2021), the new entrants were not restricted in any the mode of operations. Consequently, it is apparent that financial technology has led to a restructured paradigm shift in reasoning as the role of the financial sector was not only to act as a provider but as an enabler of financial services.

Many aspects of institutional operations have been positively affected by financial technology. There is improvement in the problem solving mechanisms and effective engagement with customers. Product improvement is a major boost to many institutions due to the analytical power of financial technology to process bulk information at a faster rate using artificial intelligence. SACCOs can now process loans within a few minutes compared to prior periods of manual processing of a loan. In Kenya, Amtech developed a machine learning technology in order to incorporate three applications namely Easyma, Eassysacco and FLMD (De

Guire, E., et al., 2019). This technology is useful in analysis of up to date data from members of agricultural SACCOs. With such up to date decision making tools, farmers are categorized according to their credit scores and on application of a loan, the loan is approved and disbursed to the farmer's mobile wallet within a matter of seconds.

The past two decades has seen an increase in the level of financial technology in various sector of the Kenyan economy aided by increase in mobile penetration, mobile money platforms and increase financial inclusion (Sy, M., et al., 2019). Emergence of financial technology in Kenya has changed the mode of operations in the financial sector as Safaricom introduced a money platform M-Pesa in 2007. This external force led to many financial organizations to acquire software technologies as many customers reduced the visits to financial institutions opting for mobile money. The M-Pesa project by Safaricom led to a massive increase in the level of financial inclusion as there were no registration fees and lower transactional costs compared to other financial institutions.

The innovation environment thereafter has taken a drastic change as many financial institutions have since then adopted and utilized technology in offering their services. The major task faced is the right technology to choose that fully meets the demands of the institution. The cost of acquiring an inbuilt technology is high which drives small firms away hence opting for open source software which is considered relatively cheap (Tennant, J. P. et al., 2020). Despite open source software being cheap, the importance of obtaining an inbuilt technology with user specifications outweighs the costs. The ease of use and the effectiveness of technology are considered as critical factors when choosing to adopt a technology.

The growth of the Fintech industry in Kenya continues to be an important contributor to the national nominal GDP. SASRA (2019) reports a 0.17% increase in the share of the national nominal GDP in terms of assets from 5.55% in 2018 to 5.72% in 2019. This is a strong indication of the continued demand and public confidence in the credit facilities offered by the Deposit Taking – SACCOs.

Ahmed, E. M. (2021) found that the Kenyan population's openness to adopting new and improved banking practices explains why financial technology has spread so rapidly there. Most DT - SACCOs in Kenya serve a diverse clientele, with members hailing from a number of industries like agriculture, education, government, the private sector, and the community at large. The widespread adoption of the financial technology utilized by DT - SACCOs can be attributed to the inclusion of individuals from a wide range of economic sectors. To maintain their businesses, grow at a rate that is acceptable, and create value for their stakeholders, DT - SACCOs want to improve the accessibility of the services they provide to their clients.

The Kenyan Fintech industry has made great gains toward providing high-quality banking services in a safe environment, enabled by modern information and communication technology. Most banks in East Africa and Kenya in particular, rely largely on the country's robust ICT infrastructure to help them stay competitive in a fiercely competitive business. Mbiti and Weil (2015) state that when it comes to banking and payment systems that have been digitized, Kenya is one of the most developed countries in East Africa. As a result, the Kenyan case is being studied more closely than ever before.

Evidence of growth of the Fintech industry is shown by the continuous growth of DT – SACCO performance indicators. For instance, membership in DT – SACCOs has grown from 3.1 million active members in 2017 to 4.81 active members in 2021. This growth in membership is in line with one of the core deposit taking financial services by using to ease the process of recruitment of members. To further underscore the importance of in the DT – SACCO performance, SASRA Report (2017, 2020) shows a tremendous growth in the gross loans taken from 297.6 billion in 2016 to 419.55 billion in 2020.

It is apparent that the growth of financial technology has a great impact on performance of institutions. In Kenya, there is a surge in the number of financial institutions every year which raises competition for funds from the public and giving out loans at an interest. Credit analysts use financial technology to assess the credit viability of customers to assess whether to grant a loan. The applicant's behaviour during the loan period or a review of past activities is monitored by financial technology firms to help build the borrower's portfolio. Some institutions monitor the borrower to the extent of understanding which type of games the person is interested in. To what level of monitoring depends on the consumer protection policies put in place in a country so that the consumers feels safe about their information. By and large, growth of in Kenyan DT – SACCOs will be driven by efficient financial technologies in terms of mobile banking and internet banking on the financial performance.

1.1 Statement of the Problem

In a competitive financial sector, DT – SACCOs face stiff competition from commercial banks that launch products via the mobile phone platform such as KCB Mpesa, Mshwari, Pesa Pap and Coop cash (Musango, D. M., 2018). This has the effect of reduction of transactions in DT – SACCOs as members opt for convenience. DT – SACCOs also face stiff competition from other digital credit financial services (SASRA 2017) and therefore a call for increased efficiency in service delivery. In this regard, a look at the efficiency of the financial services is a very important aspect for every financial institution.

Research by KNBS (Census Report 2019) reveals that an alarming 80% of economically active adults are not members of any of the DT – SACCOs. This is a major concern given that DT – SACCOs aim to deepen financial access and inclusion using pro – active measures to mobilize savings. Membership in SACCOs is likely to rise as the use of mobile phones and the internet spreads to more areas of Kenya (DT - SACCOs). In order to win over the public and provide convenient and trustworthy services to its customers, DT - SACCOs must rebrand the underlying financial technology. There has been progress toward financial inclusion, but the technology employed to reach this goal should overcome barriers to entry and exit for DT - SACCOs.

From the above literature, it is clear that there were shortcomings in the non – efficient usage of financial technology in DT – SACCOs. The SACCO sector is still witnessing a high level of NPLs due to non – remittance, a high level of non – inclusion of the adult population to be SACCO members, stiff competition from other financial providers despite embracing Fintech in their daily operations and service delivery. The mentioned SASRA reports and the study reviewed conclusively noted that DT – SACCOs must efficiently utilize Fintech. In this regard, this study sought to explain how, mobile and internet banking affect the financial performance of DT – SACCOs.

1.2 Objectives of the Study

The broad objective of this study was to assess the effect of Fintech on financial performance of deposit taking SACCOs in Kenya. This study was guided by a specific research objective to examine the effect of mobile and internet banking on the financial performance of Deposit Taking – SACCOs in Meru County.

2.0 THEORETICAL LITERATURE

This study is pegged on three theories; theory of diffusion of innovation, information asymmetry theory and resource based view theory.

2.1 Theory of Diffusion of Innovation

The proponent of the theory of diffusion of innovation, Rogers (1995), describes diffusion of innovation as a method of gradually informing people inside an organization about a new development. The flow of information gives rise to a special kind of communication whereby as opposed to instructions, ideas are shared (Rogers, 1995). A negative response towards an innovation has the effect of rejection of viable ideas. The theory suggests a range of tools that can be used to measure the rate at which an innovation is adopted. The theory of diffusion of innovation is important to this study to show how innovation spreads. In most instances, DT – SACCOs obtain critical information about a given financial technology and all its benefits considered before a decision is made, and finally an evaluation of the impact of the financial technology is done. For instance, one aspect of a financial technology is to market a new financial product as well as to provide avenues to collect member deposits as well as issuance of loans. In this regard, a DT – SACCO will take all the necessary steps starting from communication up to the final stage of whether to adopt a mobile financial application or to use a website portal.

2.2 Asymmetric Information Theory

According to the asymmetric information theory proposed by Akerlof, Spence, and Stiglitz (1970), there are instances in which one party to a transaction has access to more information than the other party. In a lending and borrowing scenario, information asymmetry occurs when the borrower has more knowledge about the lender's financial situation than the lender has. Asymmetry information theory is relevant in this study as credit monitoring is a critical tool used in today's DT – SACCOs to monitor the performance of loans. Credit monitoring seeks to employ sophisticated financial technology to relay and analyse critical information about a credit applicant whereby the manual approach of credit monitoring is capable of providing significant results. This approach of curbing information asymmetry will in turn lead to improved loan recovery approaches and a reduction of the level of non – performing loans.

2.3 Resource – Based View Theory

The Resource – Based View Theory idea originated with Penrose's writings in 1959. According to the resource-based view hypothesis, a company's expansion is contingent on the availability of a wide variety of internal resources. Wernerfelt (1984) argues that RBV theory recognizes the importance of both the external environment and the firm's organizational resources. Therefore, firms have a competitive edge if they are able to fully leverage their distinctive, non-substitutable, and non-transferable elements of value. By and large, resource based theory is used in this study particularly to show how DT – SACCOs have inherent capabilities which can be utilized to deliver sustained competitive advantage. Inherent capabilities are driven towards better design of the financial technology to offer effective financial products and services to boost financial performance. In this context, RBV theory will be evidenced via a strong interaction between the tangible and intangible infrastructure used by a DT – SACCO.

2.1 Empirical Literature

Mobile Banking

The term "mobile banking" refers to a financial product that enables customers to access their bank accounts and do a variety of banking-related tasks from their mobile devices. Account balance inquiries, wire transfers, term deposit tracking, and loan applications are all examples of such actions. Sub-Saharan Africa and nations like Kenya are major adopters of mobile banking since it provides easy and low-cost access to banking services. The revolutionary effect that mobile banking has had on the financial environment, especially in places with inadequate infrastructure like Sub-Saharan Africa, led to its selection as the focus variable for this research. Despite infrastructure issues, the proliferation of mobile phone use makes mobile banking an essential engine for expanding access to banking services and fostering economic growth. As the digital world continues to rapidly evolve, it is crucial to evaluate the prospective benefits and challenges of mobile banking. Previous research has shown that there is no single indication or methodology that can be used to quantify the effects of mobile banking. Mobile phone use and connectivity are on the rise in Sub-Saharan Africa, as observed by researchers such as Donou-Adonsou (2019). Rathee et al. (2020) and Obeng (2020) investigated how mobile phones facilitate faster and cheaper information sharing, placing special emphasis on the convenience aspect for consumers and businesses.

In addition, research shows that there are real economic benefits to mobile banking in the long run, including a reduction in transmission expenses. Producers and shoppers alike stand to gain from these advantages, which ripple throughout industries including agriculture and services. In Kenya, people who don't have access to a reliable internet connection can still take advantage of banking services on the go thanks to the USSD format banking and SMS banking. Ndung'u (2019) shows that the overall number of mobile phone subscribers in Kenya has grown exponentially, suggesting a sizable market for mobile banking solutions. Higher transaction volumes may occur as a result of the rising number of subscribers. Although DT-SACCO membership has increased, SASRA (2019) notes that a sizable majority of Kenyans, almost 80% of the overall economically productive population, remain unaffiliated with these organizations. In summary, mobile banking is a dynamic and influential variable which can be studied using indicators like the number of mobile banking transactions performed, the amount of money saved, the level of customer happiness, and the impact it has on various economic sectors. To fully take advantage of mobile banking's potential to promote economic inclusion and growth in Meru County, it is necessary to gain a thorough understanding of the impacts of this service on the financial results of DT-SACCOs there.

Internet Banking

Strong financial technology infrastructure supports the widespread use of Internet banking, which has become an integral part of contemporary banking. Financiers in the twenty-first century do the vast bulk of their business on the internet, either through dedicated websites or mobile apps. Internet banking is a major niche that all banks should exploit in light of the increasing use of the internet. Therefore, banks need a solid infrastructure to efficiently facilitate online transactions. Marcu, M. R. (2021) argues that the growth of internet banking faces substantial obstacles due to developments in information technology and changes in consumer dynamics.

With the critical importance of online banking in the modern financial services sector, it was selected as a factor in this research. Internet banking is becoming a must for banks that want to improve their bottom line due to the proliferation of mobile devices and other forms of ICT. It's an important consideration because of the market growth potential, cost savings, and ease it provides. Previous research has shown that assessing the

effect of online banking on economic outcomes requires thinking about a number of different measures. Key indicators of the importance of internet banking to an institution's operations include the volume of online traffic and the number of customers who use online platforms or mobile applications.

In a study conducted by Raza et al., (2020), the level of service quality provided to customers has a significant impact on their overall happiness with online banking and, in turn, the company's bottom line. The success of online banking depends heavily on how well websites and mobile apps perform. The effect of internet banking on consumer loyalty and financial success can be gleaned by analyzing interactions between users, traffic to the website, and the rate of adoption of online services. Reducing expenses and threats is a priority for online banks, as noted by Daka and Phiri (2019). Customers' need for speedy monetary transactions highlights the need of a convenient service delivery model. An institution's success in fostering customer engagement can be gauged by looking at the typical daily number of visitors to its website or online portal. To further assess the cost savings brought about by internet banking, financial institutions might compare pre- and post-implementation cost-to-profit ratios. This is in line with the findings of Daneshvar and Ramesh (2012), who used statistical methods of correlation and regression analysis to show that internet banking and other forms of IT investment result in more deposits, a higher return on investment (ROI), greater efficiency (profit per employee), fewer nonperforming assets, and lower personnel costs.

To sum up, internet banking KPIs include the volume of web traffic, the proportion of customers who are satisfied, the effectiveness of the site, the amount of money saved, and the rate of expansion in online transactions. If banks want to keep up with shifting customer preferences and innovate in the online banking space, they need a firm grasp of how internet banking impacts bottom lines.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

This study used a descriptive research approach. The researchers opted for a descriptive research strategy since it allowed them to amass a substantial amount of information rapidly. According to Kerlinger (2005), this strategy limits the researcher's ability to influence the study's variables. This study used a descriptive research approach. The researchers opted for a descriptive research strategy since it allowed them to amass a substantial amount of information rapidly. According to Kerlinger (2005), this strategy limits the researcher's ability to influence the study's variables.

3.2 Study Population

There certainly nineteen SACCOs in Meru County that accept deposits, hence this study focused on this specific subset of the population.

3.3 Data Collection

The study used secondary data sources to look into the specific impacts of FinTech on the financial performance of DT - SACCOs in Meru County. Table 1 displays data acquired for the 19 DT- SACCOs for the period 2018 – 2022. The table presents data on the number of internet banking users for different SACCOs (Savings and Credit Cooperative Organizations) from 2018 to 2022. Each row represents a different SACCO, and each column represents a specific year.

Table 1: DT- SACCO Dataset

Deposit Taking SACCOs											
		Mobile Banking					Internet Banking				
		2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
1	Mwalimu National Sacco Society Ltd	21300	23400	28700	30000	33600	5000	9800	15300	18400	21100
2	Kenya Police Sacco Society Ltd	16000	18000	20000	25000	28000	3000	5800	9200	13800	17300
3	Afya Sacco Society Ltd	4100	5200	7500	9800	11600	2100	3500	6700	8200	9900
4	UNAITAS Sacco Society Ltd	22600	25800	30900	33000	38000	6100	7400	10900	12600	15000
5	Trans Nation Sacco Society Ltd	7800	10000	13900	17000	20000	4300	6800	10400	13900	14900
6	Solution Sacco Society Ltd	8100	11300	14200	18000	22000	3500	5100	7900	10700	13000
7	UNISON Sacco Society Ltd	2700	4100	8200	9300	12600	1000	2800	6500	7800	9600
8	Yetu Sacco Society Ltd	3100	4700	6300	8600	11000	1800	2400	3500	5200	8500
9	Capital Sacco Society Ltd	2800	5900	7300	8600	9100	800	1500	2100	2400	3900
10	Chai Sacco Society Ltd	800	1200	1700	2400	3200	200	420	630	900	1350
11	Centenary Sacco Society Ltd	1800	2500	3600	4100	5200	700	900	1350	1500	1900
12	Times-U Sacco Society Ltd	2500	3100	5700	7400	9800	500	1400	2700	3500	4200

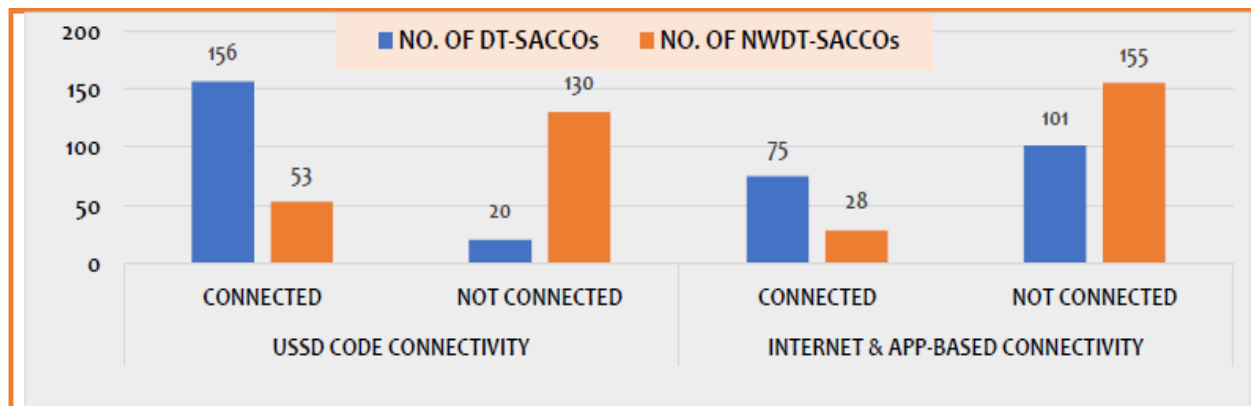
13	Jamii Yetu Sacco Society Limited	450	670	1200	1800	2000	300	670	890	1000	1400
14	Dhabiti Sacco Society Ltd	690	780	905	1420	1700	2000	300	550	740	900
15	Golden Pillar Sacco Society Ltd	1600	2200	3100	4500	6200	800	1000	1300	1700	2300
16	Siraji Sacco Society Ltd	1400	1800	2900	3400	4100	800	1300	2000	2500	3200
17	Smart Champion Sacco Society Ltd	710	920	1400	2600	3000	400	600	1000	1300	1800
18	Nyambene Arimi Sacco Society Ltd	600	1400	2200	3200	3700	300	450	900	1400	1700
19	Nexus Sacco Society Ltd	500	740	820	1040	1520	250	340	510	640	800

3.4 Data Analysis

Data analysis was done using statistical package for social science to make observations in trends and patterns in the adoption of mobile and internet banking among the SACCOs. Tables and graphs were used in presenting and displaying data.

4.0 RESEARCH FINDINGS

Figure 1: No. of Regulated SACCOs with Mobile Money Services for their members



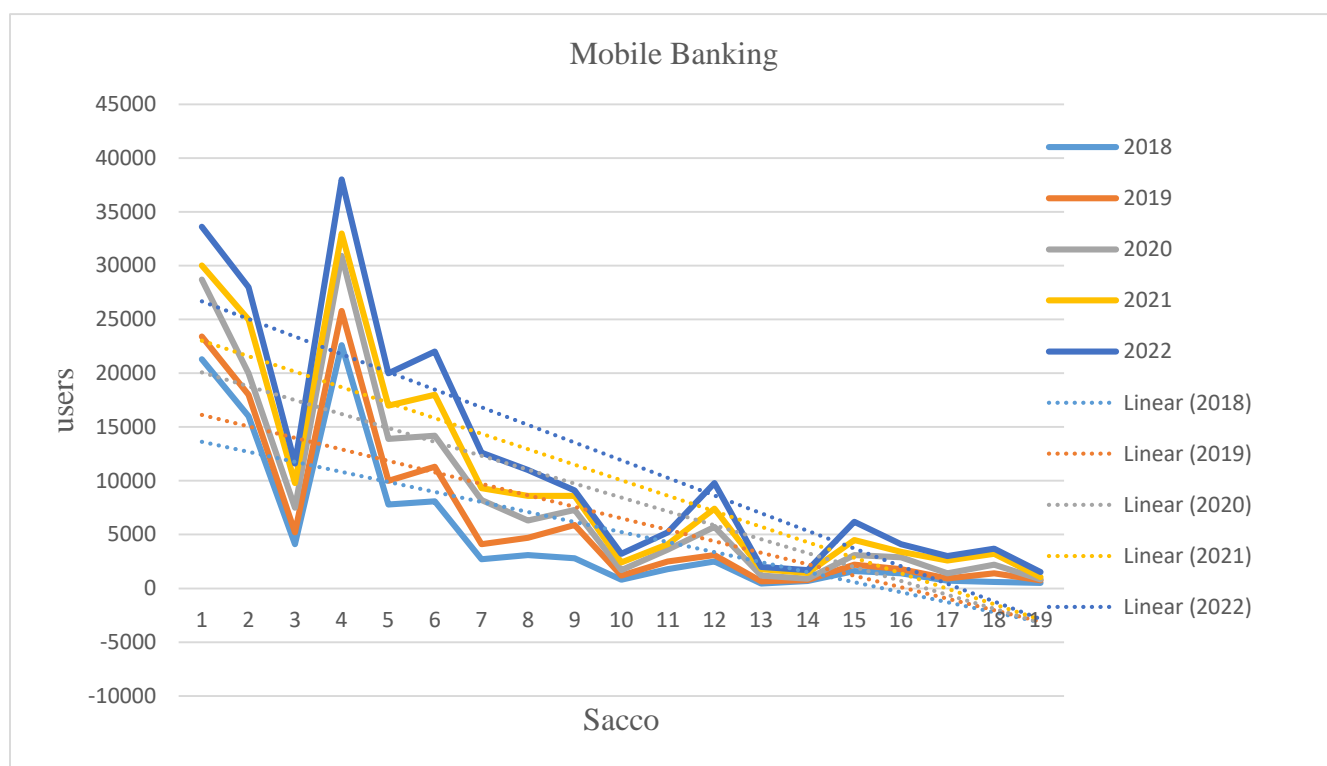
A total of 156 DT-SACCOs have implemented mobile money for their members using only the regular USSD code cell phone service, which are available in both phone models and smart phones, whereas 75 DT-SACCOs

have implemented mobile money for their members by employing both types of USSD Code as well as the internet as well as App-based cash services. Of the NWD-T-SACCOs (Non- Withdraw able Deposit Taking SACCOs) that only offer push choices for their mobile money services, 53 had implemented the use of a USSD code, while 28 had implemented combination the USSD code and internet/app-based money services on their constituents.

4.1 Mobile banking on the financial performance of DT – SACCOs

From figure 2, it can be observed that there is a steady increase in the number of mobile banking users over the years.

Figure 2: mobile banking on financial performance



Looking at specific SACCOs and groups of mobile banking users, variations in the growth rates can be observed. For example, in Sacco No 1, the number of users increased from 21,300 in 2018 to 33,600 in 2022, indicating a significant growth rate. Similarly, in Sacco no 4, the number of users increased from 22,600 in 2018 to 38,000 in 2022, showing a substantial growth rate as well.

On the other hand, some saccos show slower growth rates. For instance, sacco No. 10, the number of users only increased from 800 in 2018 to 3,200 in 2022, indicating a relatively slower growth rate compared to other groups.

These trends in mobile banking usage can be attributed to various factors. Several studies have examined the factors influencing the adoption of mobile banking. Alalwan et al., (2017) found that the extent of customer

motivation plays a crucial role in the successful implementation of mobile banking. Baabdullah et al., (2019) also emphasized the importance of studying mobile banking as it is still a subject worthy of research.

Furthermore, the impact of mobile banking on bank performance and profitability has been investigated. A study by Khadim & Islam (2022) reviewed the literature on the evaluation of customer satisfaction patterns in mobile banking services. They found that mobile banking significantly improves bank profitability and stability.

In addition to profitability, mobile banking has also been linked to financial inclusion. Ahmad et al. (2020) conducted a review of mobile money's contribution to promoting financial inclusion and development, with a focus on sub-Saharan Africa. They found that mobile money usage is highly associated with a higher probability of bank account ownership, indicating its role in enhancing financial inclusion.

Moreover, the adoption of mobile banking has implications for the efficiency and operational performance of commercial banks. Hordofa (2023) analyzed the impact of mobile banking adoption on the technical efficiency of commercial banks in Ethiopia. The study found that the shift towards mobile banking opens up new opportunities for commercial banks to enhance their operational efficiency and drive economic growth.

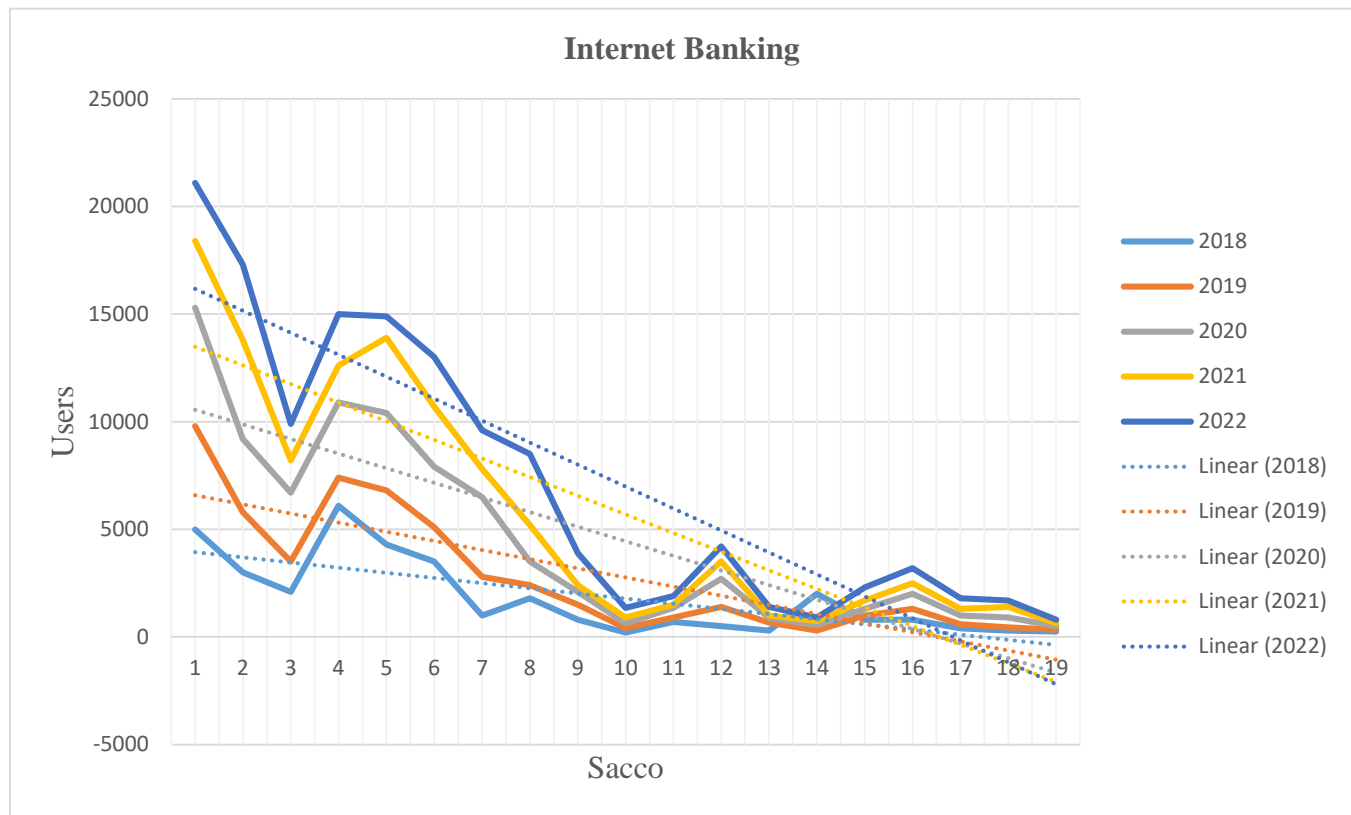
Overall, the data presented in figure 2 reflects the increasing popularity and adoption of mobile banking over the years. This trend can be attributed to factors such as customer motivation, bank profitability, financial inclusion, and operational efficiency. As mobile banking continues to evolve and expand, further research is needed to explore its impact on various aspects of the banking sector.

4.2 Internet banking on the financial performance of DT – SACCOs

Analyzing the data in figure 3, it is observed that trends and patterns in the adoption of internet banking among the SACCOs. Overall, there is a general increase in the number of internet banking users over the years. In 2018, the total number of internet banking users across all SACCOs was 31,500, and this number gradually increased to 61,400 in 2022. Looking at specific SACCOs, we can see variations in the growth rates of internet banking usage. Some SACCOs experienced significant growth in internet banking adoption, while others showed relatively slower growth. For example, SACCO 1 had a steady increase in internet banking users from 5,000 in 2018 to 21,100 in 2022. Similarly, SACCO 4 had consistent growth from 6,100 in 2018 to 15,000 in 2022.

On the other hand, some SACCOs showed slower growth rates. For instance, SACCO 10 had a relatively slower growth rate, with the number of internet banking users increasing from 200 in 2018 to 1,350 in 2022.

Figure 3: Internet Banking



The adoption of internet banking is influenced by various factors. Several studies have examined the determinants of internet banking adoption. Wang et al., (2003) conducted an empirical study on the determinants of user acceptance of internet banking. They found that factors such as usability, the internet, and the technology acceptance model play a significant role in the adoption of internet banking.

Furthermore, the impact of internet banking on customer satisfaction and loyalty has been investigated. Raza et al., (2020) developed a modified e-SERVQUAL model to assess internet banking service quality, e-customer satisfaction, and loyalty. They found that internet banking service quality significantly influences customer satisfaction and loyalty.

The perceived usefulness and ease of use of internet banking have also been studied. Poon (2007) examined the adoption of internet banking from the perspective of Malaysian consumers. The study found that the convenience and accessibility of internet banking contribute to its adoption.

Moreover, the impact of external factors such as the COVID-19 pandemic on internet banking adoption has been explored. Sudarsono et al., (2020) investigated the effect of the pandemic on the adoption of internet banking in Indonesia. The study found that the perceived usefulness, ease of use, trust, subjective norm, and attitude significantly influence customers' intention to adopt internet banking.

Additionally, the relationship between service quality dimensions and customer satisfaction in internet banking has been examined. Rod et al., (2009) conducted a study on the relationship between service quality dimensions, overall internet banking service quality, and customer satisfaction. The study found significant relationships among online customer service quality, online information system quality, banking service product quality, overall internet banking service quality, and customer satisfaction.

Overall, the data presented in the table reflects the increasing adoption of internet banking among the SACCOs over the years. The growth rates vary among the different SACCOs, with some experiencing significant increases in internet banking usage, while others show relatively slower growth. These trends highlight the changing preferences and behaviors of SACCO members towards digital banking services.

It is important to note that the data provided in the table only represents the number of internet banking users and does not provide information on the specific services or transactions conducted through internet banking. Further research and analysis would be required to understand the specific usage patterns and the impact of internet banking on the operations and performance of these SACCOs.

4.3 Trendline analysis

Table 2: Linear Equations

Mobile Banking			Internet Banking	
Year	Linear	R ²	Linear	R ²
2018	$y = -931.44x + 14554$	$R^2 = 0.5599$	$y = -239.21x + 4173.7$	$R^2 = 0.5683$
2019	$y = -1067.8x + 17189$	$R^2 = 0.5963$	$y = -424.61x + 7008.2$	$R^2 = 0.7006$
2020	$y = -1293.2x + 21380$	$R^2 = 0.6314$	$y = -678.75x + 11226$	$R^2 = 0.7377$
2021	$y = -1440.8x + 24469$	$R^2 = 0.6698$	$y = -865.75x + 14351$	$R^2 = 0.7489$
2022	$y = -1640.4x + 28315$	$R^2 = 0.6779$	$y = -1020.4x + 17190$	$R^2 = 0.7821$

The linear equations are in the form of $y = mx + b$ (1)

where:

y represents the dependent variable (financial performance).

x represents the independent variable (mobile banking).

m is the slope of the line, which indicates the rate of change of y with respect to x.

b is the y-intercept, which is the value of y when x is equal to 0.

On the other hand, R² (Coefficient of Determination) column provides the R-squared (R²) value for each regression model. R² is a measure of how well the independent variable(s) in the model explain the variability in the dependent variable. It ranges from 0 to 1, with higher values indicating a better fit of the model to the data.

In 2018, the linear equation for mobile banking usage is $y = -931.44x + 14554$, with an R^2 value of 0.5599. This equation suggests that the mobile banking usage decreased by 931.44 units per year, starting from a base value of 14,554. The R^2 value of 0.5599 indicates that approximately 55.99% of the variance in mobile banking usage can be explained by the linear equation.

In 2019, the linear equation for mobile banking usage is $y = -1067.8x + 17189$, with an R^2 value of 0.5963. This equation suggests a similar trend as in 2018, with a decrease in mobile banking usage by 1067.8 units per year, starting from a base value of 17,189. The R^2 value of 0.5963 indicates that approximately 59.63% of the variance in mobile banking usage can be explained by the linear equation.

In 2020, the linear equation for mobile banking usage is $y = -1293.2x + 21380$, with an R^2 value of 0.6314. This equation suggests a further decrease in mobile banking usage by 1293.2 units per year, starting from a base value of 21,380. The R^2 value of 0.6314 indicates that approximately 63.14% of the variance in mobile banking usage can be explained by the linear equation.

In 2021, the linear equation for mobile banking usage is $y = -1440.8x + 24469$, with an R^2 value of 0.6698. This equation suggests a continued decrease in mobile banking usage by 1440.8 units per year, starting from a base value of 24,469. The R^2 value of 0.6698 indicates that approximately 66.98% of the variance in mobile banking usage can be explained by the linear equation.

In 2022, the linear equation for mobile banking usage is $y = -1640.4x + 28315$, with an R^2 value of 0.6779. This equation suggests a further decrease in mobile banking usage by 1640.4 units per year, starting from a base value of 28,315. The R^2 value of 0.6779 indicates that approximately 67.79% of the variance in mobile banking usage can be explained by the linear equation. This suggests a moderately good fit of the model to the data.

Internet Banking

In 2018, the linear equation for internet banking usage is $y = -239.21x + 4173.7$, with an R^2 value of 0.5683. This equation suggests that the internet banking usage decreased by 239.21 units per year, starting from a base value of 4,173.7. The R^2 value of 0.5683 indicates that approximately 56.83% of the variance in internet banking usage can be explained by the linear equation.

In 2019, the linear equation for internet banking usage is $y = -424.61x + 7008.2$, with an R^2 value of 0.7006. This equation suggests a similar trend as in 2018, with a decrease in internet banking usage by 424.61 units per year, starting from a base value of 7,008.2. The R^2 value of 0.7006 indicates that approximately 70.06% of the variance in internet banking usage can be explained by the linear equation.

In 2020, the linear equation for internet banking usage is $y = -678.75x + 11226$, with an R^2 value of 0.7377. This equation suggests a further decrease in internet banking usage by 678.75 units per year, starting from a base value of 11,226. The R^2 value of 0.7377 indicates that approximately 73.77% of the variance in internet banking usage can be explained by the linear equation.

In 2021, the linear equation for internet banking usage is $y = -865.75x + 14351$, with an R^2 value of 0.7489. This equation suggests a continued decrease in internet banking usage by 865.75 units per year, starting from a base value of 14,351. The R^2 value of 0.7489 indicates that approximately 74.89% of the variance in internet banking usage can be explained by the linear equation.

In 2022, the linear equation for internet banking usage is $y = -1020.4x + 17190$, with an R^2 value of 0.7821. This equation suggests a further decrease in internet banking usage by 1020.4 units per year, starting from a

base value of 17,190. The R^2 value of 0.7821 indicates that approximately 78.21% of the variance in internet banking usage can be explained by the linear equation.

Table 3: Inter-Item Correlation Matrix

	Fintech Effectiveness_mobile_banking	Fintech Effectiveness_Internet_banking
Fintech Effectiveness_mobile_banking	1.000	.419
Fintech Effectiveness_Internet_banking	.419	1.000

Correlations between items or variables in a dataset can be visualized using an Inter-Item Correlation Matrix. There are three columns in this matrix, each representing a different type of banking convenience: "Fintech Effectiveness on mobile banking," and Fintech Effectiveness on Internet banking." Correlation coefficients between these factors are shown.

The values of correlation coefficients are on a scale from minus one to plus one, where:

If the variables are strongly linearly related and move in the same direction, then the correlation coefficient will be 1. There's a strong linear association between the variables even if they move in opposing directions, as indicated by a correlation value of -1, which denotes a perfect negative correlation. There's no linear relationship between the variables if the correlation coefficient is 0.

Comparison of mobile banking's Fintech efficiency to that of Internet banking's Fintech effectiveness: 0.419.

Secondly, Fintech Effectiveness of mobile banking to Fintech Effectiveness of Internet banking (0.419): A good and moderate association exists between "Fintech Effectiveness of mobile banking" and "Fintech Effectiveness of Internet banking," as indicated by the correlation value of 0.419. That's why it's not surprising that successful DT- SACCOs in the realm of mobile banking are equally successful in the realm of online banking. The moderate relationship between these two variables shows that there may be commonalities or synergies that contribute to the success of both mobile and online banking.

Stangor, C., & Walinga, J. (2019) suggest that a correlative study cannot be used to infer causality. The linear link between the variables is the sole type of relationship captured by the correlation coefficients. Further analysis and research is needed to demonstrate causal linkages or to understand the underlying reasons for these correlations. Correlation coefficients must be interpreted carefully, taking into account both the overall context and the particular variables being examined.

5.0 SUMMARY

The present chapter provides an overview of the study's outcomes concerning the assessment of the "Effect of Fintech on the financial performance of DT-SACCOs. A case of Meru County." The study variables, mobile banking, and internet banking, are presented in a systematic manner.

Both mobile banking and internet banking show an increasing trend in usage over the years, as indicated by the coefficients for the year variable in the linear equations. The R^2 values for both mobile banking and internet banking indicate that the linear equations can explain a moderate to strong proportion of the variance in usage.

The R^2 values suggest that the linear equations provide a reasonable level of predictability in both mobile banking and internet banking usage based on the year. Internet banking generally has higher R^2 values compared to mobile banking, indicating a slightly stronger relationship between the year and usage in internet banking.

Through internet banking, monetary transactions may be processed, transactions can be reconciled, and account activity can be verified. Certain industries possess traditional modes of distribution or unique requirements that cannot be catered to by digital banking services. The adoption of internet banking may be hindered by apprehensions regarding cyber security and potential breaches of sensitive information. Certain individuals exhibit a preference for in-person meetings with their banking associates in order to receive tailored and individualised service. Certain individuals exhibit a preference for conventional banking methods such as physical branches or engaging in dialogue with bank representatives. The advent of internet banking has allowed the institution access to new forms of indirect income. In addition to keeping their deposits safe, internet banking also helps banks get new consumers and customers are kept as a result of the bank's efficient service delivery via internet banking.

5.1 Conclusions

Effect of Mobile banking on financial performance of deposit-taking SACCOs

Maleko, Liheta, Aikaruwa, Lukas, & Sumari (2013) opines that the implementation of mobile banking technology holds significant promise for enhancing the financial performance of Savings and Credit Cooperative Organizations (SACCOs), which are financial institutions that receive deposits from their members. The potential for deposit-taking Savings and Credit Cooperatives (SACCOs) to leverage mobile banking technology may yield favourable outcomes for the financial performance of the institution. The utilization of mobile banking technology has the potential to enhance the operational efficiency, expand the customer outreach, and elevate the level of member contentment for SACCOs.

According to Millan, Kamau, & Ibua, (2023), one of the primary benefits of mobile banking for SACCO members is the enhanced convenience it provides. Savings and Credit Cooperatives (SACCOs) can enhance their membership base by providing convenient access to diverse financial services through mobile technology. The potential outcome of an enlarged membership base is an increase in deposit inflows, thereby enhancing the liquidity position of SACCOs.

SACCOs can save money by using mobile banking because it improves transaction efficiency and decreases operational costs. SACCOs can streamline their operations and reduce the amount of time spent on routine tasks by providing members with the option to make deposits, withdrawals, and transfers electronically. The implementation of this automated system reduces costs and improves productivity.

In addition, Mugo (2019) argues that mobile banking makes financial services more accessible by facilitating interaction with customers who may have trouble visiting brick-and-mortar branches. To increase their potential clientele, Savings and Credit Cooperatives (SACCOs) might expand their service areas to reach previously unreached areas and underserved populations. This increased availability has the potential to foster the expansion of SACCOs and have a beneficial effect on their economic efficiency.

To properly address the security concerns of mobile banking, according to Omino (2014), Savings and Credit Cooperatives (SACCOs) are essential. These worries can be allayed and trust amongst members by implementing effective security measures, disseminating information about potential threats, and updating security policies on a regular basis.

In conclusion, SACCOs that take deposits stand to benefit from the implementation of mobile banking technologies. By taking advantage of mobile banking's accessibility, efficiency, and ease of use, SACCOs may boost member engagement, attract new consumers, and streamline their operations. However, strong security measures must be implemented as a top priority to protect customers' personal data and inspire confidence in mobile banking.

5.2 Effect of Internet banking on financial performance of deposit-taking SACCOs

The provision of internet-based banking services is a challenging endeavour, as it is impeded by several factors such as inadequate client awareness, slow internet speeds, insufficient internet banking alerts, limited market penetration, low customer responsiveness, and customer illiteracy. Additional obstacles encompass inadequate market reach, insufficient consumer engagement, and limited consumer literacy. Although internet banking offers numerous benefits, it also introduces novel security risks for financial institutions. Due to intense competition and the swift pace of technological progress, financial institutions are compelled to allocate substantial financial resources towards the development and maintenance of their online banking infrastructure. The heightened level of convenience offered by online banking is concomitant with an escalation in the vulnerability of client data to potential compromise Tadesse (2016).

There are obstacles to overcome in the transition to the use of internet banking. Research by Oye & Sarjiyus (2019) supports that one of the foremost obstacles of online banking pertains to upholding the security and confidentiality of customer data and transactions, thereby raising concerns regarding privacy. Online banking systems are exposed to considerable risks from cyber threats, including identity theft, hacking, and phishing. It is imperative for SACCOs to adopt stringent security measures, encryption protocols, and authentication methods to ensure the protection of customer data and deter unauthorized access. Also, the operational success of internet banking is largely dependent on the reliability of its technological infrastructure, which encompasses servers, networks, and software systems. The occurrence of disturbances or technical malfunctions within these systems may lead to service interruptions, inaccuracies in transactions, or temporal lags. It is imperative for SACCOs to allocate resources towards establishing dependable and adaptable technological infrastructure in order to guarantee uninterrupted and seamless provision of online banking services.

The lack of awareness and comprehension of the hazards and optimal procedures linked to online banking may be prevalent among numerous customers. Phishing attacks and social engineering tactics frequently leverage users' deficient knowledge, inducing them to disclose sensitive data. It is imperative for SACCOs to allocate resources towards user education initiatives aimed at augmenting customer awareness and advocating for secure online banking practices. The utilization of internet banking also necessitates that patrons possess dependable internet connectivity and appropriate technological devices, such as computers, smartphones, or tablets. The adoption of online banking services may be hindered by inequalities in internet connectivity and access, particularly in areas that are remote or underserved. The widespread availability of dependable internet connectivity is imperative for the achievement and inclusiveness of online banking.

The provision of technical support and customer service is a crucial aspect of internet banking. Despite the convenience it offers, customers may face technical challenges or require clarification on their online banking transactions. It is imperative for financial institutions to offer comprehensive technical assistance and customer service avenues to ensure timely resolution of customer concerns and challenges. The provision of customer support that is both prompt and effective is of utmost importance in establishing credibility and upholding customer contentment. In addition, Internet banking is subject to a multifaceted regulatory framework that endeavours to safeguard the welfare of customers and forestall financial malfeasance. Financial institutions are

obligated to adhere to a multitude of regulations, such as those pertaining to safeguarding data, preventing illicit financial activities, and verifying the identities of their clients. The fulfilment of regulatory obligations imposes an extra level of intricacy and expenditure on internet banking operations.

The potential financial gains associated with internet banking platforms make them an appealing target for fraudsters and cybercriminals, resulting in increased incidents of fraud and cybercrime. It is imperative for financial institutions to maintain a constant vigilance in detecting and identifying fraudulent activities, adopt sophisticated fraud prevention mechanisms, and impart knowledge to their clientele regarding prevalent fraudulent schemes and scams. The perpetual challenge for SACCOs that offer internet banking services is to remain ahead of the constantly evolving cyber threats. Kaabachi, Ben Mrad, & Petrescu, 2017 argued the establishment and maintenance of trust and confidence in internet banking services are pivotal factors for customer adoption and retention. In order to foster trust among customers with respect to the safety and integrity of their financial transactions carried out via internet banking channels, it is imperative for SACCOs to exhibit transparency, reliability, and security.

To tackle these obstacles, a comprehensive strategy is necessary, encompassing technological innovations, stringent security protocols, and client instruction, adherence to regulatory standards, and on-going surveillance and enhancement of digital banking platforms. Through effective management of these challenges, financial institutions can fully leverage the capabilities of online banking to offer customers convenient, secure, and dependable financial services.

REFERENCES

- Ahmed, E. M. (2021). *An empirical assessment of adoption and innovation of the portable banking technology in Kenya*. *Indian Journal of Finance and Banking*, 8(1), 13-31.
- Chumba, J. C. (2015). *The Effect of Mobile Banking on the Financial Performance of Commercial Banks in Kenya (Doctoral dissertation, University of Nairobi)*.
- Cui, W., Kobau, R., Zack, M. M., Buelow, J. M., & Austin, J. K. (2015). *Recent changes in attitudes of US adults toward people with epilepsy—results from the 2005 Summer Styles and 2013 Fall Styles surveys*. *Epilepsy & Behaviour*, 52, 108-118.
- Daka, C. G., & Phiri, J. (2019). *Factors driving the adoption of e-banking services based on the UTAUT model*. *International Journal of Business and Management*, 14(6), 43-52.
- Donou-Adonsou, F. (2019). *Technology, education, and economic growth in Sub-Saharan Africa*. *Telecommunications policy*, 43(4), 353-360.
- Erman, C. (2017). *Financial technologies effect on financial services from an open innovation perspective*. *Journal of the econometric society*, 59(2), s68-83.
- Kaabachi, S., Ben Mrad, S., & Petrescu, M. (2017). *Consumer initial trust toward internet-only banks in France*. *International Journal of Bank Marketing*, 35(6), 903-924.
- Le, T. D., & Ngo, T. (2020). *The determinants of bank profitability: A cross-country analysis*. *Central Bank Review*, 20(2), 65-73.

- Le, T. D. (2021). *The roles of financial inclusion and financial markets development in financial technology credit: evidence from developing countries. International Journal of Block chains and Crypto currencies*, 2(4), 339-349.
- Maleko, G. N., Liheta, B. S., Aikaruwa, D., Lukas, A., & Sumari, G. A. (2013). *Women participation in microfinance institutions of Tanzania: the case of savings and credit co-operative societies (SACCOS). Journal of Business Administration and Education*, 4(2).
- Marcu, M. R. (2021). *The impact of the COVID-19 pandemic on the banking sector. Management Dynamics in the Knowledge Economy*.
- Millan, E. N., Kamau, C. G., & Ibia, M. P. (2023). *Effect of Mobile Banking Technology on Loan Performance of Deposit Taking Savings and Credit Cooperative Organisations in Mombasa County, Kenya*.
- Mugo, D. M. (2019). *An Empirical Investigation on the Effect of Mobile Banking Services on Financial Performance of Deposit-Taking SACCOS in Kenya. International Journal of Applied Business and Information Systems*, 3(1), 28-39.
- Musango, D. M. (2018). *Mobile banking services and financial inclusion among commercial Banks in Nairobi city county, Kenya (Doctoral dissertation, School of Business In Partial Fulfilment of the requirements for the award of Masters of Business Administration Degree (Management Information Systems), Kenyatta University)*.
- Ndung'u, N. (2019). *Digital technology and state capacity in Kenya. Washington, DC*.
- Ndung'u, N. S. (2019). *Taxing mobile phone transactions in Africa: Lessons from Kenya*.
- Obeng, F. K., Gumah, S., & Mintah, S. (2019). *Farmers' perceptions of information and communication technology (ICT) use in extension service delivery in Northern Region, Ghana. Ghana Journal of Science, Technology and Development*, 6(1), 21-29.
- Omino, P. A. (2014). *Liquidity risk mitigation measures and financial performance of savings and credit co-operative societies (Saccos) in Kisumu County-Kenya (Doctoral dissertation, University of Nairobi)*.
- Oye, N. D., & Sarjiyus, O. (2019). *Online Security Framework for e-Banking Services: A Review. International Research Journal of Innovations in Engineering and Technology*, 3(2), 6.
- Rathee, G., Sharma, A., Kumar, R., Ahmad, F., & Iqbal, R. (2020). *A trust management scheme to secure mobile information centric networks. Computer Communications*, 151, 66-75.
- Raza, S. A., Umer, A., Qureshi, M. A., & Dahri, A. S. (2020). *Internet banking service quality, e-customer satisfaction and loyalty: the modified e-SERVQUAL model. The TQM Journal*, 32(6), 1443-1466.
- Stangor, C., & Walinga, J. (2019). *3.5 psychologists use descriptive, correlational, and experimental research designs to understand behaviour. Introduction to Psychology*.
- Tennant, J. P., Agrawal, R., Baždarić, K., Brassard, D., Crick, T., Dunleavy, D. J., & Yarkoni, T. (2020). *A tale of two'opens': intersections between Free and Open Source Software and Open Scholarship*.