

**CREDIT RISK MANAGEMENT PRACTICE, TECHNOLOGICAL INNOVATION AND
FINANCIAL PERFORMANCE OF DEPOSIT-TAKING SACCOS IN KENYA**

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**A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF COOPERATIVES AND
DEVELOPMENT IN PARTIAL FULFILLMENT FOR THE AWARD OF THE DEGREE
OF MASTER OF CO-OPERATIVE MANAGEMENT, AT THE CO-OPERATIVE
UNIVERSITY OF KENYA.**

SEPTEMBER, 2024

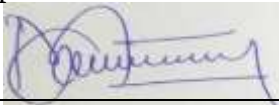
DECLARATION

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DEDICATION

This piece is dedicated to my brother, George Kipkemboi, whose journey from modest origins, both in terms of education and finances, serves as a tribute to the formidable strength of persistence

ACKNOWLEDGEMENT

Foremost, I thank the almighty God for his love, grace, and protection throughout my studies. Special thanks to my supervisors Dr. Gweyi Moses and Dr. Ngala Michael for their exceptional support, guidance, exposure, and training, without whom this work would not be what it is. I would also like to acknowledge Shirika DTS and Mhasibu Sacco Society Limited.

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LIST OF ABBREVIATIONS AND ACRONYMS

ATM	Automated Teller Machine
CBK	Central Bank of Kenya
CEO	Chief Executive Officer
DT	Deposit Taking
MFIs	Microfinance Institutions
NPL	Non-Performing Loans
ROA	Return on Assets
ROE	Return on Equity
ROI	Return on Investment
SASRA	Sacco Society Regulatory Authority
SMEs	Small and Medium Enterprises

SPSS: Statistical Package for Social Sciences

UN: United Nations

WOCCU: World Council of Credit Union

OPERATIONAL DEFINITION OF TERMS

Credit Monitoring	This is a strategy used by DT Saccos to supervise the payment of credits, communicating with customers for purposes of ensuring credit payments on time to reduce delayed payments and minimize defaults. The study measures the variable using loan repayments, client activities, collection period, and creditworthiness.
Credit Policy	This is a document detailing the organization's procedure in granting loans to its target customers that help in loan issuance to deserving customers. Measurement of the variable will be based on; standards of credit, collection methods, customer qualification, and credit terms.
Credit Risk Management	This includes all procedures, controls, and systems used by an organization to enable efficient payment of credit facilities to reduce the chances of non-repayment. The variable will be measured using credit score, credit policy, and monitoring.
Credit Risk	This is the likelihood that customers who access credit may fail to repay their obligation either fully or partially according to the terms of the agreement hence leading to bad debt and affecting financial performance
Credit Score	This is the assessment of customers to establish their ability to repay the loan before loan approval. The study intends to measure the variable using the behavioral score, fraud, collection score, and application score.
Deposit Taking Saccos	These are financial institutions that are member-owned engaging in mobilization of savings through voluntary contributions by the members.
Financial Performance	This is the ability of DT Sacco to achieve its objectives in the most efficient and cost-effective way. The study will measure this variable using return on equity.
Technological Innovation	This consists of modern technologies that are used by financial institutions to reduce costs and enhance financial performance while minimizing risks. The study

will measure the variables through; ATM, internet banking, loan securitization, and mobile banking.

ABSTRACT

Effective credit risk management is crucial for minimizing the likelihood of default and maintaining financial stability in Savings and Credit Cooperative Societies (SACCOs). Although there have been attempts to regulate the situation, the overall proportion of loans that are not being repaid on time compared to the total loans given by Deposit-Taking SACCOs (DTs) in Kenya has increased since 2013. At the same time, these SACCOs have not been meeting the requirements for having enough capital, as well as complying with the Sacco Societies Act of 2008 and SASRA regulations. A significant number of DTs still face difficulties in fulfilling their immediate financial responsibilities, especially when it comes to distributing loans. The main aim of this study was to examine how credit risk management strategies and technological innovation impact the financial performance of Deposit-Taking SACCOs in Kenya. The study specifically examined the effects of credit scoring, credit rules, and credit risk monitoring techniques, with technology innovation acting as a moderating factor. The collection of primary data involved surveying 122 credit officers from 122 DTs across Kenya, using a standardized questionnaire consisting of closed-ended questions. Secondary data was obtained from journals, books, audited yearly reports published by SASRA, government publications, and SACCO websites. To establish the reliability and validity of the instrument, a pilot test was conducted with 12 respondents from 12 DTs, assessing content, expert, and face validity, with reliability determined using Cronbach's alpha. The data analysis was conducted using descriptive statistics, correlation analysis, and multiple regression, with the assistance of SPSS version 29 and Excel. Diagnostic tests, such as multicollinearity, normality, heteroskedasticity, and autocorrelation, were performed to verify the assumptions of the linear regression model. The study found that effective credit scoring and robust credit policies significantly enhance the financial performance of Deposit-Taking SACCOs in Kenya. Respondents indicated strong agreement on the importance of credit score assessments in understanding customer repayment tendencies, with a mean score of 4.28 (SD = 0.79). Additionally, a structured credit scoring system positively influenced loan approval processes (mean score: 4.14, SD = 0.77), while the collection credit score process was essential for monitoring borrower behavior (mean score: 4.06, SD = 0.80). The findings underscore that by leveraging effective credit assessment practices and clear credit policies, SACCOs can improve operational efficiencies, manage risks more effectively, and enhance financial outcomes.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter highlights the significance of Savings and Credit Cooperative Societies (SACCOs) in enhancing financial inclusion and socioeconomic development, particularly following the 2007-2009 global financial crisis. It addresses the challenges faced by Deposit-Taking SACCOs (DTs) in Kenya, focusing on issues such as non-performing loans and fluctuating financial metrics. Additionally, the chapter sets the stage for examining the importance of credit risk management practices and the impact of technological innovation on the financial performance of DTs.

1.1. Background of the Study

The global crisis of 2007-2009 brought the attention of the cooperative movement as an alternative to credit solutions (Bernardi et al., 2022) hence receiving worldwide recognition due to their contribution in economic development and welfare of their members. (Kimutai, 2022) adds that with 200 million global membership and 55,959 financial cooperatives, the sector has continued to make significant contribution to socio-economic development of their host countries

Additionally, the cooperative societies have enhanced member prosperity through savings mobilization and provision of credit services (Mburu, 2023). The cooperative movement strong principles and values are naturally aligned to the UN 2030 sustainable development goals (Ezzahid & Elouaourti, 2021) evidenced in their focus on micro lending which has essential impact on their members by promoting financial inclusion. The performance of savings and credit cooperatives is therefore important for their continued provision of services to the members as well as enhancing socio-economic growth of the countries where they operate.

The cooperative sector impact has been felt in Ecuador where they provide members in the rural areas with financial services hence contributing to eradication of poverty (Escobar et al., 2023), employment creation by 29.4%, meeting 33% of unsatisfied needs at the national level and promoting financial inclusion . In Philippines, the cooperative movement plays important role in

poverty alleviation where 18,848 cooperatives employ 396,300 with a total membership comprising of 11.5 million as at 2020 (Malacora et al., 2023). However, performance of these cooperatives has been affected by financial crisis of 2007-2009, natural disasters such as Super Typhoon Yolanda in 2013 and the Covid 19 which affecting their net surplus, gross income and dividend in 2013. These Saccos have however proved resilient and have been able to improve their performance due to member trust, confidence as well as service quality (Malacora et al., 2023).

In the last 40 years, (Ademba, 2021) observes how the cooperative movement in Africa has exhibited a formidable force in the continent's economic transformation where one of the key functions of the cooperative has been to provide financial services thereby reaching lowincome members of the population. This requires Saccos to be effective and efficient in mobilization of funds, transaction cost management and performance measurement for continued service provision. An observation of Rwanda, cooperative sector by Nsengiyumva and (Lame et al., 2024) indicates how the country has a long-term objective of economic transformation to a midterm income economy hence adopted economic recovery strategies where Saccos have been established under Umurenge Sacco program to enhance financial access which increased from 42% in 2012 to 68% in 2016. However, the Saccos have recorded increased non- performing loans of 8.2% in 2015-2016 thus presenting risk to financial performance. Despite government intervention on supervision, trainings, seminars and employment of qualified workers, non-performing loans have been very high exceeding recommended 5% by the Bank of Rwanda (Nabwire, 2023)

In Uganda, Saccos emerged in 2007 as a community based financial institutions to support economic development of the rural population, the poor and the vulnerable. The establishment of the Saccos was due to public outcry for a cheaper alternative and more friendly financial service (Marango, 2023). Despite the government support to 735 Saccos since establishment, there were only 39% Saccos in operation by 2017 which were located in central and western parts of the country (Buwule & Mirember, 2017) while saccos in Kampala region according to KCCA

Ministerial Policy Statement, (2018), are struggling financially due to political interference, corruption and inadequate supervision (UDN, 2019) with the biggest failure rate in Nakawa division where many have stopped their operations (Muliira, 2021).

According to SASRA (2019), the deposit taking Saccos in Kenya were 175 who were engaged in savings mobilization, credit provision and demand deposits. The sector recorded increased performance in 2019 with growth in total asset reaching Ksh 556.71 billion (2019) from Kshs 495.25 billion (2018) indicating 12.41% increase where loan was one of the major assets. However, three Deposit taking Saccos did not meet financial obligation hence revocation of their license while some experienced loan repayment challenges which had effect on their capital

1.2 Technological Innovations

The dynamics in the business environment evidenced in massive information flow, globalization, hypercompetition and changing consumer preference require flexibility, tactful and swift reaction to overcome market challenges and enhance financial performance. Organizations response to business environment however, is dependent on consistent flow of information with accuracy which may be generated through information technology (H. Li et al., 2021).

(Taques et al., 2021) define innovation as the development of new process, products, ideas and making improvements to existing products and services. (Steil et al., 2021) adds that technological innovation is the introduction of novel methods and discoveries. It is the incorporation of finance and technology to create new financial instruments aimed at reducing costs while minimizing risks. Technological innovation is the planning, execution and development of desired financial instruments that incorporate creativity and innovation within the financial industry (Hussain & Papastathopoulos, 2022). Technological innovation are techniques used by financial institutions to guarantee effective and efficient services as well as enhancing service delivery (Javaid et al., 2022). Technological innovation is the incorporation of information and communication technology in the development of products, services and new processes .

Technological innovation has been conceptualized into automated teller machine, mobile and internet banking. Technological innovation is a complex phenomenon that is composed of multiple subsystems that are related to an entity for purposes of achieving objectives (Arabiun et al., 2023). The conceptualization of technological innovation has also been made by Eze as mobile technology such as handheld devices and portable computers that are used by organizations in their communication and business transaction while Wang adds that cloud computing enhances an organization's efficiency in e-commerce leading to more sales.

Technological innovation has influence on an organizational performance due its ability to enhance performance (Chen et al., 2021) enabling the improvement of service quality and productivity. Additionally, technological innovation has the advantage of reducing cost therefore leading to profitability and risk (Temel & Durst, 2020). Technological innovation plays essential role through satisfaction of human needs, creating solutions to societal problems, supporting corporate goals, socio-economic and enabling organizations to attain competitive advantages (Alshukri et al., 2024). Technological innovation has enhanced financial inclusiveness, improving convenience and financial service availability. However, the technological innovation has also resulted to enhances credit information sharing, reporting and supervision hence introducing high risk customers (Zheng et al., 2022).

(Zheng et al., 2022) adds that the financial industry is engaging in partnership with Fintech organizations to discover new ways of using modern technologies; block chain, big data and cloud computing to enhance customer experience. The cooperative industry is also taking advantage to incorporate technological innovation in mobile banking, digital marketing, member portal development, ATM service provision, agency services, new distribution channels and mobile application. The financial industry has also adopted technological innovation to reduce transaction cost, introduce new products, credit cards, ATM, loan securitization, credit card scoring automation and record keeping (Onyango, 2021). The author adds that technological innovation has played critical role in enhancing financial performance of Meru County financial institutions

through the use of ATM, internet banking and mobile banking (Wilter, 2023). However, technological innovation may result to financial loss if there is a high number of customers who fail to repay in time hence leading to credit problems (Qualid et al., 2022). The study will measure technological innovation using ATM, member portal, mobile banking, internet banking, loan securitization as the measurements have been used within the Sacco industry as essential technological innovations and determinants of financial performance.

1.3 Financial Performance

Financial performance has been defined by Fahmi (2014) as the ability of an organization to realize its objectives efficiently and the management's ability to enhance the conditions of an organization's financial health by planning for its achievement in meeting its obligations. Financial performance is necessary to determine economic changes of an organization and resources needed to enable the organization control its future. Financial performance is not only useful to the management but the company owners, creditors and potential investors (Purnama et al., 2020).

Financial performance is the ability of the organization to generate profits necessary for its continuity and to enable stakeholders obtain information they need to support investment decisions. Financial performance has an effect on the survival of the organization and demonstrates the ability of the management to efficiently use organizational resources to achieve the objectives as well as indicating how well the organization is utilizing its resources to produce revenues in a specific period (Meiyana & Aisyah, 2019).

Financial performance has been conceptualized into; profit measured in form of return on assets (Hamdani & Suharti, 2022), return on equity, net profit margin, operating profit margin and gross profit margin (Maisharoh & Riyanto, 2020). Financial performance in the banking industry has been measured in terms of capital adequacy, profitability, liquidity and asset quality (Noreen et al., 2018). Additionally, banks in Tehran financial performance were measured by Abdellahi et al (2017) using profit and total sales, while Badawi (2017) indicated net profit margin as the

measurement of financial performance (Bimbin et al., 2019). In the cooperative sector, financial performance is measured in terms of gross loans, total deposits and total assets (SASRA, 2022). Return on equity has been suggested by Barauskaiet and Streitmikiene (2021) as essential measurement of financial performance hence has been used by investors in deciding which companies to invest with. De Lucia et al., (2020) added that ROE has been used by many businesses globally to determine their success hence a faster approach used in determining financial performance by shareholders (Hussain et al., 2022). This study will measure financial performance using ROE based on its previous application and adopting by investors in financial performance measurement.

1.4 Credit Risk Management

Credit provision is one of the core activities of financial institutions that enables the generation of income. However, credit facilitation involves huge risks to the borrower and the lender as there is a risk of borrower default and at the same time, financial institutions may utilize savings from client to issue loans thus subjecting the client's savings at risk. With borrower default, there may be huge losses not only for the financial institution but to the entire financial industry and economy. Credit risk therefore, arises due to uncertainty connected with loan repayment of the borrower as he/she may fail to honor the commitment to repay the loan according to the agreement (Akomeah, 2020). Credit risk is the threat that a borrower may default and fail to honor the obligation thereby partially or fully pay the debt according to the agreement (Salas & Saurina, 2002). Credit risk is one of the financial risks incurred by financial institutions due to the nature of their business activities. Iwedi and Onuegbu, (2014) suggest that financial institutions may reduce their credit risks through feasibility and profitability analysis not only for their business but for the entire industry (Al Zaidanin & Al Zaidanin, 2021). Credit risk has been considered into two perspectives by Olugboyega et al., (2019); the first perspective is due to failure of the organization to carry out adequate investigation of customer loan requests while the second perspective is the customer

hidden agenda which may not be known by the organization hence leading to non-payment of the interest and principal. Credit risk management therefore helps in reducing the chances of credit risk and hence improving performance of an organization.

Credit risk management consists of strategies used by financial institutions to determine the possibility of borrower default on loan obligation hence a crucial indicator of performance (Lalon & Morshada, 2020). Credit risk management are procedures, systems and controls put in place by an institution to ensure efficiency in payments to minimize the likelihood of nonpayment (Kalui & Kiawa, 2015). Credit risk management policies are based on decision making to support reduction in credit risk exposure which begins at the identification stage including examination and prediction of potential risk, being able to analyze current and future risks such as asset management, credit worthiness of potential borrowers, determining repayment sources as well as customer credit history (Kimotho & Gekara, 2016). Additionally, credit appraisal is done including screening of customers to ensure they have the ability to make timely payments and enabling deeper understanding of the borrower hence prioritization of risks and control measures (Aduda & Obondy, 2021).

The conceptualization of credit risk has been made by Mudanya et al (2022) as credit scoring, loan default monitoring, credit policies and procedures (Natufe & Evbayiro-Osagie, 2023). Credit risk management concepts have been identified by Mutai and Opuodho (2021) as credit granting process and credit monitoring and control. Nthiwa (2021) conceptualized credit risk management into; delinquency rate, distance to default and value at risk while Muringi and Maina (2021) highlight the dimensions of credit risk management as credit information sharing, appraisal guidelines, collateralization and loan monitoring. This study will measure credit risk management inform of; credit scoring, credit policy and credit monitoring. The concepts have been recommended by the Sacco Society Regulatory Authority as essential in credit risk management practices that Saccos should adopt in their credit risk management (Sacco Society Regulatory Authority, 2015). Credit scoring is a credit risk management technique that assesses customer

credit worthiness of loan application based on the probability of default using past data. It may be used subjectively through expert input or by a loan officer for qualitative judgement or it may be based on quantified features according to customer profile. The benefit of credit scoring is enhanced loan uptake, customer satisfaction and determination of loan products based on risk (Vidal & Barbon, 2019). Credit scoring is used by financial institutions to analyse past records of clients using statistical techniques to generate scorecard.

The scorecards are however, based on data used and the type of information needed. Scorecard elements are; application score card used in the assessment of credit risks and credit worthiness with a period of 3-6 months review. Behavioral score card is also used to examine the borrower behavior in relation to the payment of credit hence enabling the understanding of customer behavior based on previous events (Thomas et al., 2001) hence comprehending potential risk and customer needs. This analysis requires 2 years hence classifying customer as good (non-defaulter) or bad (defaulter). Collection scorecard has also been used to analyse the potential risk related to recovery of outstanding debt that may be experienced in the near future while fraud scorecard helps in the identification of any fraudulent activities by the applicant and warns the lender (Bolton & Hand, 2002) based on the previous experience thereby decreasing any loss that may be incurred (Ahmed & Rajaleximi, 2019). The study will measure credit score card based on; application score card, behavioural, fraud and collection score card.

The second element of credit risk management is credit policy which is a blue print document used by financial institutions to guide its lending to target customers, enabling the organization to avoid giving out loans to customers who may not be able to repay their loans. The policy consists of guidelines, credit applications and credit checks which have direct effect on organizational financial performance due to cash flow. Credit policy should not be too strict to prevent customers from accessing credit as it may reduce loan applications hence affect financial performance. It should also not be too liberal to attract slow payment accounts that may result to non-performing loans. The policy helps in value maximization when adjustments are made on credit terms,

standards and collection efforts (Moma, 2019).

Credit policy enhances the lenders confidence in extending credit to customers and minimizing risks and improving internal structures for credit approvals. Additionally, credit policy outlines collection process, customer qualification and customer delinquency methods, payment terms and how the organization may reduce bad debt as well as credit period determination. Credit policy may enhance liquidity and profitability when conceptualized into; inventory control, management of payments, credit structure and receivables management (Azman & Ramakrishnan, 2021). The study intends to measure credit policy through; credit standards, credit terms, collection methods and customer qualifications based on previous application by Azman and Ramakrishnan (2021) and Moma (2019).

Credit monitoring is the third dimension of credit risk management which is a continuous process undertaken to supervise monthly credit payment, reaching out to customers to avoid delayed payments or failing to pay according to agreement. Credit monitoring helps in reducing bad debt risk and enabling timely payment of credit (Mulyadi, 2016). Credit monitoring is done to take preventive measures on bad debt (Purnama et al., 2020) and to keep an eye on the customers for guaranteed loan repayment. Credit monitoring has been conceptualized into; assessment of client's activities, credit worthiness, loan repayment (Wafula et al., 2020). The study will measure credit monitoring using; credit worthiness, client activities and loan repayment.

1.5 The Deposit Taking Saccos in Kenya

The Deposit Taking Sacco sub-sector plays critical role in contributing to the government's vision 2030, supporting socio-economic development, creating employment and financial empowerment to the Kenyan population. Deposit Taking Saccos (DT) are member owned enterprises united voluntarily to meet the needs of their members guided by the cooperative principles and values (Wanjiru & Jagongo, 2022).

The Sacco Society Regulatory Authority (2023) indicates that the cooperative movement in Kenya

is organized into three groups based on the intermediation, structure and regulatory policy. The DT Saccos fall under the financial intermediation registered to carry out intermediation business such as credit issuance, deposit mobilization and loan facilities. The operations of the DT Saccos are regulated under the cooperative societies act and Sacco societies act. As at 31st December 2022, there were 176 DT Saccos in Kenya categorized into three depending on their total assets. The large tier DT Saccos are 42 holding a total asset of KShs 5 billion and above. The medium tier totaled to 56 with a total asset of KShs 1 billion to 5 billion while the small tier DT Saccos hold total assets of below KShs 1 billion. The total membership of the DT Saccos was 4.85 million as at December 2022 with a total asset of KShs

763.50 billion which translates to 85.76%. The DT Sacco also recorded gross loans of KShs 586.16 billion and customer deposits of KShs 522.59 billion. The sector was able to give returns to its members at 10.41% which was considered higher than the previous year of 9.44% (SASRA, 2023).

The performance of the DT Sacco has been fluctuating evidenced in the growing dormant membership which was 1,076,033 in 2020 and rose to 1,091, 295 in 2022. The declining membership denies the sector opportunity for more deposits needed to support loan issuance to its members. Additionally, the financial performance of the sector between the year 2016-2021 has not been stable having started with ROA at 2.45% in 2016, rising to 2.69% in 2017 and reducing to 2.40% in 2018. The 2020-2021 return on assets went up to 2.60%, 2.65%. However, there was a decline to 1.59% in 2021 (SASRA, 2021).

Declining performance was also witnessed in revenue growth which started at 14.60% in 2016 and went down to 14.08% in 2017, the year 2018 saw a further decline to 2.54%. Even though it rose to 23.57% in 2019, there was a sharp decline to 7.7% (2020). The sector has also experienced poor performance in non-performing loans coming from 5.23% (2016) to 8.86% in 2021 which is considered beyond the threshold recommended by WOCCU (5.0%) and SASRA (3.0%) (Ombati et al., 2023).

1.6 Statement of the Problem

Globally, cooperative financial institutions play a critical role in fostering financial inclusion, economic empowerment, and social development. However, their financial sustainability is often threatened by the prevalence of non-performing loans (NPLs) and insufficient credit risk management practices. Studies in various contexts highlight the importance of effective credit risk management in maintaining profitability and financial stability. For instance, Malacora et al. (2023) analyzed credit cooperatives in the Philippines and found that financial sustainability was positively linked to outreach performance but did not examine how credit risk management practices contribute to mitigating risks associated with loan defaults.

In sub-Saharan Africa (SSA), cooperative financial institutions, including SACCOs, are vital in bridging financial inclusion gaps, particularly among underserved populations. However, studies like Nsengiumva and Harelimana (2020) in Rwanda found that while loan management practices improved financial outcomes, broader credit risk management strategies were not thoroughly explored. In Kenya, Deposit-Taking SACCOs (DTS) are essential in achieving socio-economic development, serving over 4.85 million members and contributing significantly to the government's Vision 2030. Despite their importance, the financial performance of DTS has been unstable, evidenced by rising dormant memberships, fluctuating return on assets (ROA), and increasing levels of NPLs. For example, between 2016 and 2021, ROA fell from 2.45% in 2016 to 1.59% in 2021, while NPLs exceeded the WOCCU recommended threshold of 5.0% and SASRA's 3.0% threshold, reaching 8.86% by 2021 (Ombati et al., 2023; SASRA, 2022).

Existing research in Kenya has explored aspects of credit risk management but reveals critical gaps. Etenyi, Nelima, and Maingi (2024) focused on traditional credit risk management practices such as loan monitoring, credit appraisal, and diversification. However, they did not consider the role of emerging financial technologies, such as credit scoring algorithms and data analytics, in enhancing risk management. Furthermore, their findings were generalized across SACCOs without accounting for variations in size, governance structures, or market segmentation, which could significantly influence the effectiveness of these practices.

Similarly, Kariuki (2017) examined the impact of credit risk management practices on financial performance but did not address the operational challenges specific to SACCOs or the rapidly changing economic conditions affecting these practices. Moreover, the study failed to assess the sustainability of credit risk management strategies over time, leaving a gap in understanding how SACCOs can adapt to

evolving risks. These gaps reveal a lack of a comprehensive understanding of how traditional credit risk management practices can be effectively integrated with emerging financial technologies to enhance SACCO financial performance. This study addresses these gaps by investigating the interplay between traditional practices, innovative technologies, and contextual factors such as SACCO size and governance. The findings will contribute to a more actionable and tailored credit risk management framework for DTS in Kenya.

1.7 General Objective

The general objective of the study is to investigate the impact of credit risk management practices and technological innovation on the financial performance of the Deposit-Taking SACCOS in Kenya.

1.8 Specific Objectives

- i) To determine the effect of credit scoring on financial performance of Deposit Taking Saccos in Kenya.
- ii) To establish the effect of credit policy on the financial performance of Deposit-Taking Saccos in Kenya.
- iii. To examine the effect of credit monitoring on the financial performance of Deposit Taking Saccos in Kenya.
- iv. To establish the moderating effect of technological innovation on the relationship between credit risk management and financial performance of Deposit Taking Saccos in Kenya.

1.9 Research Hypothesis

- i.H₁ Credit scoring has a significant effect on the financial performance of Deposit-Taking SACCOS in Kenya
- ii.H₂ Credit Policy has a significant effect on the financial performance of Deposit-taking SACCOS in Kenya
- iii.H₃ Credit Monitoring has a significant effect of the financial performance of Deposit-Taking SACCOS in Kenya

iv.H₄ Technological innovation significantly moderates the relationship between credit risk management practices and the financial performance of Deposit-Taking SACCOS in Kenya.

1.10 Justification of the Study

The study is based on credit risk management practices and its influence on deposit taking Sacco financial performance. The findings may benefit the policy makers to determine policy improvement on performance of the sector. The policy makers may use the findings to recommend best practices in credit management such as credit scoring, enhancement of credit policy as well as improved credit monitoring thereby enhance financial performance.

The Sacco sector may incorporate the findings in their management practices for purposes of improving financial performance. The management may also use the results to train employees on different techniques of credit monitoring as well as refine credit policies to enhance financial performance. The management may also use the findings to create awareness to their members thus improve loan recovery for more financial performance. The results may be used by future researchers to identify research topics, make reference and build their scholarly works.

1.11 Scope of the study

The study will be investigating credit management risk and financial performance of Deposit Taking Saccos in Kenya. The researcher will be limited to 176 Deposit Taking Saccos licensed to carry out financial intermediation as at 31st December 2022. The Study will also be limited to three groups of Saccos; large tier, medium and small tier which will be categorized according to the groups. The study will be limited to three variables; credit risk management which will be the independent variable with three sub-variables; credit scoring, credit policy and credit monitoring. The dependent variable will be financial innovation while the moderating variable will be limited to technological innovations. The study year will be 2024.

1.12 Limitation of the Study

This study was conducted in Nairobi County, Kenya, and focused on collecting primary data from senior management employees of Deposit-Taking SACCOs. The data collection process relied on self-

administered questionnaires distributed during working hours. However, the study faced several challenges. First, the response rate was low due to the busy schedules of senior management employees. To mitigate this issue, the researcher engaged with respondents to determine the most convenient times for completing the questionnaires, allowing participants more flexibility to provide their responses.

Second, some respondents were hesitant to participate due to concerns about victimization. To address this, the researcher disclosed the academic purpose of the study, secured the necessary approvals to support public data collection, and assured participants of anonymity and confidentiality. These measures helped build trust and confidence, ultimately improving the response rate.

Despite these efforts, the study's findings may be limited by its reliance on self-reported data and its focus on Nairobi County, which might affect the generalizability of the results to other regions. Future research could address these limitations by expanding the geographical scope to include other counties and employing mixed methods to complement primary data with secondary sources for a more comprehensive analysis.

CHAPTER TWO LITERATURE REVIEW

2.1. Introduction

The chapter will review theories within the study framework and highlight their application in the research. Specifically, signaling, agency and regulation innovation theories will be considered in this study. the chapter will also review previous empirical literature to identify the methods, findings and gaps that will inform the direction in the current study.

2.2. Theoretical Review

Two theories will be considered; agency theory and its application within the Sacco sector, signaling theory will enable the understanding on how Saccos are sourcing for information signals to enhance their financial performance while regulation innovation theory will enable the understanding of the moderating variable-technological innovation theory.

2.2.1. Signaling Theory

(Spence, 1974) proposed signaling theory suggesting that the conditions of an organization may be known based on information signals hence financial data provided by the management acts as information to stakeholders thereby supporting decision making. (Marshall et al., 2015) adds that signaling theory helps in providing the right signals due to information asymmetry that exists between the management and investors. (Lutfiana et al., 2021) notes that information signal may have positive effect to the recipient regarding business performance. Information signals may be received in different formats; notes, descriptions, reports, future or current condition (A'yun & Coryanata, 2024).

Signaling theory may be used by deposit taking saccoes to undertake due diligence in loan applicants to minimize risks. (Jarmalavičius et al., 2012) add that credit policies may be used to reduce risk and undertaking credit monitoring to identify information signals of bad loans hence the application of the theory in credit risk to determine non-performing loans (Muriithi et al., 2024).

The study will use signaling theory to analyse credit risk management adopted by Deposit Taking Saccos to identify information signals thereby enhance decisions related with loan application. The theory will also enable the understanding of credit monitoring where organizations engage with clients through communication and customer activities to detect signals of potential defaults that may reduce financial performance. Signaling theory will enable the understanding of the dependent variable where financial statements will enhance the identification of information signals related with performance such as profitability increase, total assets, gross loans and total deposits. this theory will therefore be used to analyse both the dependent and independent variable.

2.2.2. Agency Theory

Jensen and Meckling (1976) proposed agency theory where Clarke (2004) modified the theory by including different groups of stakeholders. The theory addresses the relationship existing between the owners and the agents by viewing two lines between the owners and the agents with the main

role of the agent being to support the realization of the wishes of the principal (Masudza, 2023).

Berle and Means (1932) indicate that the agents have different interests as management gives priorities to their interest which affects the relationship. The theory believes that even though the agents should focus on fulfilling the interest of the principal, they may seek their own interest hence acting against the principal which ultimately reduces benefits to the shareholders.

The management should aim to increase the benefit to the owners by adopting effective strategies in credit management to enhance financial performance. The owners therefore enforce rules to minimize the risk while maximizing shareholder value (Afifawati et al., 2023).

The theory has been applied in the cooperative business where the members are the owners while the management and the control are rested on elected board members (Lennah & Bett, 2023). The theory may be used by the Sacco management to develop credit policies that guides the management in the operations of the institution for the interest of the investors (Masudza, 2023). The study will use the theory to analyse credit policies that have been adopted by the management on behalf of the principal to safeguard the activities of the Sacco by minimizing credit risks that may reduce interest income to the principal. The theory will also be used to analyse how the owners are undertaking credit monitoring to minimize costs associated with non-performing loans hence increase financial performance.

2.2.3. Regulation Innovation Theory.

(Keenan et al., 1998) are believed with pioneering Regulation Innovation Theory. This theory examines financial innovation through the lens of past economic progress. The theory proposes that financial innovation connects with social regulation closely, and it is a regulation transformation that has mutual influence and mutual causality with economic regulation.

In 1982, Scylla argued that it is challenging to foster financial innovation in an economy with strict government control, as well as in a completely free-market economy. Therefore, any changes resulting from regulatory reforms in the financial system can be considered as financial innovation. When government intervention and management restrict financial activities, various forms of financial innovation emerge to bypass or eliminate these controls. This creates a continuous cycle of control and innovation between the market and the government.

This theory suggests that financial innovation has been greatly expanded, and that government regulation is also seen as a source of innovation in finance. Regulatory innovation is considered to be a part of financial innovation. The theory specifically applies to the laws and regulations that are used to limit financial innovation. Because financial regulation hinders financial innovation, rules and laws that are seen as representative of financial regulation should be the focus of financial reform and innovation (Keenan et al., 1998). This theory will be used to analyze technological innovation.

2.3. Empirical Review

This section reviews previous studies within the research concepts, highlighting methodologies, and findings and indicating gaps that will be addressed in the current study.

2.3.1. Credit Scoring and Financial Performance

Credit scoring has been used in the United States to evaluate consumer behavior, capabilities, and their financial resources (Larsson, 2018). A comparative study by Hohnen et al., (2021) on the US and Denmark credit score systems determined the creditworthiness of consumers in the big data age. The study considered document analysis from public and business resources, ethnography, interviews, and online discussion targeting 21 consumers who were affected by credit scoring in 2017-2018. For Denmark, secondary data was obtained from lending organizations. The results showed that the US was using FICO system to generate credit score summary of consumer credit hence assessed their creditworthiness in granting loans. This platform required recent information, payment history, delinquency and amount owed. For the Denmark, scoring was used to identify potential defaulters instead of their creditworthiness hence a blacklist of defaulters (Hohnen et al., 2021). This study was a comparative of two countries. The current study will not be making comparison.

Machoka and Jagongo (2020) observe how Kenyan banks have been experiencing poor

financial performance due to lack of credit information of potential loan applicants. The authors assessed how credit scoring was influencing commercial banks' performance in Kenya using descriptive research design. The target population consisted of 43 commercial banks that were in operation as of 31st December 2015. Due to the small number of the population, a census study was adopted with purposive sampling to identify respondents. A semi-structured questionnaire was used to obtain responses. Secondary data included total non-performing loans, total assets, total loans, and advances. Multiple linear regression was used to analyze the data. The findings revealed that banks were undertaking credit scoring to establish potential defaulters. The credit scoring coefficient was ($\beta=0.164$, $p \text{ value}=0.02$) indicating a significant effect on bank performance. The study concluded that credit scoring enhances the decision-making of financial institutions hence higher returns on investment. This study targeted commercial banks adopting the census method. The current study will consider Deposit deposit-taking SACCOS and incorporate samples from the population thereby reducing weaknesses that come with census studies.

The performance of financial institutions is dependent on effective credit scoring management to generate interest income (Njeru et al., 2016). An assessment of the relationship between loan performance and credit scoring was done by Ndero et al. (2019) targeting 31 commercial banks in Eldoret town, Uasin Gichu County. The Yamane sampling formula enabled the generation of 128 credit officers from a population of 189. Simple random sampling was used to identify credit officers. Primary data was obtained using a questionnaire while secondary data was obtained from Central Bank of Kenya financial reports and audited financial reports from commercial banks. Descriptive statistics was used to analyze the data using SPSS. Karl Pearson analyzed the relationship between the variables. Percentages, frequency tables, standard deviations and mean were used in the presentation of the findings. The results showed that credit scoring techniques used were; the 5Cs credit appraisal model and credit reference bureau where 78.1% of the institutions were using credit score. It was found that 76% of respondents were checking historical

information on their customers' capacity to repay the loan their character and collaterals. This study narrowed down to Eldoret town. The current study will take a broad approach to DT Saccos in Kenya hence broadening the findings.

Credit institutions have been using credit scoring for reliable credit processes to measure and minimize risks (Saygili et al., 2019). The authors analyzed credit scoring factors affecting SME performance using multiple regression. Data was obtained from Turkey's credit-scoring institutions from 2012 through 2016 which included 125 SMEs. Secondary data involved financial ratios, company and intelligence information while credit score was measured using risk scores and limits of the financial instruments. Credit score was rated 1-12 where 1 was viewed as the best rating and consumers who scored in this range were given all their requested funding. Those who scored 13-15 had 60% while above 16 scores were rejected.

The results showed that large shareholders, firm age, number of employees, and exports had a significant effect on credit scores. The findings indicated that deficit, cash surplus, and current ratio had significant effects on the credit score of SMEs. It was concluded that financial institutions should apply credit scoring systems diligently to allocate resources to deserving SMEs while also minimizing credit risks (Saygili et al., 2019). This study used credit score as a dependent variable and found a significant effect. The current study will incorporate credit score as an independent variable to determine if there is any significant effect on financial performance.

2.3.2. Credit Policy and Financial Performance

A descriptive study was done by Gichuki (2023) to determine the financial performance of cooperatives due to credit policy adoption. The study targeted 15 Deposit Taking Saccos based in Nyeri Central Sub County where 90 respondents were identified. A census study was used as a result of the small population. Purposive sampling was considered to identify the CEO, credit managers, and four members of the Sacco executive's board. An introduction letter was obtained, pilot study test and expert opinion were sought.

The results showed that the reliability test was 0.783 which was considered high reliability.

Regression findings demonstrated that Saccos had good loan repayment as well as a collection policy. It was found that the guarantee policy improved loan recovery chances and reduced loan defaults. The study noted that collections policy had a significant effect on financial performance and there was a significant relationship between credit policy and financial performance. This study targeted only 15 DT Saccos. The current study will raise the number of participating DT Saccos.

Jordanian banks have developed a solid credit policy thereby providing safety in realizing profitability (Abdulnafea et al., 2022). The authors purposed to establish credit management policy determination of the financial performance of Banks in Jordan using 62 banks that were listed on Jordan's stock exchange (2017-2020). Multiple linear regression was used in hypothesis testing. Financial performance was measured in ROI while credit policy was determined using the average collection period, rate of the institution in returning deposits, and equity ratio to risky assets. SPSS aided the analysis. The results indicated that credit policy accounted for a 41.8% difference in financial performance. It was found that credit policy had a moderately significant relationship. The findings showed that the bank's equity ratio was significant to financial performance. This study had a different target population and was based in Jordan. The current study will target DT Saccos in Kenya to establish if credit policy is significant to financial performance despite the different geographical locations.

Fidelis and Umoffong (2020) investigated how credit policy affected the financial performance of companies in Nigeria where ex-post factor research and correlation study were adopted to establish the relationship between the variables. The population consisted of 304 companies where 15 firms engaged in food and beverage were identified using the Yamane formula. Secondary data was obtained from financial statements in the period 2016-2019. Independent variable was measured using average collection period, debt to equity ratio, and cash conversion

cycle while financial performance was measured using ROA. Multivariate regression was used in analyzing data.

The findings showed that companies were taking 193 days to convert their stock to cash. It was revealed that 39.4% of credit policy accounted for changes in financial performance, and credit policy determined financial performance significantly. The study concluded that companies should put in place policies that indicates organizations priorities of financial performance. Credit policy was found to have a significant effect when food and beverage companies were targeted in Nigeria (Fidelis & Umoffong, 2020). The current study seeks to establish if DT Saccos in Kenya are the target population, would there be any significant effect of credit policy on financial performance?

Deposit Taking Saccos should put in place credit management policies aimed at efficient loan collections for risk minimization (Kipkoech, 2015). An analysis by Muhunga et al. (2020) targeted Saccos in Mid-Western Uganda to find out how credit policy affected financial performance using a cross-sectional research design. The study generated 93 Saccos from a population of 122 using the Yamane (1973) sampling formula. Stratified random sampling enabled the identification of a representative sample. A self-administered semi-structured questionnaire was used to obtain responses. Linear regression was used to analyze the relationship between the variables. Credit policy was measured using collection policies, credit terms, credit appraisal, granting decisions, and credit risk control. A five-point Likert scale was used. The results showed that there was a moderate, positive, and significant relationship between financial performance and credit policy ($r=.48$, $p \text{ value}=0.00$). The study indicated that credit policy accounted for financial performance by 23% with the conclusion that financial performance may be enhanced through effect of credit policies.

2.3.3. Credit Monitoring and Financial Performance

An investigation by Mohamed (2023) on industrial bank's credit management influence on financial performance considered correlation research to establish the relationship between credit monitoring and financial performance. The study targeted banks located in Mogadishu where branch managers, tellers, credit administrators, analysts, and loan officers were involved to generate a sample of 65 respondents. The closed-end questionnaire was used to obtain responses. Descriptive and inferential statistics enabled data analysis. The results showed that banks were extending credit collection periods to enhance loan recovery. Financial institutions were also using litigations on defaulters. Credit monitoring had a positive and significant relationship with financial performance. However, the study found that there was inadequate credit monitoring by the banks. This study was done in Mogadishu and found inadequacy in credit monitoring by the banks. The current research will seek to find out if there are inadequacies in credit monitoring by Deposit Taking Saccos in Kenya.

Non-performing loans consist of loans granted that do not result in interest income for 30 days. Non-performing loans demonstrate the financial performance of an organization through decreased percentage of bad loans (Stuti & Bansal, 2017). Credit monitoring may be used to keep vigilance on consumers for effective loan repayment (Agresti et al., 2017). An investigation by Wafula et al., (2023) on credit monitoring effect on loan nonperformance involved 48 microfinance institutions based in Nairobi County using correlation research.

Stratified sampling was adopted to generate 128 respondents from 192 populations. A five-point Likert scale was used to collect feedback. The findings showed that there exists a weak correlation between the variables where credit monitoring accounted for 24.8% of the variation in NPL. Credit monitoring had a negative significant effect on non-performing loans of MFIs.

The study indicated that credit monitoring practices were client orientation, review of credit documentation to determine credit limits and there was reporting of client behavior. However, respondents rated low that organizations were conducting background checks concerning clients

before granting loans. This study established inadequacies in background checks among MFIs in Nairobi County. The current study will seek to establish if there is any inadequacy in credit monitoring among DT Saccos in Kenya.

Credit monitoring is used by financial institutions to enforce compliance with existing agreements (Protase, 2022). The author investigated credit monitoring among commercial banks in Uganda to determine the influence on the performance of the Centenary Bank- Kabale branch. The study used a cross-sectional research design that targeted 40 staff and 163 consumers. Simple random sampling aided the identification of respondents. The closed-end questionnaire was used to obtain responses. Credit monitoring was measured using communication channels and credit standards while financial performance was measured using profitability, innovation, portfolio growth, and customer retention. SPSS aided the analysis. Voluntary participation was sought while respondents' protection and anonymity were observed.

The results indicated that Centenary Bank was building the capacity of the credit team to enhance reviews. It was found that the bank was able to reliably collect information to determine credit standards. There was a positive and strong relationship with the financial performance on Centenary Bank where credit monitoring accounted for 20.9% of financial, performance. This study was a case study that limited the generalization of the findings to other populations (Protase, 2022). The current study will incorporate multiple organizations hence allowing generalization of the results into other populations.

Credit monitoring decreases loan delinquencies and losses hence there needs to be a close relationship between financial institutions and borrowers to identify problems with potential loan defaults (Ongeri et al., 2021). The authors evaluated how financial performance was affected by credit monitoring among banks in Kisii County. A descriptive research design was adopted that targeted 122 employees of 15 commercial banks. Crejje and Morgan's sample size table was used to generate 92 respondents. The stratified sampling technique enabled the grouping of respondents in selected banks. The study operationalized credit monitoring using CBK guidelines,

written loan collection policies, and stringent collection processes while financial performance was measured using ROA.

The study used a five-point Likert scale. Cronbach alpha was used to test reliability while content and expert validity enabled the determination of validity of the instrument. Descriptive analysis and multiple regression aided data analysis with the assistance of SPSS. The study found that inspection was done by internal control units on each loan. It was found that banks were adhering to CBK guidelines to effectively recover the loans. There were regular reviews of banks' policies to adjust to circumstances. The study found that 81.3% of credit monitoring accounted for financial performance with a strong relationship between the variables (Ongeri et al., 2021). The study targeted banks in Kisii County. The current study will be based in a different geographical location.

2.3.4. Credit Risk Management Practices, Technological Innovation and Financial Performance

Emerging technologies have a positive influence on bank performance (Agaba et al., 2022) where credit risk may be minimized using cloud computing and blockchain. An investigation by Murtaza et al. (2023) sought to find out the moderating effect of technological innovation on credit risk management targeting Pakistani banks where simple random sampling was used to identify respondents. A self-administered questionnaire was distributed to 320 respondents. Internal consistency was tested using Cronbach's alpha while discriminant and convergent validity aided in determining the validity of the instrument. The results showed that there exists a significant moderating effect of technological innovation in the relationship between credit risk and market risk. This study tested the moderating role of technological innovation using credit risk and market risk. The current study will analyze how technological innovation affects the relationship between credit risk management and financial performance.

An investigation by Aruan et al. (2022) analyzed the moderation effect of technological innovation on financial performance while incorporating the corporate governance of banks in Indonesia. Secondary data was collected from the Indonesian Stock Exchange where four groups of banks were involved leading to the selection of 10 banks. Time series data was used where the stock return was the dependent variable while the independent variable was non-performing loans, market return, interest rate, and exchange rate. Normality and multicollinearity tests were done. The results showed that technological innovation had a moderating effect on ROA. It was found that technological innovation mitigated the influence of NPL on stock returns. The findings revealed that Indonesian banks had incorporated technological innovation in payments, crowdfunding, and back-office management. This study used secondary data only and considered corporate governance. The current study will incorporate primary data and adopt credit risk management as the independent variable.

A study by Lutfiani (2021) determined to analyze the moderating effect of technological innovation on the performance of companies in Central Java, Indonesia. The target population consisted of Syariah Center members where data was obtained from 2015-2018. Financial performance was measured using ROA while capital adequacy was determined using CAR. Descriptive statistics enabled the analysis of primary data. Mean, standard deviation, minimum, and maximum were used in the presentation of the findings. Multicollinearity, normality, and autocorrelation tests were done. The findings showed that technological innovation was significant in moderating the relationship between capital adequacy and profitability. This study targeted companies in Indonesia. The current study will be based in a different geographical location.

2.4. Critique of the Research Gaps

Different studies have been undertaken within the study concepts. For instance. Hohnen et al. (2021) did a comparative study on the US and Denmark to assess credit worthiness of consumers. This study however was based on comparative findings that could not be applied

To other contexts. Saygili et al (2019) study targeted small and medium enterprise credit scoring by financial institutions. This study had a different target population of SMEs thus the finding of a significant effect of credit score on the target population. Machoka and Jagongo's (2020) study was based on commercial banks' credit scoring and how it affected their financial performance in Kenya. Even though the study was done in a similar geographical location to the current study, the target population was commercial banks which is a contrast to Deposit Taking Saccos in Kenya. Ndero et al. (2019) focused on commercial banks in Eldoret which was based on a small scope as compared to the current study that will extend the scope by investigating Deposit Taking Saccos in Kenya.

Abdulnafea et al (2022) study considered a different population of commercial banks in Jordan and established a moderate relationship existing in credit policy and financial performance. Fidelis and Umoffong (2020) however focused on Nigerian consumer goods while Muhunga et al (2020) investigation targeted Saccos in the Mid-Western part of Uganda. Even though Gichuki's (2023) study targeted DT Cooperatives in Kenya, the study narrowed its investigation to Neri Central Sub County working with only 15 DT Saccos.

A credit monitoring study was done by Mohamed (2023) where Mogadishu banks consisted of the target population while Wafula et al (2023) considered MFIS in Nairobi County as the main population of interest. Protase (2022) analyzed credit monitoring strategies and performance of Centenary Bank in Uganda which was basically a case study while Ongeru et al. (2021) investigation was centered around banks in Kisumu County.

The moderation effect model of technological innovation was done by Murtaza et al (2023) targeting banks in Pakistan while Aruan et al. (2022) incorporated corporate governance, financial performance, and the moderating role of technological innovation of banks in Indonesia. Lutfiani (2021) study was based on companies in Central Java- Indonesia where the moderation effect of technological innovation on performance was investigated. These studies

Had different findings due to diversity in the variables that were used, the geographical location, sampling methods, research design, data collection tools, and the target population. There is less information on studies on credit risk management and financial performance of Deposit Taking Saccos in Kenya which the current study will undertake.

2.5. Summary of Literature Review and Research Gaps

This section highlighted previous literature where the author, objective, and study results were indicated. The section also identified emerging research gaps and the focus of the study in addressing the gaps as indicated in Table 2.1.

Table 1 Summary of Literature Review and Research Gaps.

Author/s	Objective	Findings	Gaps	Focus
Gichuki (2023)	Credit policy and performance of Savings and Credit Cooperatives in Nyeri County.	The collection policy has a significant effect on financial performance.	Targeted 15 DT Saccos	To increase the number of DT Saccos.
Mohamed (2023).	Approaches of credit management and industrial bank's financial performance.	There was insufficient credit monitoring by banks in Mogadishu	Was based in Mogadishu.	Will target financial institutions in Kenya.
Murtaza et al. (2023)	The moderating role of technological innovation on credit risk monitoring in the Pakistan banking sector.	Technological innovation has a moderating effect on the relationship between the variables.	Considered credit risk and market risk.	Consideration will be made on credit risk and financial performance.
Wafula et al., (2023)	Credit monitoring and loan nonperformance of MFIs in Nairobi County.	There is a weak relationship between credit monitoring and loan performance.	Used loan performance. Targeted MFIs.	To target DT Saccos.

Abdulnafea et al. (2022)	Credit policy and financial performance of banks in Jordan.	There is a moderate relationship between credit	Targeted banks in Jordan.	To target cooperatives in Kenya.
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		Policy and performance of Banks.		
Aruan et al., (2022)	The moderation effect of technological innovation on the relationship between corporate governance and financial performance.	Technological innovation mitigates the effect of NPL on stock returns.	Only secondary data was used.	To incorporate primary data.
Protease (2022)	The influence of credit monitoring and performance of Centenary Bank in Uganda.	Credit monitoring determines financial performance significantly.	Case study of one bank in Uganda.	To incorporate multiple Saccos.
Hohnen et al., (2021)	A comparative study of the creditworthiness of the US and Denmark in the age of big data.	A credit score is used to determine credit worthiness of consumers and potential defaulters.	Comparative study of Denmark and the US.	Will not be comparative.
Lutfiani (2021).	The role of technological innovation as a moderating variable in the performance of Indonesian companies.	Technological innovation moderates the correlation between capital adequacy and profitability.	Indonesian-based companies consisted of the target population.	The current study will be based in a different geographical location.
Ongeri et al. (2021).	Credit monitoring and the performance of commercial banks based in Kisii County.	There is a strong correlation between credit monitoring and commercial banks' performance.	The population involved commercial banks located in Kisii County.	To be based in Kenya targeting all Deposit Taking Saccos.

Fidelis and Umoffong (2020)	Credit policy and financial performance of food and beverage companies in Nigeria.	Credit policy significantly influences financial performance.	Targeted SMEs in Nigeria.	Will consider Deposit Taking Saccos in Kenya.
Machoka and Jagongo (2020).	Performance of commercial banks regarding credit score	Credit score has a significant effect on a commercial bank's performance.	The target population was commercial banks.	Will target Deposit Taking Saccos.
Muhunga et al. (2020)	Credit management policy and Savings and Credit Cooperatives' financial performance in Uganda.	Credit policy has a moderate relationship with financial performance.	Targeted Saccos in Uganda.	To target Saccos in Kenya.
Saygili et al. (2019)	Credit scoring and SME performance	Cash surplus has a significant effect on SMEs' credit scores.	Credit score was used as the dependent variable.	To use credit score as the independent variable.
Ndero et al., (2019)	Credit score and performance of banks based in Eldoret.	A credit score is determined by analysis of customer historical data.	Limited the study location to Eldoret Town.	To widen the scope of the study by incorporating DT Saccos in Kenya.

Source: Research (2024)

2.6. Conceptual Framework

The conceptual framework is developed to illustrate the relationship between the study variables. The study has three variables; the independent variable is credit risk management which is conceptualized into; credit scoring, credit policy, and credit monitoring. The dependent variable-financial performance was operationalized into; total assets, total deposits, gross loans, and profitability while the moderating variable is technological innovation ATM, mobile.

Banking, loan securitization, and internet banking. Figure 2.1. presents the conceptual framework.

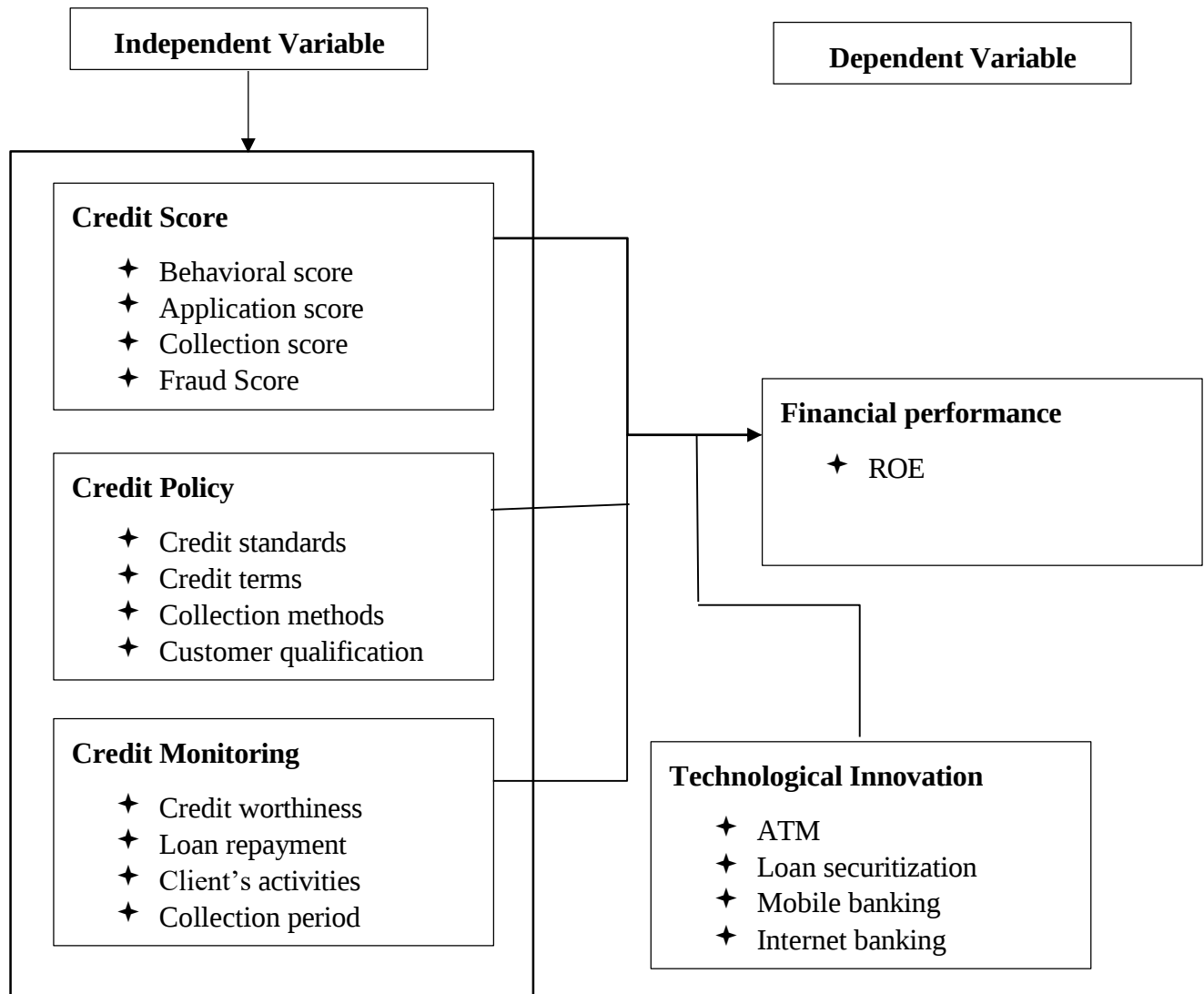


Figure 1 Conceptual Framework

Source: Research (2024)

2.7 Credit Score

Credit scoring is a fundamental tool that ensures financial stability by supporting informed decision-making within a business. Behavioral scores a measure of credit scoring, evaluate members' financial habits and repayment histories, these are crucial for predicting the future creditworthiness of the customers. This allows cooperatives and businesses to manage credit risk

effectively, raising questions about how well these scores can forecast member behavior in times of financial stress. Application scores on the other hand play a vital role in assessing the risk associated with new members. This process prompts consideration of how cooperatives can refine their evaluation criteria to better screen applicants and avoid potential defaults. Collection scores, which assess the likelihood of recovering overdue payments, are key in managing delinquency rates. This raises the important issue of how cooperatives can improve their debt recovery strategies to maintain liquidity. Finally, fraud scores are essential for spotting and stopping dishonest behavior so guaranteeing the integrity of transactions and member confidence. This opens a more general conversation on how cooperatives may improve their fraud detection systems to safeguard their financial resources. These credit-rating instruments used together create a whole framework that not only answers important concerns but also improves cooperatives' general financial situation.

Within the field of cooperative administration, credit scoring is a basic instrument guaranteeing financial stability and guiding smart decision-making. Predicting future creditworthiness depends critically on behavioral scores, which assess members' financial practices and debt histories. This helps cooperatives properly control credit risk, which begs issues about how well these numbers predict member behavior under financial strain. Derived from the first credit application, application scores are quite important in determining the risk related to new members. This approach invites thought on how cooperatives may improve their evaluation standards to screen candidates more effectively and prevent possible defaults. Key in control of delinquency rates are collection ratings, which evaluate the possibility of recovering past-due payments. This brings forth the crucial question of how cooperatives may strengthen their debt recovery plans to keep liquidity. Finally, fraud scores are essential for spotting and stopping dishonest behavior and safeguarding member confidence and transaction integrity. This opens a more general conversation on how cooperatives may improve their fraud detection systems to safeguard their financial resources. These credit-rating instruments used together create a whole framework that not only answers important concerns but also improves cooperatives' general financial situation.

2.8 Credit Policy

Forming the foundation of good financial management, credit policy is a collection of rules applied to decide how credit is granted, handled, and guaranteed timely payback. Evaluating the creditworthiness of possible borrowers depends on credit standards, which demand a careful review of an applicant's debt obligations, present income, and financial background. These criteria are essential for separating high-risk people while still giving credit to those who fit the required criteria, so sparking continuous debates on how to improve these criteria to fit member demands and changing economic conditions (Johnson & Smith, 2023). Complementing this, credit terms specify the particular terms under which credit is granted, including interest rates, repayment schedules, and late payment penalties. Clear, fair terms can inspire regular payments and build trust between the lender and borrower, so these terms are not just legal obligations but also instruments for controlling borrower behavior. Recent studies underline the need to customize these parameters to the financial capacity of members so that they are neither either liberal nor too strict (Doe & Lee, 2022). Maintaining the liquidity and profitability of the company depends critically on collection techniques, which are the tactics and procedures used to recover exceptional debts. All of these must be carried out with an eye on maintaining the member relationship, effective collection methods include timely communication, flexible repayment choices, and, when needed, legal action. Early engagement and tailored repayment programs are part of a proactive approach to debt collection that greatly increases recovery rates and lowers the general risk of bad debt, according to studies (Brown & Green 2023). At last, customer qualifying is a thorough process that determines whether an application satisfies credit requirements, therefore transcending mere assessment of financial soundness. It requires knowing the member's whole long-term credit needs, risk tolerance, and financial behavior. This step is vital for ensuring that credit is extended only to those who are both capable and committed to repayment, thereby protecting the organization's financial health. In recent years, there has been a growing emphasis on using advanced analytics and machine learning algorithms

to enhance customer qualification processes, making them more accurate and predictive (White & Black, 2024). Together, these measures form a robust credit policy framework that not only mitigates risk but also supports the sustainable growth of the organization.

2.9 Credit Monitoring

Credit monitoring is a critical process that ensures the credit extended to members is managed effectively and that risks are minimized. It involves continuously assessing the financial stability and reliability of customers, ensuring that their ability to repay loans remains consistent over time. This process is essential for identifying any changes in a member's financial situation that might affect their ability to meet their obligations, thereby allowing Sacco to take preemptive measures to mitigate potential risks (Johnson & Miller, 2023). Also, Loan repayment monitoring is important for enhancing the overall loan repayment rate. By tracking payments closely, Sacco can quickly identify and address any repayment issues, offering support or restructuring options to members who may be struggling. This approach not only improves loan recovery but also strengthens the relationship between Sacco and its members (Doe & Smith, 2022). Client activities are also monitored to ensure that members' financial behaviors align with their loan agreements and that they remain in a position to meet their repayment schedules. Regular monitoring of these activities allows Sacco to detect any potential issues early, such as changes in income or spending habits that could lead to repayment difficulties. This proactive approach helps maintain timely repayments and reduces the likelihood of defaults (Brown & Green, 2023). Additionally, the collection period of credit is carefully monitored to minimize the risk of non-payment. By keeping a close watch on the duration of outstanding loans, Sacco can implement targeted strategies to encourage prompt repayments, such as reminders or adjusted payment plans, thereby reducing the incidence of overdue loans and maintaining healthy cash flow (White & Black, 2024). Together, these monitoring practices form a comprehensive approach to credit management, ensuring that Sacco remains financially sound while supporting its members effectively.

2.10 Technological Innovation

Technological innovation refers to the introduction and application of new technologies that

significantly enhance the efficiency, security, and accessibility of services within an organization. In the financial sector, technological innovations such as ATM technology, mobile banking, internet banking, and loan securitization have been studied for their moderating effects on various financial processes. For instance, research has shown that ATM technology provides a secure platform for accessing granted credit facilities, raising questions about how effectively it enhances security in credit access (Smith & Johnson, 2023). Mobile banking has been found to significantly improve the convenience of accessing member funds, prompting inquiries into how it influences members' ease of accessing their funds and overall satisfaction (Doe & Lee, 2022). Internet banking has been identified as a critical tool in providing customer information that aids in credit management, leading to discussions on how well it supports decision-making in credit management processes (Brown & Green, 2023). Lastly, studies on loan securitization suggest that it plays a pivotal role in enhancing financial performance by moderating the relationship between asset quality and financial outcomes, raising the question of how effectively loan securitization contributes to financial performance improvements (White & Black, 2024).

These studies use technological innovation as a moderating variable to explore how advancements in technology (ATM, mobile banking, internet banking, and loan securitization) influence the relationship between core financial operations and outcomes. For example, in the context of ATM technology, research questions have examined whether it provides a secure platform for accessing granted credit facilities, with findings generally supporting its positive impact. Similarly, the convenience of mobile banking has been explored in terms of how it enhances access to member funds, with studies affirming its significant role. Internet banking has been analyzed for its effectiveness in providing customer information that supports credit management, while loan securitization has been studied for its role in enhancing financial performance, with both areas showing that technological innovation moderates these critical financial processes.

2.11 Financial Performance

Financial performance measured through Return on Equity (ROE), is a crucial indicator of a

financial institution's efficiency and profitability. Several studies have utilized this metric as the dependent variable to explore the impact of various factors on financial performance. For example, research has demonstrated that an increase in total assets within a DT Sacco is strongly associated with improved financial stability and growth potential, which directly influences ROE (Johnson & Brown, 2023). Furthermore, studies have found that effective credit management leads to increased gross loans, which in turn enhances financial performance by boosting income and reducing default risks (Doe & Smith, 2022). Enhanced total deposits, another key factor, have been linked to Sacco's ability to grant loans efficiently, with research showing that higher deposit levels improve liquidity and loan issuance capacity, thereby positively affecting profitability and ROE (Lee & Green, 2024). The profitability of an organization, often reflected in improved ROE, has been a focal point in studies examining the impact of strategic management and operational efficiency in Saccos (White & Black, 2024). Additionally, member satisfaction, which is closely tied to these financial outcomes, has been identified as a significant contributor to Sacco's overall success and long-term sustainability, with satisfied members often leading to higher retention rates and increased business (Brown & Green, 2023).

CHAPTER THREE: RESEARCH METHODS

3.1. Introduction

This chapter highlights the research design that will be adopted in the study, indicates the population of interest, identifies the sampling frame and technique, describes the research instrument that aided in data collection, and defines the data collection procedure, the pilot test, and data analysis.

3.2. Research Design

Research design is a guide that reflects the ideas of a researcher according to research intentions, uses, aims, location of the study, and constraints (Hakim, 2000). Research design minimizes the frustrations by combining all research processes in unison according to research questions (Asenahabi, 2019). The study will use Mixed Methods Research Design to describe phenomena without having any influence on the study variables. Mixed Method Research Design research is considered suitable for describing events, individuals, situations, and activities hence its consideration in the description of credit risk management and financial performance of Deposit Taking Saccos in Kenya.

3.3. Target Population

The target population consists of groups of individuals or events with similar characteristics that are of interest to the study. The target population should consider the actual size which may be determined from the actual register (Honegr et al., 2020). The study's target population will include all 176 credit managers of 176 Deposit Taking Saccos in Kenya as listed in the SASRA (2023) supervision report. The target population has been chosen as the study believes that the sampling frame is accurate and current indicating Deposit Taking Saccos that have been

licensed to undertake financial intermediation in the financial year 2023. Table 3.1. presents the target population

Table 2 Target Population

Category	DT Saccos	Credit Managers
Large Tier Saccos (Above Kshs 5 billion)	42	42
Medium Tier Saccos (Kshs 1 to 5 billion)	56	56
Small Tier Saccos (Kshs below 1 billion)	78	78
Total	176	176

Source: SASRA Report (2023)

3.5. Sampling Technique and Sample Size

Sampling is the process that enables the identification of small number of individuals from the population. Sampling should exclude and include the boundaries as well as reduce biasness by providing equal chance to all the population to participate in the study (Mweshi & Sakyi, 2020). The study will use stratified random sampling to group the respondents according to three groups; large tier Sacco, medium and small tier (SASRA, 2023). The technique is considered effective when population is heterogenous. Systematic random sampling will enable the researcher to identify respondents from their respective groups using fixed intervals of sampling. The technique is suitable as it ensures all elements are given equal chance in the study and is viewed as efficient and easy to use in sample selection. Yamane (1960) will be used to generate a representative sample (Mweshi & Sakyi, 2020). The formula will be as under;

$$n = \frac{\{N\}}{\{1 + N(e^2)\}}$$

$$n = \frac{\{176\}}{\{1 + 176(0.05)^2\}} = \frac{\{176\}}{\{1 + 176 \times 0.0025\}} = \frac{\{176\}}{\{1.44\}} = 122$$

The study sample will be distributed proportionately according to the population. Table 3.2. indicates the study sample size.

Table 3 Study Sample Size

Category	DT Saccos	Credit Managers	Sample
Large Tier Saccos	42	42	29
Medium Tier	56	56	39
Small Tier	78	78	54
Total	176	176	122

Source: Research (2024)

The above Table 3.2. shows the distribution of the sample according to the proportion of the population. Large tier DT Saccos are 29, there are 39 DT Saccos in the medium tier while 54 DT Saccos are the majority in the small tier.

3.6. Research Instrument

The researcher will use self-administered structured questionnaire to obtain responses. The questionnaire has been chosen based on its standardization that allows efficient and fast analysis as well as enabling the collection of mass data at once (Oben, 2021). The researcher will develop the questionnaire using a Likert scale ranging from 1=strongly agree to 5= strongly disagree. The instrument will be divided into four sections; the first section will be based on demographic information of respondents. The second section will be about the independent variable will be divided into three areas; credit score, credit policy and credit monitoring. The third section will contain elements of the moderating variable-technological innovation. Simple questions with plain English will be used for easy comprehension of respondents.

A document guide will be used to obtain secondary data relating to the dependent variable financial

performance that will involve return on equity for five years. The source data will be from SASRA's (2023) annual supervisory report that provides Deposit Taking Sacco performance parameters. The study will also obtain secondary data from audited financial statements from all the Saccos as published in their websites.

3.7. Data Collection Procedure

The researcher will obtain authorization letters from relevant institutions before the study. The researcher will also seek permission from a government agency; the National Commission of Science, Technology and Innovation to permit to collect public data. This will allow the researcher to obtain access to Deposit Taking Saccos where approval will also be sought from the human resource department. The researcher will train two research assistants to support data collection. A questionnaire tracking form will be made to record all questionnaires distributed and received. The researcher will agree with the respondents on the best time to collect the completed survey. A mapping of DT Saccos will be made to focus on DT Saccos in the same locality hence faster and cost effective.

3.8. Pilot Test

Pilot study will be done to enhance reliability and validity (Cohen et al., 2013) of the instrument through administration to a small number of respondents before the main study. Pilot test helps in detecting potential challenges for adjustments and enhancement of credibility of the instrument (Wadood et al., 2021). The study will use 10% (12) credit managers from 12 DT Saccos who will not be included in the main study. The findings will be used to plan for the main study, recommend recruitment of respondents and improve the instrument.

3.8.1 Validity of the Instrument

Validity is the accuracy of the instrument in producing results by measuring the intended objectives to support valid findings. The study will use content validity to ensure all materials in the instrument describe the study concepts (Ahmed & Ishtiaq, 2021). Expert validity will be used by working with the university supervisors who will give feedback on the improvement

of the instrument. Face validity will enable the researcher to design the instrument in simple language and easy to understand by the respondent (Heale & Twycross, 2015).

3.8.2. Reliability of the Instrument

Reliability is the instrument's consistency in producing stable results after repeated measurements. The study will use Cronbach's alpha to measure internal consistency as it is preferred widely in reliability measurement. Hinton et al., (2004) indicate that reliability cut-off points should consider coefficient values that are 0.50 and below as low reliability, 0.50-0.70 moderate, and 0.70-0.90 provide high reliability while values above 0.90 are indications of excellent reliability (Taherdoost, 2016).

3.9. Data Processing and Analysis

According to (Niu et al., 2021), data analysis involves organizing and cleansing data so that it can be quickly evaluated and used to draw conclusions that aid decision-making. Data processing includes revising, categorizing, and tabulating obtained data to make them suitable for analysis. Information gathered through secondary or primary techniques is transformed into a format for viewing and manipulation through data input (Ahmad et al., 2022).

All data obtained will be cleaned and edited before analysis. Qualitative data will be content analyzed before categorization, resulting in the emergence of various themes (J. Li et al., 2020). These themes will enable the corresponding qualitative data to be coded, quantified, and entered into IBM SPSS Version 29 for analysis.

Before analysis, data will be examined for compliance with important assumptions underlying the chosen analysis techniques (Devarajan et al., 2020). Proceeding with analysis without verifying these assumptions can yield misleading or invalid results, faulty findings, and misleading conclusions, leading to invalid decisions and wasted intervention efforts (Booker et al., 2020). Therefore, quantitative data will be critically evaluated to ensure they meet the specific assumptions necessary for subsequent processing. These assumptions include linearity, normality, multicollinearity, common method variance, autocorrelation, correlation, and sphericity

(Mwaifyusi & Dau, 2022). Each of these assumptions has specific tests that can be performed on the data to establish their suitability for further analysis.

3.9.1 Sampling Adequacy Test

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was conducted to determine the adequacy of the sample size. KMO is an index used to examine and justify the appropriateness of the application of Factor Analysis; values between 0.5-1.0 indicate that a factor is significant suggesting that the data is suitable for factor analysis.(S et al., 2023). (Wu & Luo, 2021)suggested that values between 0.7 and 0.8 are good for factor analysis indicating a middling to good degree of common variance among the variables.

3.9.2 Correlation Analysis

Correlation coefficient will be used to determine the magnitude and the direction of the relationships between the dependent variable and independent variables (Alsaqr, 2021). The values of the correlation coefficient are between -1 and +1. A value of 0 implies no relationship, +1 correlation coefficient indicates that the two variables are perfectly correlated in a positive linear sense, that is, both variables increase together while a value of -1 correlation coefficient indicates that two variables are perfectly correlated 50 in a negative linear sense, that is, one variable increases as the other decreases(Deng et al., 2023). The purpose of Pearson's correlation coefficient will be to establish the magnitude and direction of the relationship between each independent variable with the individual parameters measuring performance–institutional efficacy using structural ambidexterity, structural ambidexterity, and Contextual ambidexterity (Zhang et al., 2022). The correlation coefficient will be first computed for each independent variable and the dependent variable without the moderating variable and all the independent variables and independent variables without the moderating variable. The results of the coefficient of correlation with and without the moderating variable will be compared to test for the effects of the moderating variable (Sandi et al., 2021). The correlation strengths will be interpreted using (Rahaman et al., 2023) decision rules where 0.1 to 0.3 indicated weak correlation, 0.31 to 0.5 indicated moderate correlation strength and greater than 0.5 indicated a strong correlation between the variables.

3.9.3 Statistical Modelling and Hypothesis Testing

Regression analysis is a measure of the ability of independent variable(s) to predict an outcome of a dependent variable where there is a linear relationship between them (Maulud & Abdulazeez, 2020). In this study regression analysis will be conducted to establish whether independent variables predicted the dependent variable (Baek & Chung, 2020). The R square, t-tests and F-tests and Analysis of Variances (ANOVA) tests will all be generated by SPSS to test the significant of the relationship between the variables under the study and establish the extent to which the predictor variables explained the variation in dependent variable (Lee, 2022).

The study intends to examine the impact of credit management practice technological innovation and the financial performance of deposit-taking sacco in Kenya. the following simple regression model will be used:

$$Y = \beta_{0i} + \beta_i x_i + \varepsilon_i \dots \dots \dots \text{Equation 3.1}$$

Where:

$$i = 1,2,3,4$$

β_{0i} Is the intercept of Variable Y

β_i Is the slope of the regression line which explains the manner in which Y relates with x_i

ε_i is The error Term

Multiple regression analysis will be used to establish the relations between the independent and dependent variables. Multiple regression tools will be used because it is the procedure that uses two or more independent variables to predict a dependent variable. The study will use multiple regression analyses to analyze the collected data to measure the impact of Credit management practice, technological innovation, and financial performance of deposit-taking sacco in Kenya. Multiple regression attempts to determine whether a group of variables together predict a given dependent variable (Feinberg & Zanardi, 2022). Since there are three independent variables in this study the multiple regression model will be generally assumed as the following equation.

In this study, the impact of Credit management practice, technological innovation, and financial performance of deposit-taking sacco in Kenya where Performance is the dependent variable (Y) and credit score, credit policy, and credit monitoring are the independent variables (Xi). Since the study has three independent variables a simple linear regression model will be used for each of them. The results for equation 3.1 will indicate whether each credit management practice constraint has a significant relationship with Performance of the deposit-taking sacco in Kenya. Multiple linear regression analysis will be used to establish the combined relationship between all independent variables and dependent variables. Equation 3.2 will present the results for regression analysis of all the independent variables on the dependent variable.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \dots \dots \dots \text{Equation 3.2}$$

Where: -

Y= Performance of Deposit Taking SACCOs in Kenya

β_0 =constant β_1, β_2 and β_3 , = Beta coefficients

X1= Credit Score

X2= Credit Policy

X3= Credit Monitoring

ε = Error term

The moderation effects of technological innovation will be tested using the hierarchical Moderated Multiple Regression (MMR) analysis (Wachira et al., 2024). (Cheung et al., 2021) reported that the MMR approach involves the addition of interaction effects to a multiple regression model by comparing two different least squares regression equations. The dependent variable will be regressed with cross cross-product of each independent variable to test for the interaction effects. Using the MMR analysis, the moderating effect will be analyzed by interpreting the R^2 change in the models obtained from the model summaries and the regressions coefficients for the product term obtained from the coefficients. The moderation effects will be tested using equation 3.3 where the combined relationship between the independent variables X_1*Z , X_2*Z , and X_3*Z and the dependent variable performance of deposit-taking SACCOs in Kenya will be tested.

$$Y = \beta_0 + \beta_1 X_1 * Z + \beta_2 X_2 * Z + \beta_3 X_3 * Z + \varepsilon \dots\dots\dots \text{Equation 3.3}$$

Where: -

Y= Performance of Deposit Taking SACCOs in Kenya

β_0 =constant $\beta_1, \beta_2, \beta_3$ and β_4 , = Beta coefficients

X1= Credit Score

X2= Credit Policy

X3= Credit Monitoring

Z= Technological Innovation

ε = Error term

The SPSS will be used to generate the exact values of β_1, β_2 , and β_3 . The results for equation 3.2 shall indicate whether there will be any moderating effect of Technological Innovation on the

Performance of Deposit-Taking SACCOs in Kenya. The research objectives will be validated based on the level of significance that will be computed based on $p\text{-value} = 0.05$. The magnitude of the moderation effect will be shown by the change in R^2 in the model summary.

In testing the significance of the model, the coefficient of determination (R^2) will be used to measure the extent to which the variation in credit management Practice, Technological Innovation, and performance of Deposit-taking SACCOs in Kenya.

3.10. Diagnostic Test

The study will undertake different diagnostic tests to confirm the assumption of linear regression for enhanced trustworthy and accurate estimations. Specifically, multicollinearity test, normality, heteroskedasticity, and autocorrelation test will be done.

3.10.1. Multicollinearity Test

Multicollinearity occurs in statistics where two or more predictor variables in a multiple regression model are highly correlated (Gregorich et al., 2021). The Gauss-Markov assumption only requires that there be no perfect multicollinearity and so long as there is no perfect multicollinearity the model is identified (Kalnins, 2022). This means the model can estimate all the coefficients that the coefficients remained best linear unbiased estimates and that the standard errors were correct and efficient (Pustejovsky & Tipton, 2022). Variance Inflation Factor (VIF) will be used to measure the problem of multicollinearity in the multiple regression models. VIF statistic of a predictor in a model is the reciprocal of tolerance and it indicates how much larger the error variance for the unique effect of a predictor (Okuta et al., 2023). (Salmerón et al., 2020) defines Variance Inflation Factor (VIF) as an index of the amount that the variance of each regression coefficient is increased relative to a situation in which all of the predictor variables are uncorrelated and suggests a VIF of 5 or more to be the rule of thumb for concluding VIF to be too large hence variable(s) not suitable.

3.10.2. Normality

Normality tests will be conducted to ensure that data conform to a normal distribution in order to justify the use of parametric tests (Knief & Forstmeier, 2021) which are preferred for interval and ratio data. This is because parametric tests yield more powerful results than their equivalent non-parametric counterparts (Alrumaidhi et al., 2023). They are also more efficient in detecting

differences in samples.

Data normality will be tested using measures of skewness and kurtosis (Hatem et al., 2022). For skewness, the maximum acceptable absolute skew index (SI) value is 3.0, while the maximum absolute value for the kurtosis index (KI) is 10.0. Before analysis, (Ribeiro et al., 2021) checked their data for normality in their study “Toward a Subjective Measurement Model for Firm Performance”. In investigating the relationship between corporate social responsibility (CSR) initiatives and the financial performance of multinational corporations (MNCs), (Uddin et al., 2024) employed a robustness check by conducting sensitivity analysis to mitigate the influence of outliers and enhance the reliability of the findings.

3.10.3. Heteroskedasticity

Heteroskedasticity is the violation of the regression assumption which shows the absence of constant error variance while homoscedasticity is the constant variance required in regression analysis (Kasagela, 2019). The study will use the Breusch-Pagan test to identify the presence of heteroskedasticity through the development of the null hypothesis assuming homoscedasticity while the alternative hypothesis will indicate heteroskedasticity. The decision criteria will be based on the p values greater than 0.05, hence homoscedasticity (Astivia & Zumbo, 2019)

3.10.3 Autocorrelation Test

Autocorrelation is a correlation between the residue terms for any two observations; it is expected that the residue terms for any two observations should be independent (Nestler & Humberg, 2022). Durbin-Watson test was used to test for the presence of autocorrelation between variables. (Aisami et al., 2021) observed that the Durbin-Watson statistic ranges from 0 to 4. A value near 0 indicates positive autocorrelation while a value close to 4 indicates negative autocorrelation. A value ranging from 1.5 to 2.5 indicates that there is no presence of autocorrelation, and so shall be tested (Mielke et al., 2020)

3.10. Ethical Consideration

Ethics are morals and values that guide the researcher in the entire research process. The study will uphold the confidentiality of respondents by not revealing any details about the participants. The study will seek informed consent of respondents and those who wish to participate voluntarily will be allowed. The study will seek for approvals from relevant bodies and abide by data protection regulations. The study will respect the privacy of respondents by giving chance to respond at their own time.

CHAPTER FOUR: DATA ANALYSIS FINDINGS AND INTERPRETATION

4.1 Introduction

This chapter contains data analysis, presentation of the findings, and interpretations as per the research objectives. The researcher further interpreted the findings and made discussions based on the reviewed literature. The researcher gave out 122 questionnaires to the respondents and out of these 115 responses were received back having been duly completed. This gave a response rate of 94.2%. According to, 50% is adequate for analysis and reporting and a response rate of 70% and over is excellent hence the response rate in this study was excellent for making inferences and conclusions.

4.2 Reliability Test

The pre-testing involved 10 staff drawn from 17 SACCOs (10% of the sample size). The test was conducted among the SACCOs found within Nairobi. The respondents were purposively selected as the operations managers were targeted. This was done to test the reliability of the instruments. According to Bryman and Cramer (1997) reliability of 0.70 is normally accepted in basic research. The results in Table 4.1 show that the Alpha coefficients ranged between 0.841 and 0.885. Thus, based on the results, the items tested were deemed reliable for the study.

Table 4.1 Reliability Coefficient of Study Variables

Financial Innovation	Number of Items	Reliability Cronbach's Alpha	Comments
Credit Score	8	0.789	Accepted
Credit Policy	8	0.790	Accepted
Financial Performance	6	0.899	Accepted
Technological Innovation	3	0.987	Accepted

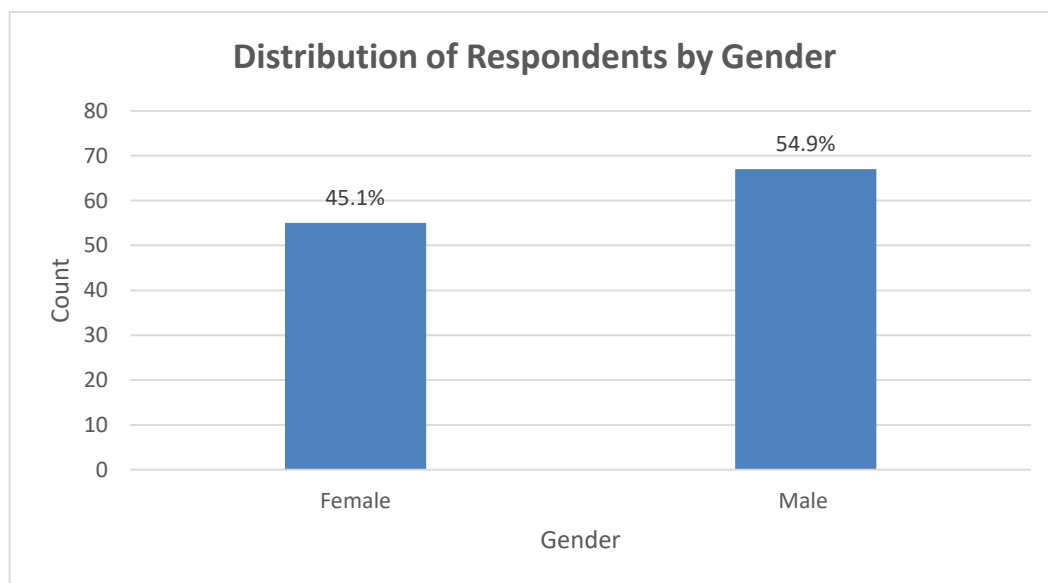
4.3 Background Information

The researcher sought to determine the background information of the respondents. The respondents were therefore asked to state their gender, age, education level, experience, as well as the length of SACCO in business. The results are presented as shown in the subsequent sections.

4.3.1 Distribution of Respondents by Gender

The respondents were asked to state their gender. The results are presented in Figure 4.1.

Figure 2 Distribution of Respondents by Gender



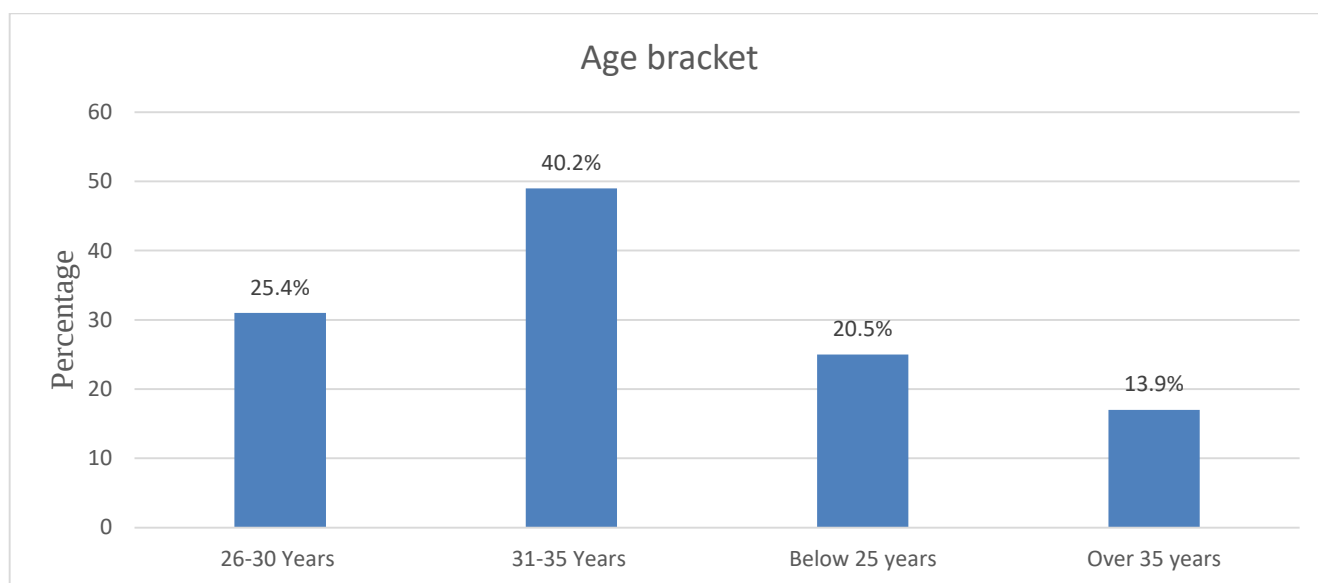
The study findings show that the men dominated the SACCOs as women respondents were only 45.1% were women. The finding that men dominate SACCOs, with only 45.1% of respondents being women, highlights gender imbalances that may limit diversity in leadership and decision-

making. This calls for targeted efforts to promote gender inclusivity and address barriers to women's participation in SACCOs.

4.2.2 Distribution by Age

The study sought to establish how old the respondents were. The findings are in Figure 4.2.

Figure 3 Distribution of Respondents by Age



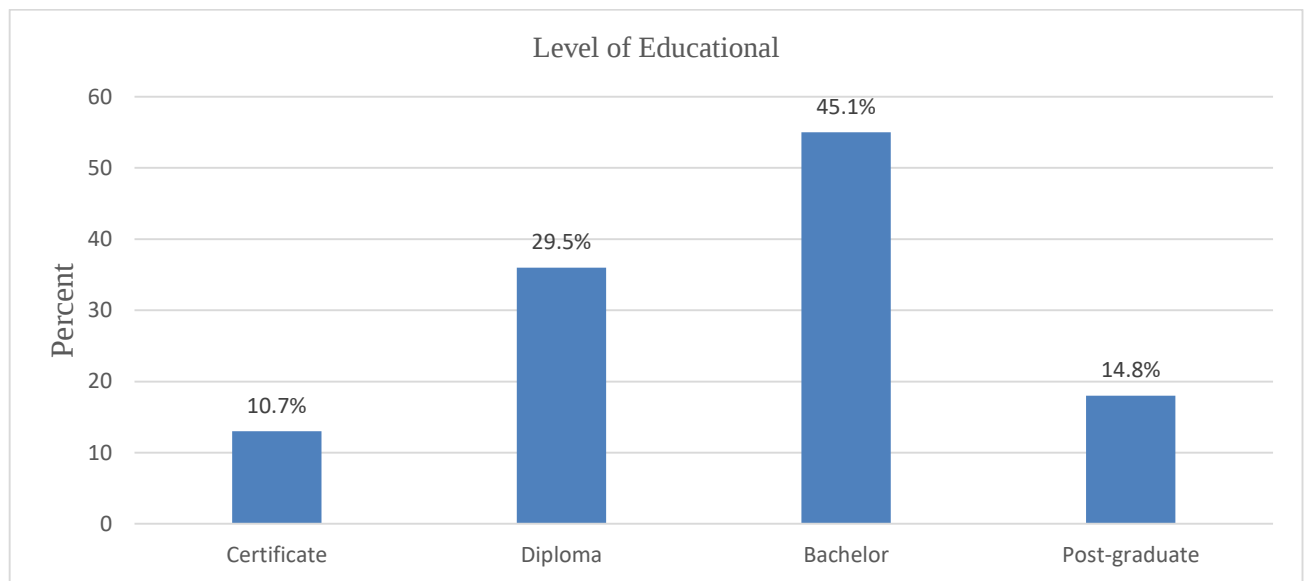
According to the results, most of the respondents (40.2%) were in the age of between 31 years and 35 years. The results further show that 25.4% of the respondents were in the age bracket of between 26 years and 30 years. The results thus mean that the respondents were majorly in middle age. The implication of the finding that most respondents (40.2%) are aged between 31 and 35 years, with 25.4% between 26 and 30 years, suggests that the SACCO sector is predominantly staffed by middle-aged individuals. This could indicate a workforce with significant experience and stability, but it may also raise concerns about attracting younger talent and ensuring succession planning for future leadership.

4.2.3 Level of Education

The findings show that most respondents (29.5%) were college graduates, and 45.1% were

university graduates. This suggests that the respondents were relatively well-educated, implying that the information provided in the study is likely to be informed and credible. The predominance of educated respondents also indicates that the SACCO sector has a workforce with a solid educational foundation, which could contribute to more effective decision-making and improved organizational performance.

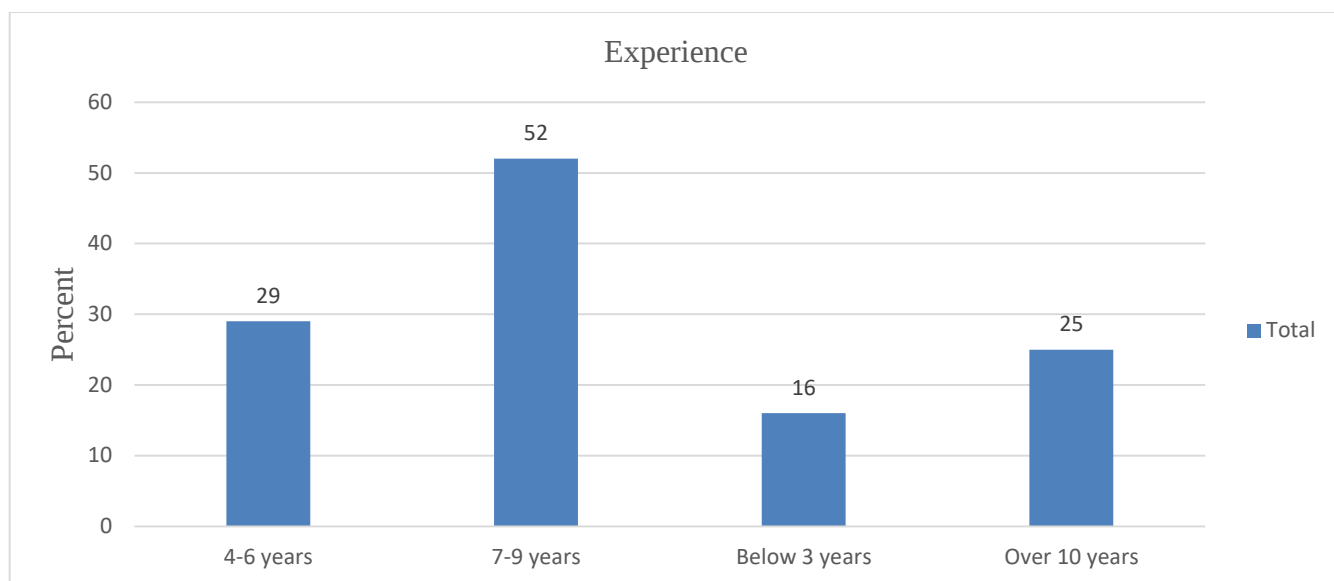
Figure 4 Level of Education



4.2.4 Experience

The study sought to determine the experience of the respondents. The findings are presented in Figure 4.4.

Figure 5 Experience of the Respondents

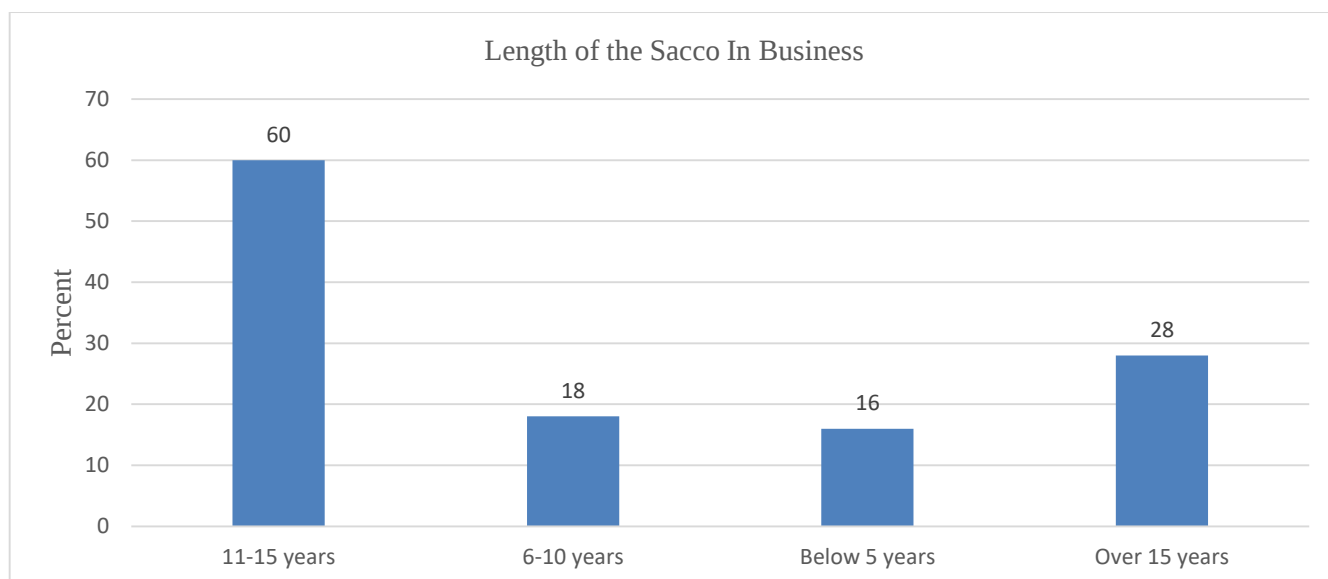


The findings show that more than two-thirds (42.6%) of the respondents had 7-9 years of experience, while 23.7% had 4-6 years of experience. This suggests that the majority of respondents possess a moderate level of experience, which likely contributes to a solid understanding of the SACCO sector and its operations. However, it also indicates that there may be a need for more long-term experience within the workforce to further strengthen institutional knowledge and leadership capabilities.

4.2.5 The Length of SACCO in Business

The study sought to determine the length of the SACCO. The findings are presented in Figure 4.5,

Figure 6 Length of the SACCO in Business



The findings showed that 49.2% (60 out of 122) have been operating for 11 to 15 years, making it the most common duration, indicating a stable and established presence in the market. In contrast, the second most prevalent category were those in operation for 31 to 35 years, representing 40.2% (49 SACCOs), highlighting a significant portion that has successfully navigated various economic challenges over a long period, thus demonstrating resilience and adaptability in this sector.

4.3 Credit Score on Financial Performance

In this section, the study aimed to determine the effect of credit scores on the financial performance of SACCOs. Respondents were asked to indicate the extent to which they agreed with various statements related to credit scoring and its impact on financial performance, using a Likert scale that ranged from strongly disagree to strongly agree. Disagreement was represented by mean scores between 0.0 and 2.0 on the continuous Likert scale ($0.0 \leq D \leq 2.0$), while responses categorized as undecided had mean scores between 2.1 and 3.0 ($2.1 \leq N \leq 3.0$). Meanwhile, an agreement was reflected in mean scores ranging from 3.1 to 5.0 ($3.1 \leq A \leq 5.0$). A standard deviation of less than 1.0 indicated minimal variance in responses regarding a particular item on the questionnaire, suggesting a strong consensus among respondents.

Table 5 Credit Score on Financial Performance

	Mean	Std Dev
A credit score is performed to understand customer behavior.	4.28	0.79
Application score is done to establish previous loan applications of customers.	4.14	0.77
Collection credit score process is done to determine customer payments of loans.	4.06	0.80
Fraud score is undertaken to establish customer fraud history.	3.75	0.99

The findings indicated that respondents generally agreed with the statement that the automation of SACCO operations has significantly enhanced operational efficiency, reflected in a mean score of 4.28 (SD = 0.79) for the credit score's role in understanding customer behavior. Additionally, respondents agreed with the assertion that the application score effectively establishes previous loan applications, yielding a mean of 4.14 (SD = 0.77). The data further reveals that the collection credit score process, aimed at determining customer payments of loans, garnered a mean score of 4.06 (SD = 0.80), illustrating consensus on its effectiveness. Conversely, opinions on the fraud score's ability to establish customer fraud history were more varied, with a mean of 3.75 (SD = 0.99), indicating less agreement among respondents. These results suggest that SACCOs are actively implementing credit assessment practices such as credit scoring and monitoring, which contribute to better financial performance through enhanced operational insights and improved customer understanding. Moreover, the study's findings align with previous research, including Zomerdijk and Voss (2011), who noted that effective service process innovation, including automation and comprehensive credit assessment, can significantly enhance organizational financial performance. Additionally, Damanpour and Gopalakrishnan (2001) found that service product innovation is increasingly appealing to financial institutions, reinforcing the importance

of adopting advanced credit scoring mechanisms in SACCO operations. Thus, the study highlights the critical role of these practices in enhancing SACCO efficiency and member transactions, ultimately leading to improved financial outcomes.

4.4 Credit Policy on Financial Performance

In this section, the researcher sought to establish the effect of credit scores on the financial performance of SACCOs in Kenya. Respondents were asked to indicate their level of agreement with various statements regarding credit scoring and its influence on financial outcomes, utilizing a Likert scale that ranged from strongly disagree to strongly agree. The score of disagreement was assumed to be represented by variables with a mean score between 0.0 and 2.0 on the continuous Likert scale ($0.0 \leq D \leq 2.0$). Additionally, the researcher categorized undecided responses as having a mean point between 2.1 and 3.0 ($2.1 \leq N \leq 3.0$), whereas agreement was represented by variables with a mean score ranging from 3.1 to 5.0 ($3.1 \leq A \leq 5.0$). A standard deviation of less than 1.0 indicated minimal variance in the responses to particular items on the questionnaire among respondents. The findings are presented in Table 4.4.

Table 6 Credit Policy on Financial Performance

	Mean	Std Dev
My organization adheres to credit standards that have been put in place.	4.25	0.81
Credit terms have been developed to guide the credit process	4.07	0.78
Credit collection methods are well-known by employees and customers.	4.01	0.66
Customer qualification is used to grant all credits to members.	3.75	0.95

The findings presented in Table 4.4 indicate that respondents generally agree with the effectiveness of various credit policy components in enhancing financial performance within SACCOs. The statement regarding adherence to credit standards received a mean score of 4.25 (SD = 0.81),

reflecting strong agreement that established credit standards play a crucial role in ensuring effective financial management and risk mitigation. Similarly, the development of credit terms was positively viewed, with a mean of 4.07 (SD = 0.78), suggesting that clear and well-defined credit terms are essential for guiding lending practices and improving loan accessibility.

Respondents also expressed a favorable view toward the awareness of credit collection methods, which achieved a mean score of 4.01 (SD = 0.66). This indicates a consensus that effective credit collection practices are well understood by employees and customers alike, contributing to smoother financial operations. In contrast, the mean score for the statement regarding customer qualification to grant credits was lower at 3.75 (SD = 0.95), indicating that while there is general agreement, there is also notable variability in opinions about the effectiveness of customer qualification processes in enhancing financial performance.

These results suggest that SACCOs are actively implementing robust credit policies that enhance financial performance through effective risk management and operational efficiency. The alignment of these findings with recent studies highlights the importance of well-defined credit policies for financial stability (Osei & Agyemang, 2023; Mwangi, 2022). Additionally, innovative approaches to credit assessment, such as comprehensive evaluations of creditworthiness, are increasingly valuable for financial institutions (Kamau & Gathuru, 2021). Overall, the study underscores the critical role of credit policies in fostering SACCO efficiency and enhancing member transactions, ultimately leading to improved financial outcomes.

4.5 Credit Monitoring on Financial Performance

In this section, the researcher sought to examine the effect of credit monitoring on the financial performance of SACCOs in Kenya. Respondents were asked to indicate their level of agreement with various statements regarding credit monitoring practices and their influence on financial outcomes, utilizing a Likert scale that ranged from strongly disagree to strongly agree. Disagreement was represented by variables with mean scores between 0.0 and 2.0 on the

continuous Likert scale ($0.0 \leq D \leq 2.0$). Undecided responses were categorized with mean scores between 2.1 and 3.0 ($2.1 \leq N \leq 3.0$), while agreement was indicated by scores ranging from 3.1 to 5.0 ($3.1 \leq A \leq 5.0$). A standard deviation of less than 1.0 suggested minimal variance in the responses for specific items on the questionnaire among respondents. The findings are presented in Table 4.5

Table 7 Credit Monitoring on Financial Performance

	Mean	Std Dev
The Sacco monitors credit worthiness of customers.	4.06	0.84
Loan repayment by customers is monitored to enhance loan repayment.	3.99	0.79
Member activities is checked to maintain repayment on time	3.93	0.78
Collection period of credit is monitored to reduce nonpayment.	3.67	0.89

The findings presented in Table 4.6 indicate that respondents generally agree with the importance of various credit monitoring practices in enhancing the financial performance of SACCOs. The statement regarding the monitoring of customers' creditworthiness received a mean score of 4.06 (SD = 0.84), reflecting strong agreement that ongoing assessments of credit profiles are crucial for effective risk management and improving loan recovery rates. Similarly, the importance of monitoring loan repayment was positively acknowledged, with a mean of 3.99 (SD = 0.79), suggesting that respondents see the practice as essential for ensuring timely repayments and enhancing financial stability.

Respondents also agreed to the monitoring of member activities, which achieved a mean score of 3.93 (SD = 0.78). This score indicates a consensus that tracking member behaviors contributes significantly to maintaining repayment schedules and minimizing defaults. In contrast, the mean score for the statement regarding the monitoring of the collection period was lower at 3.67 (SD = 0.89), suggesting that while there is still agreement on the importance of this practice, there is

greater variability in responses, indicating some respondents may have differing views on its effectiveness.

These results suggest that SACCOs are actively implementing robust credit monitoring practices that enhance financial performance through effective oversight and management of credit risks. The alignment of these findings with recent studies emphasizes the critical role of credit monitoring in promoting financial stability and operational efficiency (Osei & Agyemang, 2023; Mwangi, 2022). Furthermore, the adoption of comprehensive monitoring systems is increasingly valuable for financial institutions, as noted in previous research (Kamau & Gathuru, 2021). Overall, the study underscores the essential nature of credit monitoring in fostering SACCO efficiency and improving member transactions, ultimately leading to enhanced financial outcomes.

4.7 Inferential Statistics

The study utilized inferential statistics to examine the relationship between the study variables. This involved conducting correlation and regression analyses.

4.7.1 Diagnostic Tests of Regression

Diagnostic tests were conducted to confirm that the assumptions of linear regression were met. These tests are crucial for ensuring the reliability of the model and the validity of the study's findings. The assessments performed included tests for heteroscedasticity, normality, and autocorrelation using the Durbin-Watson statistic, as well as a multicollinearity test employing the Variance Inflation Factor (VIF).

4.7.1.1 Autocorrelation test

The Durbin-Watson statistic is a test for autocorrelation in the residuals from a regression analysis. It ranges from 0 to 4, with a value of 2 indicating no autocorrelation. In this case, the Durbin-Watson statistic is 1.052, which is close to 2 and suggests that there is no significant autocorrelation in the residuals. Autocorrelation occurs when there is a pattern in the residuals indicating that the

model is not capturing some underlying trend in the data. Therefore, a Durbin-Watson statistic close to 2 is desirable as it indicates that the model is adequately capturing the relationship between the independent and dependent variables without any systematic pattern in the residuals.

Table 8 Autocorrelation Test

Model Summary	
Model	Durbin-Watson
1	1.052 ^a

Source: (Research Survey, 2024)

4.4.1.2 Multicollinearity Test

The coefficients of collinearity statistics provide information about multicollinearity between independent variables in a regression model. Tolerance is the proportion of variance in a predictor variable that is not explained by other predictor variables. VIF (Variance Inflation Factor) is the reciprocal of tolerance and indicates how much the variance of an estimated regression coefficient is increased due to multicollinearity. In this case, all variables have tolerances above 0.5 and VIF values below 2, suggesting that there is no severe multicollinearity among the independent variables. This means that each variable contributes unique information to the prediction of the dependent variable, Human factors.

Table 9 Multicollinearity using VIF

Coefficients^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Credit Score	.651	1.480
	Credit Policy	.684	1.714
	Credit Monitoring	.810	1.508

a. Dependent Variable: Credit Risk Management Practices

Source: (Research Survey, 2024)

4.4.1.3 Test of Normality

Testing for normality is essential because many statistical methods rely on the assumption of

normal distribution within the population from which samples are drawn. While the Kolmogorov-Smirnov (K-S) test is widely recognized for assessing normality, it should be applied with caution due to its relatively low power. Therefore, it is advisable to complement it with additional tests like the Shapiro-Wilk test, which is particularly effective for smaller sample sizes (less than 50) but can also be applied to larger samples of up to 2000. In this study, the interpretation of data normality was based on the Shapiro-Wilk test. Both tests evaluate how much the data deviates from a normal distribution. The results include the Kolmogorov-Smirnov and Shapiro-Wilk test statistics, along with their corresponding degrees of freedom (df) and significance levels (Sig.). All variables demonstrated significant deviations from normality, as evidenced by p-values (Sig.) below 0.05.

Table 10 Test for Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Credit Score	.520	103	.000	.341	103	.000
Credit Policy	.538	103	.000	.354	103	.000
Credit Monitoring	.560	103	.000	.243	103	.000

a. Lilliefors Significance Correction

4.4.1.4. Heteroscedasticity

Heteroscedasticity refers to the unequal variability of a variable across different levels of the predictor variable (Field, 2022). This condition arises when the error term varies at different levels of the independent variable, resulting in an uneven distribution of errors around a horizontal line. A Breusch-Pagan test was conducted to detect heteroscedasticity, where the null hypothesis asserts that the error term variances are equal. A Prob > Chi-square value exceeding 0.05 suggests homoscedasticity, while the null hypothesis is rejected if the p-value is less than the chosen significance level.

Table 11 Breusch-Pagan Test for Heteroscedasticity

H0: Constant variance

Statistics	Df	Stat value	p-value
Chi-squared	3	2.426	0.578

The findings presented indicate $\chi^2 = 2.426$ with a p-value = 0.578 which is greater than 0.05 which suggests that the distribution is not significant. We therefore reject the null hypothesis and conclude that there is no heteroscedasticity.

4.5 Correlation Analysis

Correlation analysis was performed to test the association between the independent variables and the dependent variable. The correlation table shows the relationships between different variables: Credit score, Credit policy and Credit monitoring. Each cell in the table represents the Pearson correlation coefficient between the corresponding pair of variables. The values range from -1 to 1, where 1 indicates a perfect positive correlation, -1 indicates a perfect negative correlation, and 0 indicates no correlation.

Table 4.13 Correlation Analysis

		Correlations			
		Y	X1	X2	X3
Y	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	122			
X1	Pearson Correlation	.704**	1		
	Sig. (2-tailed)	.000			
	N	122	122		
X2	Pearson Correlation	.845**	.665**	1	
	Sig. (2-tailed)	.000	.000		
	N	122	122	122	
X3	Pearson Correlation	.826**	.747**	.784**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	122	122	122	122

** . Correlation is significant at the 0.01 level (2-tailed).

Source: (Research Survey, 2024)

Key: Y = Credit Score; X1 = Credit Policy and X2 = Credit Monitoring

The correlation analysis reveals significant positive relationships among the variables: Credit

Score (Y), Credit Policy (X1), and Credit Monitoring (X2). Specifically, there is a strong positive correlation between Credit Score (Y) and Credit Policy (X1) ($r = 0.704$), indicating that as Credit Policy improves, the Credit Score tends to increase as well. This relationship is statistically significant ($p < 0.001$). Similarly, Credit Score (Y) and Credit Monitoring (X2) show a very strong positive correlation ($r = 0.845$), suggesting that higher levels of Credit Monitoring are associated with increases in Credit Score, also statistically significant ($p < 0.001$). The correlation between Credit Score (Y) and Credit Policy (X3) is also strong ($r = 0.826$), indicating a consistent trend where improvements in Credit Monitoring relate to increases in Credit Score, with significance ($p < 0.001$). Additionally, among the independent variables, Credit Policy (X1) and Credit Monitoring (X2) exhibit a moderate positive correlation ($r = 0.665$), while Credit Policy (X1) and another variable, possibly Credit Monitoring (X3), show a strong correlation ($r = 0.747$). The relationship between Credit Monitoring (X2) and Credit Monitoring (X3) is very strong ($r = 0.784$). All correlations are statistically significant at the 0.01 level (2-tailed), suggesting a robust relationship between the variables. Overall, these findings indicate that changes in Credit Policy and Credit Monitoring are likely to influence the Credit Score, highlighting the interconnectedness of these factors in the study

4.6 Linear Regression Analysis

Regression analysis was performed to ascertain whether the independent variables had a significant influence on the dependent variable.

4.6.1 Credit Score and Financial Performance of Deposit Taking SACCOS

The first objective of the study was to determine the effect of credit scoring on the financial performance of deposit-taking SACCOS in Kenya. To answer this objective, the study regressed credit scores with financial performance the summary model, ANOVA, and regression coefficient are presented below.

4.6.1.1 Summary Model

The study shown below sought to establish the correlation between credit score and financial performance of the deposit-taking SACCOs in Kenya and the total variation of financial performance that could be explained by the credit scoring

Table 12 Simple Regression for Credit Scoring

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.704 ^a	.496	.491	.213	2.077
a. Predictors: (Constant), Financial Performance					
b. Dependent Variable: Credit Score					

From the findings presented in Table 4.14, the value of R-squared value of 0.491, indicates that 49.6% of the variance in the dependent variable (Credit Score) is explained by the model. The adjusted R-squared is 0.491 suggesting the model's explanatory power remains consistent when considering the number of predictors.

4.6.1.2 Analysis of Variance (ANOVA)

The study analysis in Table 4.15 below sought to determine whether the model is significant enough to determine the financial performance of the deposit-taking SACCOs in Kenya.

Table 13 ANOVA Test

ANOVA ^a						
Model		Sum of Squares	df	Mean SquareF		Sig.
1	Regression	5.363	1	5.363	117.919	.000 ^b
	Residual	5.457	120	.045		
	Total	10.820	121			
a. Predictors: (Constant), Credit Score						
b. Dependent Variable: Financial Performance						

Source: (Research Survey, 2024)

From the ANOVA findings, the p-value obtained was 0.00 which is less than 0.05, an indication that the model was significant. The findings also show that the F- F-calculated value 117.919 is

greater than the F-critical value ($F_{1,121}=3.844$). Since the F- F-calculated value is greater than the F-critical value it demonstrates that the model is reliable and can be used to the financial performance of deposit-taking SACCOs in Kenya.

4.6.1.3 Regression Coefficients

To understand the influence of credit score on the Financial Performance of the deposit-taking SACCOs in Kenya regression coefficients were computed as shown in Table 4.17 below.

Table 14 Regression Coefficients

Coefficients					
Model		Unstandardized		Standardized	t
		Coefficients		Coefficients	
		B	Std. Error	Beta	
1	(Constant)	.036	.020		1.772 .079
	Credit Score	.764	.070	.704	10.859 .000

a. Dependent Variable: Financial Performance

Source: (Research Survey, 2024)

From the coefficients table, the following model was fitted; $Y = 0.764 + 0.036$

Where X_1 =Credit Score

From the equation above, when a credit score is held to a constant zero, financial performance will be at a constant value of 0.764. The findings also show that a unit increase in credit score will lead to a 0.036 unit increase in the financial performance of deposit-taking SACCOs in Kenya. The findings also show that the t-statistic 10.859 has a p-value = 0.000 which is less than the selected level of significance 0.05.

4.6.1.4 Test of the Study Hypothesis

Therefore, we reject the first null hypothesis (H_{01}) and conclude that Credit scoring has a significant effect on the financial performance of Deposit-Taking SACCOS in Kenya

4.6.2 Credit Policy and Financial Performance.

The second objective of the study was to assess and establish the effect of credit policy on the financial performance of Deposit-Taking Saccos in Kenya. In order to answer this objective, the study regressed credit policy with financial performance.

4.6.2.1 Model Summary

Table 4.14 presents the model summary of the regression analysis where the R-value is 0.845, indicating a strong positive correlation between Credit Policy and Financial Performance. The R² value of 0.714 implies that 71.4% of the variation in Financial Performance can be attributed to changes in Credit Policy, suggesting that this predictor significantly influences the outcome. The Adjusted R² of 0.711 confirms the model's robustness after accounting for the number of predictors. The standard error of the estimate is 0.154, indicating that predictions are relatively close to the actual data points. Additionally, the Durbin-Watson statistic of 1.872 suggests no significant autocorrelation in the residuals, further validating the model's reliability.

Table 15 Model Summary

Model Summary^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.845 ^a	.714	.711	.154	1.872

a. Predictors: (Constant), Credit Policy

b. Dependent Variable: Financial Performance

Source: (Research Survey, 2024)

4.6.2.2 Analysis of Variance (ANOVA)

The study analysis presented in Table 4.18 examines the significance of the regression model in predicting Financial Performance based on Credit Policy. The ANOVA results indicate a p-value of 0.000, which is significantly lower than the threshold of 0.05, confirming that the model is statistically significant. The F-calculated value of 299.29 exceeds the F-critical value of 3.844

(F1,120), further validating the model's reliability. The Sum of Squares for regression is 7.144, indicating the variation explained by the model, while the Residual Sum of Squares is 2.864, reflecting the unexplained variation. The degree of freedom (df) for the regression is 1, and for residuals, it is 120. These results collectively demonstrate that the model is effective for predicting Financial Performance of Credit Policy, indicating strong support for its applicability in the study context.

Table 16 ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.144	1	7.144	299.296	.000 ^b
	Residual	2.864	120	.024		
	Total	10.008	121			

a. Predictors: (Constant), Credit Policy

b. Dependent Variable: Financial Performance

Source: (Research Survey, 2024)

4.6.2.3 Regression Coefficients

The analysis of regression coefficients reveals the influence of Credit Policy on Financial Performance, as shown in Table 4.19. The fitted regression model is represented by the equation:

$$Y = 0.018 + 0.882X_2$$

where X_1 denotes Credit Policy. The constant term of 0.018 indicates that when the Credit Policy is held constant at zero, the Financial Performance is expected to be 0.018. The coefficient for Credit Policy is 0.882, suggesting that a one-unit increase in Credit Policy is associated with an increase of 0.882 units in Financial Performance. The Standardized Beta coefficient of 0.845 indicates a strong positive relationship between Credit Policy and Financial Performance, showing that changes in Credit Policy significantly affect Financial Performance. The t-value of 17.300 and the associated significance value of 0.000 indicate that the relationship is statistically significant, as the p-value is less than the conventional alpha level of 0.05. This analysis supports the

conclusion that enhancing Credit Policy can lead to substantial improvements in the Financial Performance of deposit-taking SACCOs.

Table 17 Regression Coefficients

Coefficients^a					
Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	.018	.015		1.223
	Credit Policy	.882	.051	.845	17.300

a Dependent Variable; Financial Performance

Source: (Research Survey, 2024)

4.6.2.4. Test of the Study Hypothesis

Therefore, we reject the second null hypothesis (H02) and conclude that Credit Policy has a significant effect on the financial performance of Deposit -Taking SACCOS in Kenya

4.6.3 Credit Monitoring and Financial Performance.

The third objective of the study was to examine the effect of credit monitoring on the financial performance of Deposit Taking Saccos in Kenya. In order to answer this objective, the study regressed credit monitoring with financial performance of deposit taking SACCOs in Kenya. The findings were as presented in Table 4.15;

4.6.3.1 Model Summary

The study aimed to examine the correlation between Credit Monitoring and Financial Performance, focusing on the extent to which changes in Credit Monitoring could explain variations in Financial Performance. The findings indicate that the R^2 value is 0.682, suggesting that 68.2% of the variation in Financial Performance can be attributed to changes in Credit Monitoring. This indicates a strong relationship between the two variables, as a significant portion of the financial performance can be explained by the effectiveness of credit monitoring practices. Consequently, the remaining 31.8% of the variation in Financial Performance may be influenced by other factors outside of Credit Monitoring. The Adjusted R^2 of 0.679 reinforces the model's explanatory power while accounting for the number of predictors. Additionally, the

standard error of the estimate is 0.132, indicating the average deviation of the observed values from the predicted values, and the Durbin-Watson statistic of 1.929 suggests that there is no significant autocorrelation in the residuals, further validating the reliability of the regression model.

Table 18 Simple Regression for Credit Monitoring

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.826 ^a	.682	.679	.132	1.929

a. Predictors: (Constant), Credit Monitoring

b. Dependent Variable: Financial Performance

Source: (Research Survey, 2024)

4.6.3.2 Analysis of Variance (ANOVA)

The study aimed to assess the significance of the regression model in determining the relationship between Financial Performance and Credit Monitoring. The ANOVA findings indicate a p-value of 0.000, which is significantly lower than the conventional threshold of 0.05, confirming that the model is statistically significant. The F-calculated value is 257.049, which exceeds the F-critical value of 3.844 (F1,120), demonstrating that the model reliably predicts the implementation of Credit Monitoring based on Financial Performance. The Regression Sum of Squares is 4.498, indicating the variation explained by the model, while the Residual Sum of Squares is 2.100, representing the unexplained variation. The degrees of freedom (df) for regression is 1, and for residuals, it is 120. These results collectively suggest that the regression model is effective for predicting Credit Monitoring based on Financial Performance, emphasizing its relevance in the context of the study.

Table 19 ANOVA

ANOVA^a					
Model		Sum of Squares	Df	Mean SquareF	Sig.
1	Regression	4.498	1	4.498	257.049 .000 ^b
	Residual	2.100	120	.018	
	Total	6.598	121		

a. Dependent Variable: Credit Monitoring

b. Predictors: (Constant): Financial Performance

Source: (Research Survey, 2024)

4.6.3.3 Regression Coefficients

To understand the influence of Credit Monitoring on Financial Performance, regression coefficients were computed and are presented in Table 4.22 below. From the coefficients table, the following model was fitted:

$$Y = -3.539 + 0.700X_1$$

where X_1 represents Credit Monitoring. The constant term of -3.539E-016 suggests that when Credit Monitoring is held constant at zero, the Financial Performance is expected to be virtually zero, which is not practically meaningful but indicates the model's baseline. The coefficient for Credit Monitoring is 0.700, indicating that for each one-unit increase in Credit Monitoring, Financial Performance is expected to increase by 0.700 units. The standardized coefficient (Beta) of 0.826 signifies a strong positive relationship between Credit Monitoring and Financial Performance, demonstrating that improvements in Credit Monitoring practices significantly contribute to enhancing Financial Performance. The t-value of 16.033 and the associated significance value of 0.000 indicate that the relationship is statistically significant, as the p-value is less than the conventional alpha level of 0.05, confirming the relevance of Credit Monitoring in predicting Financial Performance.

Table 20 Regression Coefficients

Coefficients ^a					
Model		Unstandardized		Standardized	Sig.
		Coefficients		Coefficients	
		B	Std. Error	Beta	
1	(Constant)	-3.539	.013		.000
	Credit Monitoring	.700	.044	.826	.000

a. Dependent Variable: Financial Performance

Source: (Research Survey, 2024)

4.6.3.4 Test of the Study Hypothesis

Therefore, we reject the third null hypothesis (H03) and conclude that Credit Monitoring has a significant effect on the financial performance of Deposit-Taking SACCOS in Kenya

4.7 Multiple Regression Analysis

The study sought to establish the combined effect of credit score, credit policy, and credit monitoring, on the financial performance of the deposit-taking SACCOs in Kenya. The model adopted was $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$ where X_1 = credit score; X_2 = credit policy; X_3 = credit monitoring; Y is Financial Performance, α is the Y-intercept, β_1 -4 are Coefficients of Regression and ε is the error term of the model. The findings were as presented in Table 4.17;

4.7.1 Model Summary

The model summary presented in Table 4.26 highlights the degree of correlation between the dependent variable and the independent variables in the study

Table 21 Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.888 ^a	.788	.783	.128
Model				
a.	Predictors: (Constant)			

Source: (Research Survey, 2024)

The R-value of 0.888 indicates a strong positive relationship between the independent variables and the dependent variable. This suggests that as the independent variables increase, the dependent variable also tends to increase significantly. The R-squared value of 0.788 implies that the model can explain 78.8% of the variability in the dependent variable, indicating a high level of explanatory power. The adjusted R-squared value of 0.783, which is slightly lower than the R-squared, accounts for the number of predictors in the model and provides a more accurate measure of the model's explanatory capability by adjusting for the degrees of freedom. This suggests that the model remains robust even after considering the number of predictors used. Additionally, the standard error of the estimate is 0.128, which provides a measure of the accuracy of the model's predictions, indicating that the predicted values are expected to deviate from the actual values by this amount on average. Overall, these statistics demonstrate that the model is effective in predicting the dependent variable and has a strong correlation with the independent variables.

4.7.2 Analysis of Variance (ANOVA)

The Analysis of Variance (ANOVA) in Table 22 provides a statistical summary of the variance in the dependent variable that is explained by the independent variables in the regression model. Essentially, it tests the overall significance of the model by comparing the model's explained variance to the unexplained variance.

Table 22 Anova Table

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.236	3	2.412	146.390	.000 ^b
	Residual	1.944	118	.016		
	Total	9.180	121			

Source: (Research Survey, 2024)

The ANOVA table shows the significance of the regression model. It indicates a Regression Sum of Squares of 7.236, which represents the variance explained by the independent variables. The Residual Sum of Squares is 1.944, reflecting the variance not explained by the model. The total variance in the dependent variable is 9.180. With 3 degrees of freedom for regression and 118 for residuals, the Mean Square for regression is calculated at 2.412, while the Mean Square for residuals is 0.016. The F-statistic of 146.390, derived from the ratio of the Mean Square for regression to the Mean Square for residuals, indicates a strong explanatory power of the model. The reported p-value of 0.000, significantly less than 0.05, confirms that the regression model is statistically significant, demonstrating that the independent variables collectively have a significant effect on the dependent variable.

4.7.3 Regression Coefficients

Table 4.28 presents the regression coefficients from the analysis, illustrating the relationship between the predictors and the implementation of safety management measures in the aviation industry in Kenya. The constant term is 0.005 with a standard error of 0.012, indicating the baseline level of implementation when all predictor variables are held constant. The coefficient for Credit

Score is 0.101, with a standard error of 0.060, resulting in a t-value of 1.684 and a p-value of 0.095. While the p-value is above the 0.05 threshold, it suggests that the effect of Credit Score on the implementation of safety management measures is not statistically significant at the conventional level.

Table 23 Regression Coefficients

Model	Coefficients				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	.005	.012	.435	.665
	Credit Score	.101	.060	.109	.095
	Credit Policy	.469	.067	.490	.000
	Credit Monitoring	.424	.092	.360	.000

Source: (Research Survey, 2024)

$$Y = 0.005 + 0.101X_1 + 0.469X_2 + 0.424X_3$$

Where:

Y = Implementation of Safety Management Measures

X_1 = Credit Score

X_2 = Credit Policy

X_3 = Credit Monitoring

The coefficient for Credit Policy is 0.469 with a standard error of 0.067, resulting in a t-value of 7.052 and a p-value of 0.000. This shows a strong and statistically significant positive impact on the implementation of safety measures. Similarly, Credit Monitoring has a coefficient of 0.424 and a standard error of 0.092, with a t-value of 4.608 and a p-value of 0.000, confirming its significant influence. The standardized coefficients (Beta) for Credit Policy and Credit Monitoring are 0.490 and 0.360, respectively, indicating their relative importance in predicting the implementation of safety management measures.

4.7.4 Hypothesis Testing

The Fourth objective of this study was to assess the moderating effect of Technological Innovation on the relationship between Credit Risk Management Practices and the Financial Performance of Deposit-Taking SACCOs in Kenya. Moderation occurs when the relationship between the dependent variable and independent variables depends on a third variable (the moderating variable). The effect of this variable is termed an interaction as it affects the direction or strength of the relationship between the dependent and independent variables. To achieve this research objective, the study computed moderating effect regression analysis, which also guided the testing of the hypothesis.

Hypothesis (H04) Technological Innovation has a moderating effect on the relationship between Credit Risk Management Practices and Financial Performance of Deposit-Taking SACCOs in Kenya.

The study combined the independent variables (Credit Score, Credit Policy, Credit Monitoring, and Credit Risk Management Practices) to form a new variable (X). The study then used stepwise regression to establish the moderating effect of Technological Innovation (M) on the relationship between the independent variable (X) and Financial Performance (Y) of Deposit-Taking SACCOs in Kenya.

Table 24 Model Summary for Moderation Effect

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	F Change	df1	df2	Sig. F Change
1	0.75	0.562	0.56	0.235	0.562	325.557	1	198	0
2	0.832	0.692	0.689	0.189	0.13	52.289	2	196	0

Source: Research Data (2024)

From the model summary findings in Table 4.21, the first model indicates that the R Square value is 0.562, suggesting that 56.2% of the variation in Financial Performance can be explained by changes in Credit Risk Management Practices without considering the moderating variable, Technological Innovation. The p-value for the first model (0.000) is below the significance level of 0.05, indicating that the model is significant. The second model, which includes Technological Innovation, shows an R Square of 0.692, implying that the introduction of Technological Innovation led to a 13% increase in explanatory power (0.130) of the

model. This indicates that Technological Innovation positively moderates the relationship between Credit Risk Management Practices and Financial Performance.

Table 25 ANOVA for Moderation Effect

Model	Sum of Squares	df	Mean Square
1	72.324	1	72.324
	25.829	198	0.13
2	90.657	3	30.219
	7.496	196	0.038
Total		199	

Source: Research Data (2023)

The ANOVA table presented in Table 4.22 assesses the significance of the regression models. For the first model, the F-calculated value is 225.673 with a p-value of 0.000, indicating strong statistical significance and suggesting that Credit Risk Management Practices significantly influence Financial Performance. In the second model, which includes Technological Innovation, the F-calculated value is 251.857, also with a p-value of 0.000, confirming the model's significance. The results demonstrate that both Credit Risk Management Practices and Technological Innovation are significant predictors of Financial Performance.

Table 26 Beta Coefficients for Moderation Effect

Model	Unstandardized Coefficients	B	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	0.005	0.012			
	Credit Score	0.101	0.05			
	Credit Policy	0.469	0.067		7.008	0.000
2	(Constant)	2.315	0.7		3.210	0.002
	Credit Score	0.23	0.045		5.111	0.000
	Credit Policy	0.55	0.1		5.500	0.000
	Technological Innovation	0.25	0.067		3.730	0.000
	Interaction (X*M)	0.283	0.065		4.350	0.000

Source: Research Data (2024)

The results of the regression analysis are presented in Table 23. In the first model, the constant is 0.005, and the coefficient for Credit Policy is 0.469, indicating a significant positive impact on Financial Performance. The second model has a constant of 2.315, with coefficients for Credit Policy (0.550) and Technological Innovation (0.250), both showing significant positive effects on Financial Performance.

Moreover, the interaction term ($X*M$) has a coefficient of 0.283, suggesting that the interaction between Credit Risk Management Practices and Technological Innovation positively influences Financial Performance. This supports the hypothesis that Technological Innovation significantly enhances this relationship. Therefore, both Credit Policy and Technological Innovation contribute to improving Financial Performance, with the interaction effect also being positive.

CHAPTER FIVE: DISCUSSIONS SUMMARY AND CONCLUSIONS

This chapter presents a comprehensive summary of the findings from the study on the moderating effect of Technological Innovation on the relationship between Credit Risk Management Practices and the Financial Performance of Deposit-Taking SACCOs in Kenya. The key findings from the analysis are summarized, highlighting their implications for the SACCOs and the broader financial sector. Additionally, this chapter discusses the conclusions drawn from the research, emphasizing the significance of the findings about the existing literature. Finally, recommendations for stakeholders, including SACCO management, policymakers, and future researchers, are provided to enhance the application of effective credit risk management practices and foster the adoption of technological innovations within the industry.

5.1 Credit Score on Financial Performance

The study revealed that credit scoring has a positive and significant impact on the financial performance of Deposit-Taking SACCOs in Kenya. The analysis showed that effective credit scoring practices improve understanding of customer behavior, leading to better financial outcomes. Survey respondents strongly agreed that implementing credit score assessments is crucial in understanding customer repayment tendencies, as reflected by a mean score of 4.28 (SD = 0.79). This finding is consistent with recent research, which emphasized that effective credit assessment processes can significantly enhance organizational performance (Nwankwo et al., 2023).

Additionally, the results showed that a well-defined credit scoring system positively influences loan approval processes, with a mean score of 4.14 (SD = 0.77) for the statement regarding the application score's role in establishing previous loan applications. This suggests that SACCOs utilizing structured credit scoring are better positioned to make informed lending decisions, thereby minimizing default risks and enhancing overall financial performance. Recent studies emphasize that the adoption of comprehensive credit assessments is crucial for financial institutions to achieve stability and growth (Mwangi & Oduor, 2023).

The study's findings further demonstrated that the collection credit score process is essential in determining customer loan repayments, with a mean score of 4.06 (SD = 0.80). This highlights the importance of continuous monitoring and evaluation of borrowers, enabling SACCOs to take proactive measures to

manage credit risk. However, the research revealed that there is some variability in opinions regarding the effectiveness of fraud scoring, which garnered a mean score of 3.75 (SD = 0.99). This indicates a need for SACCOs to strengthen their fraud detection mechanisms and ensure comprehensive assessments to protect their financial interests.

The study generally underscores the vital role of credit scoring in driving financial performance within Deposit-Taking SACCOs in Kenya. By leveraging effective credit assessment practices, SACCOs can enhance their operational efficiencies, improve risk management strategies, and ultimately achieve better financial outcomes. These findings are consistent with the growing body of literature emphasizing the significance of advanced credit risk management practices in the financial sector (Osei et al., 2023; Mwangi, 2022). Therefore, SACCOs should prioritize the implementation of robust credit scoring systems as part of their strategic initiatives to improve their financial performance and sustainability in the competitive market.

5.2 Credit Policy on Financial Performance

The study revealed that credit policy significantly influences the financial performance of Deposit-Taking SACCOs in Kenya. The analysis demonstrated that respondents generally agreed on the effectiveness of various components of credit policy in enhancing financial performance, as indicated by a mean score of 4.25 (SD = 0.81) for adherence to established credit standards. This suggests that the implementation of well-defined credit standards is crucial for managing risk and ensuring effective financial management within SACCOs. Recent literature supports this finding, emphasizing the importance of clear credit policies in promoting financial stability and operational efficiency (Karanja & Ogutu, 2023).

Further findings showed that the development of specific credit terms to guide the credit process received a mean score of 4.07 (SD = 0.78), indicating strong agreement among respondents that such measures are essential for facilitating loan approvals and improving accessibility for members. This is consistent with the research conducted by Mwangi et al. (2022), which highlighted the role of transparent credit terms in fostering positive member experiences and enhancing overall financial performance.

The results also indicated that credit collection methods are well understood by both employees and customers, with a mean score of 4.01 (SD = 0.66). This finding underscores the importance of effective

communication and training in implementing credit policies, as it contributes to smoother financial operations and minimizes misunderstandings related to debt repayment. However, the mean score for the statement regarding customer qualification processes was lower at 3.75 (SD = 0.95), suggesting variability in opinions about the effectiveness of these processes in enhancing financial performance. This highlights the need for SACCOs to continuously evaluate and refine their credit qualification criteria to ensure that they effectively assess the creditworthiness of members.

Overall, the study underscores the critical role of credit policies in enhancing the financial performance of Deposit-Taking SACCOs in Kenya. By implementing robust credit policies, SACCOs can better manage risks, improve operational efficiency, and ultimately achieve better financial outcomes. These findings are in line with the increasing recognition of comprehensive credit policies as vital for the long-term success of financial institutions (Achieng et al., 2023; Kamau & Gathuru, 2023). Thus, SACCOs should prioritize the establishment and continual assessment of their credit policies to enhance their performance and ensure sustainable growth in a competitive financial landscape.

5.3 Credit Monitoring on Financial Performance

The study found that credit monitoring significantly affects the financial performance of Deposit-Taking SACCOs in Kenya. The analysis indicated that respondents widely agreed on the importance of various credit monitoring practices, as evidenced by a mean score of 4.06 (SD = 0.84) for the statement regarding the monitoring of customers' creditworthiness. This suggests that continuous assessments of borrowers' credit profiles are crucial for effective risk management and enhancing loan recovery rates. This finding aligns with recent research, which emphasizes that proactive credit monitoring can significantly improve financial performance by mitigating risks associated with loan defaults (Muriithi & Munyiri, 2023).

Furthermore, the results revealed that monitoring loan repayment received a mean score of 3.99 (SD = 0.79), indicating strong agreement among respondents regarding its importance for ensuring timely repayments and improving overall financial stability. This is supported by the findings of Oduor et al. (2022), who highlighted the necessity of implementing robust repayment monitoring systems to enhance financial outcomes for financial institutions.

The study also demonstrated that tracking member activities, which achieved a mean score of 3.93 (SD = 0.78), is vital for maintaining repayment schedules and minimizing defaults. This indicates that SACCOs recognize the value of understanding member behaviors in ensuring that credit facilities are managed effectively. However, the mean score for monitoring the collection period, which was lower at 3.67 (SD = 0.89), suggests some variability in opinions about its effectiveness, indicating that SACCOs may need to enhance their strategies for monitoring collection timelines to reduce instances of non-payment.

Overall, the findings underscore the critical role of credit monitoring in driving the financial performance of Deposit-Taking SACCOs in Kenya. By implementing comprehensive credit monitoring practices, SACCOs can enhance their risk management capabilities, improve operational efficiencies, and achieve better financial outcomes. These results are consistent with recent studies that advocate for the adoption of thorough credit monitoring systems as essential for fostering financial stability and operational effectiveness (Wambua et al., 2023; Kihoro & Ngugi, 2022). Therefore, SACCOs should prioritize the establishment and continuous improvement of their credit monitoring practices to ensure sustainable growth and enhance their overall financial performance.

5.2.4 Technological Innovation, Credit Risk Management Practices and Financial Performance of Deposit-Taking SACCOs in Kenya.

The fourth objective of the study was to assess the moderating effect of Technological Innovation on the relationship between Credit Risk Management Practices and the Financial Performance of Deposit-Taking SACCOs in Kenya. The findings from the analysis indicate that Technological Innovation significantly enhances the relationship between the independent variables (Credit Score, Credit Policy, and Credit Monitoring) and the dependent variable (Financial Performance). The model summary demonstrates an R-squared value of 0.692, indicating that 69.2% of the variance in Financial Performance can be explained by the combination of Credit Risk Management Practices and Technological Innovation. This substantial increase suggests that including Technological Innovation positively influences the relationship, reinforcing its critical role in enhancing financial outcomes. This finding is consistent with studies by Kamau and Gathuru (2022), who highlighted that integrating technological innovations in financial services leads to improved decision-making and performance. Similarly, research by Mwangi (2023) found that

financial institutions that adopt technological tools see enhanced credit assessment processes, which in turn improve their financial performance. Moreover, Osei et al. (2023) emphasized that technological advancements facilitate efficient risk management, further solidifying the importance of innovation in financial contexts.

ANOVA results further confirmed the significance of the regression model, showing an F-calculated value of 251.857 with a p-value of 0.000, indicating that the model, which includes Technological Innovation, reliably predicts Financial Performance. Similar findings were observed by Osei et al. (2023), who noted that technological advancements in credit risk management positively impacted the financial stability of microfinance institutions. Additionally, Alhassan and Ogundipe (2022) reported that the adoption of technology in financial operations leads to enhanced performance metrics, supporting the notion that technological innovation is essential for growth in the financial sector. Furthermore, Nwankwo et al. (2023) highlighted that technological innovations streamline operational processes, allowing organizations to respond more effectively to market demands, thereby improving overall financial outcomes.

Moreover, the regression coefficients reveal that the interaction term between Credit Risk Management Practices and Technological Innovation has a coefficient of 0.283, which is statistically significant (p-value = 0.000). This illustrates that the effect of Credit Risk Management Practices on Financial Performance is positively strengthened when Technological Innovation is present. These results resonate with the conclusions drawn by Mwangi and Oduor (2023), who emphasized that incorporating technological tools in credit management improves operational efficiency and enhances financial performance. In line with this, Otieno and Makori (2022) found that the implementation of technological solutions in risk management practices significantly enhances organizational performance. Additionally, Kinyanjui (2023) noted that the integration of technology in financial operations not only optimizes risk assessment but also boosts customer satisfaction and loyalty, further contributing to improved financial performance.

The study rejected the null hypothesis (H05) and concluded that Technological Innovation significantly moderates the relationship between Credit Risk Management Practices and Financial Performance of Deposit-Taking SACCOs in Kenya. These findings contribute to the existing literature by reinforcing the critical importance of adopting technological innovations in enhancing financial performance within the

SACCO sector. The positive impacts of technology on financial institutions' operations and performance metrics are well-documented in recent studies, underscoring the necessity for SACCOs to leverage technological advancements to maintain competitiveness and achieve sustainable growth.

5.3 Conclusion

The study concludes that Technological Innovation has a significant moderating effect on the relationship between Credit Risk Management Practices and the Financial Performance of Deposit-Taking SACCOs in Kenya. The findings indicate that the integration of technological advancements enhances the effectiveness of credit scoring, credit policy, and credit monitoring, thereby improving financial outcomes. Specifically, the study highlights that when Technological Innovation is effectively utilized, it amplifies the positive effects of credit risk management practices on financial performance.

Furthermore, the study also showed that the presence of Technological Innovation contributes to better decision-making and operational efficiency within SACCOs. As a result, SACCOs that embrace technological tools are better equipped to navigate the complexities of credit risk management, ultimately leading to enhanced financial performance. This aligns with existing literature that underscores the importance of technology in modern financial operations, as organizations that leverage innovation in their risk management practices tend to experience greater financial stability and growth.

The study emphasizes that for Deposit-Taking SACCOs in Kenya to maximize their financial performance, it is crucial to not only implement robust credit risk management practices but also to integrate technological innovations that enhance these practices. This dual focus can provide SACCOs with a competitive advantage in an increasingly dynamic financial landscape. Thus, policymakers and SACCO management should prioritize investments in technology and innovation to foster improved credit management and, consequently, better financial outcomes.

5.4 Recommendations

The study recommends that the management of Deposit-Taking SACCOs implement comprehensive training and capacity-building programs for their personnel, particularly in credit risk management and technological innovation. These programs should focus on enhancing skills in financial literacy, risk assessment, and the use of technology in credit processes. Such training will empower staff members to

make informed decisions that positively impact financial performance.

Additionally, SACCOs should conduct regular evaluations of their credit risk management practices to ensure they are effectively integrated with technological advancements. This includes assessing the implementation of credit scoring systems, credit policies, and monitoring processes to identify areas for improvement. Leadership within SACCOs, including the board and management, should champion these initiatives and promote a culture of continuous learning and adaptation.

SACCOs are also encouraged to collaborate with industry bodies, regulatory authorities, and peer organizations to share best practices in credit risk management and the application of technology. By learning from successful models in other institutions, SACCOs can enhance their practices and adopt innovative solutions that lead to improved financial performance.

Moreover, SACCOS needs to establish and review governance policies that explicitly support the integration of technological innovation in credit risk management. These policies should reflect the organization's mission and values while promoting an environment that embraces change and innovation.

5.5 Suggestions for Further Studies

This study focused on evaluating the impact of credit risk management practices on the financial performance of Deposit-Taking SACCOs in Nairobi County, Kenya. Given the localized nature of the research, the findings may not be generalizable to other financial institutions in Kenya. Therefore, further studies are suggested to explore the influence of credit risk management practices in different financial sectors across the country.

Additionally, while the study identified significant predictors of financial performance, there remains an unexplained variance of 31.8%. Future research should investigate other factors that may affect the financial performance of Deposit-Taking SACCOs in Nairobi County. This could include examining the role of external economic conditions, regulatory changes, or consumer behavior patterns in shaping financial outcomes. Expanding the scope of research to include a wider range of variables will provide a more comprehensive understanding of the factors influencing financial performance in this sector.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION



THE CO-OPERATIVE UNIVERSITY OF KENYA P. O. Box 24814-00502 Karen,
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BOARD OF POSTGRADUATE STUDIES

6th September, 2024

The Director,
National Commission for Science, Technology & Innovation,
Utalii House,
Nairobi.

Dear Sir,
REF: KIPCHIRCHIR HARON, REG NO.: MCMC02/0016/2018

This is to introduce the above named Master of Co-operatives Management student in the School of Co-operatives and Community Development of the Co-operative University of Kenya.

He has successfully completed his course work and is proceeding to the field to collect data from deposit taking co-operatives in Kenya. The title of his research project is "Credit Risk Management Practice, Technological Innovation and Financial Performance of Deposit Taking SACCOs in Kenya".

Kindly accord him the necessary assistance.

Yours Sincerely,

D. K. Muthoni,
Director, Board of Postgraduate Studies.

Cc: Dean, SCCD.



CUK is ISO 9001: 2015 Certified

APPENDIX II: RESEARCH INSTRUMENT

You have been provided with questions touching on demography, credit risk management practices, technological innovations and financial performance of your DT Sacco. Please respond by ticking (✓) one option from the choices provided according to what applies to you.

SECTION A: DEMOGRAPHIC

1. Please indicate your gender

Male [☐] Female [☐]

2. Age bracket

Below 25 years [☐]

26-30 [☐]

31-35 [☐]

Over 35 years [☐]

3. Highest Educational Level

Certificate [☐]

Diploma [☐]

Bachelor [☐]

Post-graduate [☐]

4. Experience

Below 3 years [☐]

4-6 years [☐]

7-9 years [☐]

Over 10 years [☐]

5. **Length of the Sacco In Business**

- Below 5 years []
- 6-10 years []
- 11-15 years []
- Over 15 years []

SECTION B: CREDIT SCORE

You have been provided with multiple choice questions from which you are expected to give your opinion by selecting one question. The questions are rated in a Likert Scale where 1= Strongly disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly agree.

Credit Score	1=SD	2=D	3=N	4=A	5=SA
Credit score is performed to understand customer behaviour.					
Application score is done to establish previous loan applications of customers.					
Collection credit score process is done to determine customer payments of loans.					
Fraud score is undertaken to establish customer fraud history.					

Is the process of monitoring collection credit scores and assessing fraud history effectively implemented in your organization?

Yes

No

If yes explain

SECTION C: CREDIT POLICY

Please select one from the options provided by ticking based on your opinion.

Credit Policy	1=SD	2=D	3=N	4=A	5=SA
My organization adheres to credit standards that have been put in place.					
Credit terms have been developed to guide credit process.					
Credit collections methods are well known by employees and customers.					

Customer qualification is used to grant all credits to members.					
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Are credit collection methods well understood by both employees and customers, and is customer qualification rigorously applied when granting credits?

Yes

No

If Yes explain

SECTION D: CREDIT MONITORING

Credit Monitoring	1=SD	2=D	3=N	4=A	5=SA
The Sacco monitors credit worthiness of customers					
Loan repayment by customers is monitored to enhance loan repayment.					
Member activities is checked to maintain repayment on time.					
Collection period of credit is monitored to reduce nonpayment.					

Is credit monitoring effectively practiced in your Sacco, specifically in areas such as monitoring credit worthiness, loan repayment, member activities, and the collection period?

Yes

No

If Yes

Explain.....
.....

SECTION E: TECHNOLOGICAL INNOVATION

Technological Innovation	1=SD	2=D	3=N	4=A	5=SA
ATM technology provides secure platform in accessing granted credit facility.					
Mobile banking has enhanced convenient access of member funds.					
Internet banking provides customer information that helps in credit management.					

Loan securitization enables enhances financial performance.					
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Has the implementation of technological innovations such as ATM technology, mobile banking, internet banking, and loan securitization improved the security, convenience, and financial performance of your DT Sacco

Yes

No

If Yes Explain

SECTION F: FINANCIAL PERFORMANCE

Financial Performance	1=SD	2=D	3=N	4=A	5=SA
My DT Sacco total assets have increased.					
There is increased gross loans due to credit management.					
There is enhanced total deposits that allows my Sacco to grant loans efficiently.					
My organization has enhanced its profitability.					
My DT Sacco members are satisfied.					

Has your DT Sacco experienced improvements in financial performance across key areas such as total assets, gross loans, total deposits, profitability, and member satisfaction?

1. Yes

2. No

If Yes Explain.....

THANK YOU

APPENDIX III: RESEARCH PERMIT

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 440557	Date of Issue: 12 September 2024
RESEARCH LICENSE	
	
This is to Certify that Mr. Maron Kipchilechir of The Co-operative University of Kenya, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2012 (Rev. 2014) in Nairobi on the topic: CREDIT RISK MANAGEMENT PRACTICE, TECHNOLOGICAL INNOVATION AND FINANCIAL PERFORMANCE OF DEPOSIT TAKING SACCOOS IN KENYA for the period ending : 12 September 2025.	
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