ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 13, Issue 4, pp: (585-593), Month: October - December 2025, Available at: www.researchpublish.com

Influence of Internet Banking Technology on Loan Performance of Deposit-Taking SACCOs in Nairobi City County, Kenya

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DOI: https://doi.org/10.5281/zenodo.17960271

Published Date: 17-December-2025

Abstract: **Technological advancements in the digital financial sector have enabled financial institutions to enhance operational efficiency while prioritizing customer needs. This study aimed to examine the effect of internet banking technology on loan performance among Deposit- Taking Savings and Credit Cooperative Organizations (DT SACCOs) in Nairobi City County. Specifically, the study explored how digital financial innovations influence the loan performance of DT SACCOs. Previous research underscored the importance of adopting financial innovations in the financial services industry. To establish the research gaps and theoretical foundation, the study reviewed the diffusion of innovation theory along with relevant literature. A descriptive research design was employed, targeting a sample of 70 respondents comprising members of the board of management and staff from forty DT SACCOs within Nairobi City County. Out of the 70 distributed questionnaires, 63 were completed and returned, yielding a response rate of 90%. The analysis revealed that most respondents acknowledged a significant influence of internet banking technology on loan performance in DT SACCOs, with a mean score of 4.18. Regression analysis and hypothesis testing further confirmed that the implementation of digital financial innovations in loan processes positively influences loan performance. Based on these findings, the study recommends that DT SACCOs adopt internet banking technology to enhance their loan portfolio performance, especially as the financial sector increasingly transitions toward a digital environment.**

Keywords: **Digital Financial innovation, loan performance, deposit-taking SACCOs.**

1. INTRODUCTION

1.1. Digital Financial Innovation

Digital financial innovation refers to the application of technological advancements in the delivery of financial services (Pazarbasioglu et al., 2020). Over the past three decades, the financial sector has undergone significant digital and technological transformations, enabling institutions to redesign their business models for enhanced service delivery, increased operational efficiency, and customer-centric approaches (Beck, 2020). Innovations in internet connectivity, mobile technology, advanced computing, data portability, artificial intelligence, and robotics have collectively driven the evolution of digital financial solutions (Frame, Wall & White, 2018).

Internet or online banking is a specific form of digital innovation that leverages the internet to deliver banking services (OECD, 2020). It allows customers to perform financial transactions using devices such as computers, smartphones, and tablets through their banks' online portals offering convenience by eliminating the need to physically visit banking premises (Tahir et al., 2018). In Kenya, the adoption of online banking has grown steadily, contributing to improved operational efficiency and minimized risks associated with in-person transactions. However, a significant barrier to adoption remains the high initial cost of establishing digital infrastructure (Ndwiga & Maina, 2018).

The fast-paced evolution of technology and increasing internet penetration have compelled financial institutions, including SACCOs, to reevaluate their customer engagement and retention strategies. By delivering quality services conveniently and at a lower cost, internet banking has enhanced the overall customer experience and attracted a broader client base, particularly among tech-savvy millennials (Jepchumba & Simiyu, 2019; Abbasi, Kamran & Akhtar, 2017). Despite its benefits, online banking adoption presents challenges such as internet outages, cyber security threats, and breaches of customer privacy (Abdou, Hadjiantoni & Derwin, 2015). In recent years, the rise in cyber threats has led to unauthorized access to banking systems, resulting in fraudulent activities including account manipulation, data breaches, and malware attacks that compromise customer trust (Abbasi, Kamran & Akhtar, 2017).To address these concerns, financial institutions must not only invest in robust security systems but also actively educate customers on safe internet practices, as improper usage can increase vulnerability to online fraud (Ameme & Yeboah-Boateng, 2016).

1.2 Loan Performance

Lending is a core function of SACCOs, making loan performance a critical determinant of their liquidity and profitability. Nsengiyumva and Harelimana (2020) define loan performance as the measure of whether loans are repaid in full according to the loan agreement. Loan performance is thus a central factor in the financial stability of any institution involved in credit provision. When borrowers make repayments including interest on schedule, the loan is classified as performing. However, there is always the inherent risk that borrowers may fail to meet their obligations as agreed, leading to the classification of such loans as non-performing. This, in turn, negatively impacts a SACCO's profitability.

The global financial crisis of 2008 highlighted significant deficiencies in loan performance management practices, as well as the financial sector's inability to detect and mitigate risks in a timely manner (Nguyen, Dao & Hussain, 2020; Bauze, 2019). Non-performing loans (NPLs) not only diminish a SACCO's ability to issue new credit but also deprive it of expected revenue in the form of interest payments (Mensa, 2015). Mensa further underscores the pivotal role of performing loans in supporting institutional growth, linking loan performance to key financial indicators such as lending capacity, liquidity, and overall profitability.

Poor appraisal procedures, improper client selection, and weak loan monitoring mechanisms have been identified as major contributors to loan defaults within SACCOs (Samoei, Kiprotich, Nambuswa & Namusomge, 2015). However, digital financial innovations have been increasingly recognized for their potential to mitigate these challenges. Research indicates that such innovations can mitigate the risk of onboarding high-risk borrowers (Arner, Auer & Frost, 2020), lessen cash-handling risks such as theft and fraud, and save time and resources (D'Silva, Filková, Packer & Tiwari, 2019).

Additionally, they improve transaction efficiency and shorten decision-making turnaround times (Feyen et al., 2021), thereby contributing to enhanced liquidity and profitability (Goldfarb & Tucker, 2019).In their study on mobile money innovation, Memba and Sum (2016) found that the adoption of digital financial technologies significantly improved loan performance by lowering default rates, which in turn reduced the burden of non-performing loans on financial institutions.

1.3 Statement of the Problem

Over the past decade, many SACCOs in Kenya have adopted digital financial innovations to remain competitive in the rapidly evolving financial services sector. Several studies have examined the impact of these innovations on the SACCO sector (Tsuma, 2015; Nderitu, Muthii & Ngina, 2020; Moki, Ndungu & Kinyua, 2019; Tahir et al., 2018; Agufa, 2016; Aoko, 2017; Jeruto, 2020). These studies generally conclude that effective implementation of digital financial innovations can lead to improved service delivery, enhanced liquidity, increased profitability, and overall better financial performance for SACCOs.

Despite substantial investment in digital technologies, many SACCOs continue to experience high levels of non-performing loans (NPLs), exceeding the regulatory threshold of 5% of the total loan book as recommended by the Sacco Societies Regulatory Authority (SASRA). According to the SASRA Supervisory Report (2020), the NPL rate for DT SACCOs has shown a steady increase over the past five years: 5.12% (2015), 5.23% (2016), 6.14% (2017),

6.30% (2018), 6.15% (2019), and 8.39% (2020). Persistent high loan delinquency rates contribute to elevated NPLs, which in turn strain liquidity and hinder SACCOs from fulfilling their obligations (Jeruto, 2020). Given that loan issuance is a central function of SACCOs, the performance of these loans is crucial to maintaining both liquidity and profitability. An increase in NPLs is indicative of deteriorating loan performance.

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It is also evident that most existing research on digital financial innovations has predominantly focused on financial performance as the dependent variable (Wamugo, 2018; Nekesa & Olweny, 2018; Njenga, Kiragu & Opiyo, 2015; Mwangi, 2018; Mugo, Muathe & Waithaka, 2018), with limited attention given to loan performance. This study seeks to address that gap by specifically examining the impact of digital financial technologies on loan performance. It focuses on key digital innovations including mobile banking technology, process digitalization, application programming interfaces (APIs), and internet banking and their influence on the loan performance of DT SACCOs in Nairobi City County.

1.4 General Objective

The primary objective of this study is to assess the effect of internet banking technology on loan performance in deposit-taking SACCOs within Nairobi City County.

1.5 Research Hypothesis

H_{01}: Internet banking technology does not have a significant effect on the loan performance of deposit taking SACCOs in Nairobi City County.

2. LITERATURE REVIEW

2.1. Theory of Asymmetric Information

Originally introduced in the 1970s, the Theory of Asymmetric Information suggests that an imbalance of information occurs when one party in a transaction possesses more or better information than the other, thereby gaining an unfair advantage (Ogunsanwo, Abdulai & Abere, 2020). In the context of deposit-taking SACCOs (DT SACCOs), such asymmetry arises when a member applying for a loan withholds relevant information that could influence the loan approval decision (Chege, Olweny & Opuodho, 2018). This leads to challenges such as moral hazard—where borrowers use loan funds for unintended purposes—and adverse selection—where loans are approved based on inaccurate or incomplete borrower profiles. These issues contribute significantly to poor loan performance, as reflected in the high default rates reported within the SACCO sector.

To address these challenges, DT SACCOs are increasingly leveraging internal member data to assess borrower creditworthiness. Additionally, they are adopting digital technologies that allow access to third-party databases, which support more informed and accurate loan approval decisions (Gachora, 2015). The Theory of Asymmetric Information is therefore highly relevant to this study, as it helps explain how digital innovations can mitigate information gaps and enhance loan performance in DT SACCOs (Chantal, Namusonge & Shukla, 2018).

2.2 Empirical Review

Internet (online) banking innovation involves the use of the internet to deliver financial services (OECD, 2020). Through internet banking, customers can conveniently access and manage their bank accounts using computers, mobile phones, or tablets via an online portal on their bank's website, eliminating the need for physical visits to bank branches (Tahir, Shah, Arif, Ahmad, Aziz & Ullah, 2018). In Kenya, the adoption of online banking by financial institutions has led to enhanced operational efficiency and reduced risks associated with physical transactions. However, one of the major challenges remains the high initial cost of establishing the necessary online infrastructure (Ndwiga & Maina, 2018).

The rapid evolution of technological systems, combined with widespread internet penetration, has compelled many financial institutions, including SACCOs, to re-evaluate their strategies for attracting and retaining customers, particularly in terms of service delivery (Otundo, 2019). Online banking technology enables institutions to offer high-quality services at the customers' convenience and at minimal cost, significantly enhancing the member experience. This is especially true among younger, tech-savvy demographics such as the millennial population (Jepchumba & Simiyu, 2019; Abbasi, Kamran & Akhtar, 2017).

Despite its benefits, the adoption of online banking technology comes with inherent risks and challenges. These include issues like internet downtime, the security of online channels, and breaches of customer privacy due to cyber-attacks (Abdou, Hadjiantoni & Derwin, 2015). In recent years, both customers and banks have faced rising threats to data security and privacy. Unauthorized access to banking systems has led to various forms of fraud, including account manipulation,

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data theft, and malware attacks, all of which contribute to diminished customer trust (Abbasi, Kamran & Akhtar, 2017). To mitigate these risks, financial institutions must not only implement strong cybersecurity measures but also educate customers about safe internet practices to reduce their vulnerability to online fraud (Ameme & Yeboah-Boateng, 2016).

2.3 Conceptual Framework

A conceptual framework offers a visual representation of the relationship between the study's independent and dependent variables. This study adopts the Disruptive Innovation Theory (DI) to illustrate and explain how the independent variable internet banking technology affects the dependent variable loan performance in deposit-taking SACCOs within Nairobi City County.

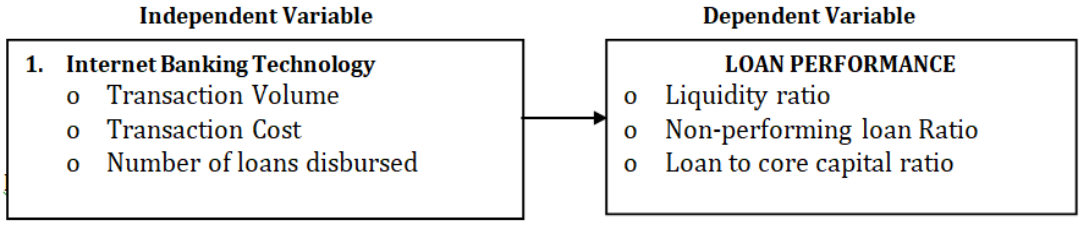

Figure 1: Conceptual Framework

3. METHODOLOGY

The study employed a descriptive research design to assess the impact of digital financial innovations on loan performance. Descriptive statistics were used to summarize and interpret the characteristics, patterns, and trends observed among the study subjects through measures such as central tendencies, means, and standard deviations. The results were visually presented using pie charts, graphs, tables, and cross-tabulations. Additionally, inferential statistics were applied to draw conclusions about the broader population based on the observed data from the descriptive analysis. The target population consisted of 190 individuals, comprising all members of the Board and staff from the forty deposit-taking SACCOs (DT SACCOs) licensed by SASRA in Nairobi City County (SASRA, 2020; Priyono, 2017).

To select respondents, the study adopted a stratified random sampling technique. Upon obtaining the list of the 40 SASRA-accredited DT SACCOs in Nairobi City County, the researcher divided each SACCO's population into two primary strata: members of the Board of Management and SACCO employees. This stratification facilitated more effective data collection, management, and interpretation. Stratified random sampling is recognized for its high statistical precision, whether in small or large sample sizes, and provides researchers with enhanced control over each stratum (Orangi, 2019). A sample size of 70 respondents was determined using the Nassiuma formula (Nassiuma, 2008 as cited by Orangi, 2019), which posits that the range of $21\% \leq C \leq 30\%$ for a coefficient of variation and $2\% \leq e \leq 5\%$ for standard variation is acceptable in most surveys.

$n = NC^2 / (C^2 + (N-1)\, e^2)$

Where:

n = Sample size

N= Accessible population

C = Coefficient of Variance in the range of$21\% \leq C \leq 30\%$

e= Standard error in the range of $2\% \leq e \leq 5\%$

Data collection for this study involved the use of questionnaires to gather primary data, while secondary data were obtained from relevant sources such as records, academic journals, annual reports, financial statements, and official websites for review and analysis. To assess the content validity of the research instrument, the Lawshe formula was employed. Content validity refers to the degree to which an instrument accurately measures all aspects of the concept under investigation. It evaluates the appropriateness and relevance of responses, questions, or observation logs in capturing the intended construct (Daud, Khidzir, Ismail & Abdullah, 2018). A content validity index (CVI) above the critical threshold of 0.778 is generally accepted for a panel of nine experts (Nikolopoulou, 2022). In this study, the instrument achieved a CVI score of 0.882, indicating strong content validity and confirming that the instrument effectively measured the intended variables.

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Reliability of the questionnaire was determined using Cronbach's Alpha Index. Reliability refers to the consistency of a measuring instrument—its ability to produce stable and consistent results across repeated applications (Architha & Aithal, 2020). To compute the Cronbach's Alpha Index, a pilot test was conducted using 10 questionnaires. The results revealed a Cronbach's alpha value of 0.98 for the variable related to internet banking technology. According to Taber (2017), a Cronbach's alpha score of 0.7 or higher is considered acceptable, indicating that the research instrument is both valid and reliable.

Multiple Linear Regression analysis is used to establish the correlations between variables and sub-variables. The multiple regression analysis model is indicated below:

$Y= \beta 0+ \beta 1X1+ \beta 2X2+ \beta 3X3+ \beta 4X4 + \varepsilon$

Where:

Y = Loan Performance

$\beta 0$ = Intercept (Constant)

$\beta 1 - \beta 4$ = Coefficients

X1 = Internet Banking Technology

ε = Probable Error Term

Hypothesis testing was conducted to examine the significance of the relationships between the study variables. The analysis was guided by a null hypothesis, which was evaluated using a Z-test at a 5% significance level. The null hypothesis was rejected if the test statistic indicated that $\mu_i \neq 0$ and the corresponding p-value was less than or equal to 0.05.

4. RESULTS

The researcher distributed a total of 70 questionnaires to the targeted respondents. Out of these, 63 were completed and returned, resulting in a response rate of 90%, while 7 respondents declined to participate. According to Mugenda and Mugenda (2003), as cited by Mwania and Murithi (2017), a response rate of 50% is considered adequate, 60% is good, and a rate of 70% or higher is deemed excellent. Therefore, the 90% response rate achieved in this study was considered excellent and sufficient for reliable analysis.

Table 1: Response Rate

Number Of Questionnaires Issued	Number of Questionnaires Validly Completed	Percentage
70	63	90.0%

4.1 Descriptive Statistics on the Effect of Internet Banking Technology on Loan Performance

To assess the effect of internet banking technology on loan performance, the researcher analyzed respondents' evaluations based on specific sub-criteria, namely transaction volume, transaction cost, and the number of loans disbursed through internet banking platforms. A five-point Likert scale was employed, where 1 represented "Very Low," 2 "Low," 3 "Average," 4 "High," and 5 "Very High." The results of this analysis are summarized in the table below.

Table 2: Effect of Internet Banking Technology on Loan Performance in DT SACCOs

Category	VL (%)	L (%)	A (%)	H (%)	VH (%)	Mean	Std Dev.
Transaction Volume							
Number of loan repayments deposits	0	0	11.1	63.5	25.4	4.14	0.587
Number of loan withdrawals	0	1.6	1.6	38.1	58.7	4.54	0.613

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Transaction Cost							
Cost of Internet banking	3.2	3.2	20.6	47.6	25.4	3.89	0.928
Loan Disbursement							
Number of loans disbursed	0	1.6	14.3	54	30.2	4.13	0.701
Aggregate mean and standard deviation						4.18	0.707

The analysis of the results presented in Table 2 indicates that a significant proportion of respondents perceived loan repayments through internet banking technology to be high (63.5%) and very high (25.4%). Only 11.1% rated the number of loan repayments as average. Regarding loan withdrawals conducted via internet banking, 58.7% of respondents rated the activity as very high, while 38.1% rated it as high; a marginal 1.6% each rated it as average and low. In terms of the cost of internet banking transactions, respondents assessed it as very low (3.2%), low (3.2%), average (20.6%), high (47.6%), and very high (25.4%). The use of internet banking for loan disbursements was considered high by 54.0% of respondents, very high by 30.2%, average by 14.3%, and low by only 1.6%.

The overall mean score of 4.18 and a standard deviation of 0.707 suggest a strong consensus among respondents that internet banking technology has a significant positive impact on the loan performance of DT SACCOs, with minimal variability in responses. These findings align with those of Mateka, Gogo, and Omagwa (2016), whose study on internet banking revealed that financial institutions had experienced growth in their loan portfolios, leading to increased disbursements and higher interest income. Likewise, Kihara (2015) notes that internet banking offers customers enhanced capabilities such as transferring funds between accounts, paying bills, accessing or requesting account statements, monitoring investment portfolios, and even trading in securities.

A multiple regression analysis was carried out to examine the relationship between internet banking technology and loan performance.

Table 3: Regression Coefficient

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	
	B	**Std. Error**		**Beta**
(Constant)	1.645	.322		4.959
Internet Banking Technology	.137	.068	.183	2.002

Dependent Variable: Loan Performance of DT SACCOs in Nairobi City County

The findings indicate that mobile banking technology has a positive and significant effect on the loan performance of DT SACCOs in Nairobi City County, with a regression coefficient of $\beta = 0.137$. This suggests that a one-unit increase in mobile banking technology corresponds to a 0.137-unit improvement in the loan performance of DT SACCOs in Nairobi City County.

4.2 Hypothesis Testing

The study employed the Z-test to evaluate the null hypothesis related to the objective. Internet banking technology was assessed in relation to loan performance at a 5% significance level to facilitate conclusion drawing.

Table 4: Summary of Hypotheses Results

Hypothesis Statement	**Sig.**	**Decision Rule**
H01: Internet banking technology has no significant effect on loan performance of DT SACCOs in Nairobi City County	0.001	Null hypothesis rejected

4.3 Interpretation of Research Findings

Internet banking technology was examined as one of the key objectives to assess its influence on loan performance in DT SACCOs. The majority of respondents indicated a significant increase in the number of loans being applied for,

approved, and repaid through online platforms. These findings align with those of Mateka, Gogo, and Omagwa (2016), whose study on internet banking demonstrated that financial institutions have recorded growth in their loan books, resulting in higher loan disbursements and increased interest income. Similarly, Kihara (2015) notes that internet banking empowers customers to perform a wide range of transactions, including transferring funds between accounts, bill payments, accessing or viewing account statements, monitoring investment portfolios, and even engaging in securities trading.

This chapter focused on DT SACCOs in Nairobi City County, analyzing the impact of digital financial innovations on their operations. Out of the 70 questionnaires distributed, a 90.0% response rate was achieved, which is considered excellent. The findings revealed that loan performance in DT SACCOs within Nairobi City County was statistically and significantly influenced by digital financial innovations such as process digitalization, mobile banking technology, application programming interfaces (APIs), and internet banking technology.

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Mobile banking technology was assessed using three key dimensions: transaction volume, number of loans disbursed, and transaction cost. Among these, transaction volume recorded the highest mean, followed by the number of loans disbursed, with transaction cost ranking lowest. The study supported the alternative hypothesis (H4), concluding that internet banking technology has a statistically significant effect on the loan performance of DT SACCOs in Nairobi City County. This conclusion was based on a positive correlation and statistically significant findings ($z = -3.2997$; $p = 0.001 < 0.05$).

The results demonstrate that the adoption of internet banking technology in DT SACCOs has contributed to an increase in the number of loan applications and approvals, along with a decrease in loan default rates due to the enhanced convenience of online loan repayment. However, the study also found that high costs and commissions associated with internet banking services could negatively affect loan performance. Specifically, increases in online banking charges were associated with a corresponding negative impact on the SACCOs' loan portfolio performance.

Despite the positive impact of internet banking on efficiency and loan performance, several security concerns remain. To mitigate these risks, SACCOs should invest in customer education and training to raise awareness about the dangers of using unsecured internet connections. Additionally, SACCOs should develop more accessible, secure, and user-friendly online financial services and actively promote them to their members.

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