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**National Payment System Innovations and Performance of Deposit Taking SACCOs in
Kenya**

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Abstract

Purpose: Kenya's SACCOs have not been left behind in embracing payment systems innovations. Despite adoption of such payment system innovations, the performance of SACCOs has been in the limelight. The purpose of this study was to assess the effect of national payment system innovations on performance of Deposit Taking SACCOs in Kenya.

Methodology: Anchored on Transaction Cost Innovation Theory, the study adopted a cross-sectional survey design. A sample of 122 deposit taking SACCOs were selected from a population of 176 using cluster sampling. The study employed a questionnaire for data collection. Data analysis was done using descriptive statistics (frequencies and percentages) and inferential statistics (bivariate regression). The study adhered to ethical considerations comprising of informed consent, confidentiality and anonymity, secure data storage and integrity throughout the research process.

Findings: National payment system innovations had a statistically significant positive effect on the performance of Deposit Taking SACCOs in Kenya ($B = 0.493$, $\beta = 0.670$, $p < 0.001$).

Unique Contribution to Theory, Practice and Policy: The study extends the application of Transaction Cost Innovation Theory to Deposit Taking SACCOs. In practice, it shows that the use of RTGS, ACH and integrated cash transfer systems improves the performance of deposit taking SACCOs. The study recommends policies that deepen the integration of SACCOs into the national payment system infrastructure.

Keywords: National Payment System Innovations, Deposit Taking SACCOs, Automated Clearing House, Real-Time Gross Settlement, Performance

JEL Classification Codes: E42, G21, O33

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INTRODUCTION

Continuous innovations in Information and Communication Technology across the globe has led to innovations in trade to an extent that new payment systems other than hard cash are the acceptable medium of exchange (Peneder, 2022). These innovations have enabled cost effective, custom-made and efficient digital financial services (Akter et al. 2022). The dynamism in technology has seen payment systems transform allowing faster transactions, larger volumes and efficient communications between financial institutions. This is evidenced by the financial system in the United States of America (USA) that has been adopting innovative payment systems in processing millions of transactions every day in payments and purchases facilitation (Bech & Hancock, 2020). For instance, since 2016, payment systems in the USA centered on the use of automated clearing house (ACH) which have seen their use grow at an average annual rate of 8.9% (Agarwal & Zhang, 2020). The participation of credit unions in payment systems is also evident in the USA. Credit Unions are participants in the Federal Automated Clearing House. This allows for real time transfers and accounts clearing.

In Latin America, Brazil takes the top spot in payment systems adoption and innovations. Duarte et al. (2022) note that a major innovation in the country's payment system is the Pix which was initiated by Brazil's Central Bank in 2020. Notably, the Brazilian cooperatives sector have developed their own cooperatives specific payment systems, namely the Sicoob and Sicredi that allow them to operate their own automated clearing houses. Payment systems have also been adopted by cooperative financial institutions in China. According to the International Monetary Fund (2012), the payment systems used in China have also been adopted in the Chinese Rotating Savings and Credit Associations (ROSCAs). Cooperatives in China integrate government settlement networks like the China National Advanced Payment System for large volume settlements in addition to holding membership in the Regional Automated Clearing Houses.

In Africa, the use of varying payment systems has had significant evolution with cash and e-payment systems being on high gear. Project Future innovation, a digital payment innovation meant to rival cash payments, gained popularity in South Africa since it allows real-time payments without exchanging elaborate bank details but allowing payments to take place using customers' details such as identity number, QR codes and virtual payments (Telukdarie & Telukdarie, 2022).

In Kenya, the national payment system operates within a regulatory framework established under the National Payment System Act, 2011, and the National Payment System Regulations, 2014. Under these regulations, the Central Bank of Kenya (CBK) is responsible for overseeing and regulating payment system activities (CBK, 2024). Although the regulatory framework provides for the participation of financial institutions and authorized payment service providers, access to national clearing and settlement infrastructure depends on the applicable participation requirements and institutional arrangements. Deposit Taking SACCOs have traditionally relied on commercial banks acting as clearing and settlement agents to facilitate access to payment infrastructure, including the Real-Time Gross Settlement (RTGS) system and Automated Clearing House (ACH) facilities. Such arrangements enable SACCOs to provide payment and settlement services to their members while operating within the established national payment system framework (Kayesi, 2025).

Due to the continued evolution of national payment systems and the participation of SACCOs in payment and settlement systems, DTSS are placed within an environment that is increasingly technology-driven. In Kenya, the regulatory framework provides for the integration of payment systems within the operations of DTSS. Further, the nature of activities undertaken by DTSS requires efficiency in funds movement, processing and settlement. This creates a basis for the examination of national payment system innovations in DTSS and their influence on performance.

Statement of the Problem

Kenya's SACCOs have not been left behind in embracing payment systems innovations. This is in an attempt to mobilize for financial resources and gain a competitive edge like other institutions of finance including commercial banks and microfinance institutions (MFIs). Some of the payment systems that the SACCOs have adopted include globalized and local transfers of cash. However, the embracing of these innovations has been facing several limitations such as the SACCOs being unable to provide cashless payment instruments for lacking a central settlement framework and connectivity to any national payment system infrastructure (SACCO Societies Regulatory Authority, SASRA, 2020). In cases where SACCOs have had the chance to adopt innovations, it has taken time to incorporate their utilization thus leading to SACCOs being less competitive as compared to other financial organizations such as banks that have been quick in adopting the innovations. This has affected the performance of DTSS in different aspects such as customers' loss to other more established financial institutions, slow services delivery, long periods of processing different financial instruments, reduced efficiency and decline in sales.

Despite adoption of such payment system innovations, the performance of SACCOs has been in the limelight. Notably, since 2015, SACCOs had for the first time in 2021 had their returns fall below 2% of their assets. The return on assets (ROA) for the year ending December 2021 fell to 1.59% from 2.65% for 2020. This was even below the 1.89% ROA recorded in 2015 (SASRA, 2022). However, this decline cannot be exclusively attributed to national payment system innovations, given the potential influence of other factors, especially the economic disruptions associated with the COVID-19 pandemic, credit risk, loan-loss provisioning and regulatory compliance costs. However, the continued investment in payment system innovations raises concerns about whether the anticipated improvements in transaction processing efficiency, operational costs and service delivery are being sufficiently realized. Although national payment system innovations are expected to reduce transaction costs and enhance institutional performance, the continued dependence on intermediary clearing arrangements presents a potential operational efficiency enigma that warrants empirical investigation. Furthermore, previous studies have predominantly examined the influence of national payment system innovations on commercial banks. This has left a limited empirical evidence on their relationship with the performance of DTSS in Kenya. It is against this background that the study sought to assess the effect of national payment system innovations on the performance of Deposit Taking SACCOs in Kenya.

Objective of the Study

The objective of the study is to assess the effect of national payment system innovations on performance of Deposit Taking SACCOs in Kenya.

Research Hypothesis

H_{Null}: National payment system innovations do not have a statistically significant effect on performance of Deposit Taking SACCOs in Kenya.

LITERATURE REVIEW

The NPS was developed by CBK as an initiative for improving operational efficiency, liquidity and enhancing payment settlement systems stability. The NPS relates to structures and processes that enhance inter-institution operations that are not restricted to clearing and settling payments thus leading to circulation of money within a country (CBK, 2021). Institutions in the financial sector are the participants in the NPS with instruments ranging from credit and debit cards, cheques and other related infrastructure such as RTGS and ACH that support a variety of financial activities which allow funds movement and transactions in the local and international markets. In Kenya, the NPS consist of RTGS, ACH, cards and some forms of mobile payments (CBK, 2021).

Based on Central Bank of Kenya (2021), RTGS allows for financial transactions to be continuously settled. Lee et al. (2021) noted that financial institutions effect transfer of funds between their accounts based on the instructions of the clients. The ACH allows for effective payments that amount to less than one million Kenya Shillings in every transaction, thus facilitating cheques truncation growth throughout Kenya. Through ACH, electronic payments between financial institutions are allowed thus enhancing efficiency (Chipeta & Muthinja, 2018).

Muhoro and Mungai (2018) analyzed the impact of RTGS on Kenya's commercial banks' financial performance by utilizing a descriptive research design. The study established a significant (p -value = 0.031) positive correlation between RTGS and ROA, with a 1% rise in RTGS translating into a 0.799 increase in ROA. In Kenyan commercial banks', Hillowle and Warui (2021) investigated RTGS and its effect on the banks' ability to make money. The study found a correlation between RTGS and financial performance, with a unit increase in RTGS translating into a 0.163 change in financial performance.

Keya (2021) investigated the effect of RTGS and ACH on commercial banks' operational efficiency in Kenya. The study found a positive association between RTGS ($\beta = 4.888$, p -value < 0.001) and ACH ($\beta = 3.663$, p -value < 0.001) with operational efficiency. In another study by Okoth and Muia (2020), an assessment of financial innovations and their effect on commercial banks' performance was conducted in Kenya. Through regression modeling, statistically significant association was found between financial performance and RTGS transfers ($\beta=2.945$, p -value=0.020) and value of ACH transactions ($\beta=1.321$, p -value=0.014). John and Onsomu (2022) evaluated financial innovations' effect on efficiency in Kenya's banking sector. Among the predictor variables were RTGS and ACH while efficiency was measured using interest rate spread. The study unearthed a progressive association between RTGS and ACH with Kenya's banking sector efficiency.

Overall, the reviewed empirical studies provide evidence of positive relationships between national payment system innovations and the performance or operational efficiency of commercial banks in Kenya. Nevertheless, these findings cannot be directly generalized to DTSs due to differences in regulatory frameworks, institutional structures, access to payment settlement infrastructure and transaction cost arrangements. Unlike commercial banks with established access

to interbank clearing and settlement infrastructure, DTSs may depend on commercial banks as intermediaries to facilitate payment processing and settlement. Such arrangements may introduce additional clearing fees and processing costs, potentially limiting the efficiency gains associated with national payment system innovations. Further, commercial banks and DTSs operate under different regulatory and liquidity management frameworks, with DTSs regulated by SASRA under the SACCO Societies Act, 2008. The reviewed studies also predominantly examined commercial bank performance using indicators such as return on assets, profitability, operational efficiency and interest rate spread, whereas the present study assessed performance using return on equity, transaction cycle time and timely service delivery. These institutional and measurement differences limit the direct applicability of commercial bank findings to DTSs and demonstrate the need for empirical evidence specific to the SACCO sector. Therefore, the present study sought to address this contextual and empirical gap by assessing the effect of national payment system innovations on the performance of Deposit Taking SACCOs in Kenya.

Theoretical Framework

The study was anchored on Transaction Cost Innovation Theory by Niehans (1983). Niehans (1983) put forth the theory by stating that, financial innovation main aim is in reducing transaction costs. For transaction costs to reduce, financial innovation simulation is necessary. This will in turn lead to improved financial services. Organizations are in most cases faced with the challenge of ever increasing transaction costs that pose a threat to their sustainability. As a result, they embark on innovations so as to cut down these costs and hence enhance sustainability.

In the context of financial services providers such as SACCOs, banks and MFIs, cash transactions require time for instance in gathering information and incur costs such as search costs. To minimize such costs, appropriate innovations in terms of products and processes should be employed. Minimizing such transaction costs represents an opportunity for the organization to increase profit and thus financial performance (Uwamariya et al. 2020). Kiplangat and Tibbs (2018) noted the importance of the theory in an IT set-up which reduces a bank's exchange cost by ensuring effective coordination among banks, administration and information gathering. Information technology lowers exchange costs by giving off-site and on-site access to the financial services providers' database thus facilitating business among providers.

Kimotho and Muturi (2019) utilized transaction cost innovation theory in assessing the innovations' effect on MFIs' financial performance. Based on the theory, process innovations introduce new processes of doing business resulting to improved efficiency in addition to expansion. The application of the theory by Dugan (2003) cites effects of financial innovations such as payments processing improvement and avoidance of regulatory restrictions and requirements when financial service providers are interconnected. This has increased their interconnectedness which will allow them to clear transactions in time. This also means that they can start lending to one another thus lowering the cost of credit. The interconnection will therefore lower costs of transaction by enabling efficient coordination amongst the SACCOs. This may in turn lead to reduced operation costs thus influencing profitability growth in SACCOs. The theory will therefore explain innovations in SACCOs in the context of national payment system innovation and its influence on performance.

Although Transaction Cost Innovation Theory provides a relevant foundation for explaining the relationship between national payment system innovations and the performance of Deposit Taking SACCOs, its emphasis on transaction cost reduction does not fully account for technological adoption and institutional influences. The Technology Acceptance Model (TAM), developed by Davis (1989), explains technology adoption through perceived usefulness and perceived ease of use. This may influence members' acceptance and utilization of digital payment services. Similarly, Institutional Theory, as advanced by DiMaggio and Powell (1983), emphasizes the influence of coercive, normative and mimetic pressures on organizational practices. In the context of DTSS, regulatory requirements and oversight by CBK and SASRA may influence institutional decisions concerning payment system adoption and integration. These perspectives provide additional insights into the technological and institutional factors that may influence the implementation of national payment system innovations. However, the present study was primarily anchored on Transaction Cost Innovation Theory. This is because its focus was on examining the relationship between national payment system innovations and institutional performance instead of explaining individual technology acceptance or regulatory pressures. Therefore, TAM and Institutional Theory are acknowledged as complementary theoretical perspectives. On the other hand, Transaction Cost Innovation Theory remains the principal theoretical foundation of the study.

Research Gap

Previous studies on national payment system innovations have predominantly focused on commercial banks in Kenya. For instance, Muhoro and Mungai (2018) and Hillowle and Warui (2021) examined the influence of Real-Time Gross Settlement (RTGS) on the financial performance of commercial banks, while Keya (2021) and Okoth and Muia (2020) investigated the relationship between RTGS, Automated Clearing House (ACH) and commercial banks' financial performance and operational efficiency. Although these studies established positive relationships between national payment system innovations and institutional performance, their findings cannot be directly generalized to DTSS, which operate under different regulatory, institutional and payment settlement arrangements. This presents a contextual research gap concerning the relationship between national payment system innovations and the performance of DTSS in Kenya.

Furthermore, a structural and theoretical gap arises from the differences in access to national payment infrastructure between commercial banks and DTSS. While commercial banks participate directly in established clearing and settlement arrangements, DTSS have traditionally depended on intermediary commercial banks to facilitate access to national payment infrastructure. This intermediary arrangement, involving SACCOs, commercial banks and CBK, may introduce additional clearing charges, processing procedures and transaction costs. These potentially reduce the efficiency benefits associated with payment system innovations. This presents an important consideration in the application of Transaction Cost Innovation Theory by Niehans (1983), which emphasizes transaction cost reduction as a principal benefit of financial innovation. Although the theory suggests that payment innovations enhance institutional performance through reduced transaction costs, the extent to which these anticipated benefits are realized by DTSS operating through intermediary clearing arrangements remains insufficiently established in the reviewed

literature. Moreover, previous studies have predominantly assessed commercial bank performance using financial indicators. Limited attention has been given to the combination of return on equity, transaction cycle time and timely service delivery in the context of DTSS. Therefore, the present study sought to address these contextual, structural and measurement gaps by assessing the effect of national payment system innovations on the performance of Deposit Taking SACCOs in Kenya.

METHODOLOGY

Research Design

The study adopted a cross-sectional survey design. According to Cummings (2018), data is collected from many different units at a single time point in a cross-sectional study. In addition, variables in a cross-sectional study are observed without having to influence them. The research design suits the current study based on an explanation by Wang and Cheng (2020) who note that cross-sectional studies allow a researcher to study one independent variable and one dependent variable.

Population of the Study

All DTSSs whose operations are Kenyan based formed the study's population. Based on a report by SASRA (2023), there are 176 licensed DTSSs in Kenya.

Target Population

The target population comprised of 704 respondents drawn from the 176 DTSSs. These included one (1) business development manager, one (1) finance/credit/accounts manager, one (1) information technology manager and one (1) operations manager based at the head office of each of the DTSSs.

Sampling Frame and Sample Size

The Yamane (1967) formula, where $n = \frac{N}{1+Ne^2}$, was used in sample size computation. Therefore, $n = \frac{176}{1+(176)(0.05)^2} = 122$. Therefore, DTSSs were sampled.

Sampling Procedure

The respondents, that is, business development managers, finance/credit/accounts manager, information technology manager and operations manager from DTSSs were selected from 122 DTSSs. Selection of the DTSSs was done through cluster sampling as DTSSs are classified in 3 tiers under SASRA. This is based on Total Assets holding where Tier 1 is the large tier with total assets above 5 billion shillings, Tier 2; middle tier has 1-5 billion shillings value of assets and Tier 3 that is the small tier hold total assets below 1 billion shillings. From the 122, in Tier 1; 33 DTSSs were sampled, Tier 2; 37 and Tier 3; 52 were sampled. There were 4 respondents from each DTSS; that made a total of 488 respondents.

Data Collection Instruments

The study employed a questionnaire for data collection. The questionnaire for the study was semi-structured. It comprised of 3 sections. Section A contained items on demographic information.

Sections B comprised of Likert scale items on the indicators of national payment system innovations. Section C contained items on performance of DTSSs.

Measurement of Study Variables

National payment systems were assessed through indicators comprising of frequency of ACH clearance, volume of RTGS and volume of integrated cash transfer. Performance of DTSSs was the dependent variable for the study. In this study, performance was evaluated based on ROE, cycle time and timely delivery in DTSSs.

Table 1: Study Variables Operationalization

Name of Variable	Category	Parameters (Primary measure)	Measure
National payment systems innovations	Independent	- Frequency of clearance at ACH	Ordinal
		- Volume of RTGS	
		- Volume of integrated cash transfer	
Performance	Dependent	- ROE	Ordinal
		- Cycle time	
		- Timely delivery	

Data Analysis and Presentation

Quantitative data was obtained for the investigation. The gathered data was coded, cleaned, and then imported into the version 26.0 of the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive and inferential methods of statistical data analysis were used. Frequencies, and percentages formed the descriptive statistics. Inferential analysis was conducted using bivariate linear regression to determine the effect of national payment system innovations on performance of DTSSs. The significance of the regression model was assessed using ANOVA, while the regression coefficient was evaluated using the t-statistic. The following was the study's regression model:

$$\text{Performance of Deposit Taking SACCOs} = \beta_0 + \beta_1 \text{ National Payment System} + \varepsilon$$

Where; β_0 is the intercept, β_1 is the regression coefficient and ε is the error term

Ethical Considerations

The researcher outlined the nature and objectives of the study and the data collection procedure to the participants. This ensured voluntary participation and informed consent was acquired from the participants. Questionnaires were only given to participants who consented to the activity. The respondents were reassured that the information provided was to be used only for academic purposes and no individual DTS was pointed out for specific information. The researcher ensured confidentiality and anonymity by not sharing the identity of the respondents, and respondents were requested not to indicate their names or the institution they work for in the research instruments. Controlled access to the filled questionnaires and data under analysis was closely monitored to safeguard integrity of the research process. The study involved minimal risk to participants and participants were not asked to provide sensitive personal data or information that could place them or their institutions at risk. Participants were free to skip any questions they were not comfortable answering. The study was designed to avoid physical, psychological, emotional, or reputational

harm and participants were advised to discontinue participation without being penalized in case of any distress. The researcher maintained the highest level of integrity and objectivity throughout the study and data was reported accurately and honestly, without fabrication, falsification, or misrepresentation.

RESULTS

Response Rate

During data collection, 488 questionnaires were distributed. Out of these, 431 questionnaires were returned. This represented a return rate of 88.3%. Following the screening and cleaning of data, six (6) questionnaires were found to be incomplete and were thus excluded from the analysis. As a result, 425 questionnaires were deemed valid and used for the final analysis. This yielded a response rate of 87.1%. This response rate was very good and sufficient to support robust statistical analysis and meaningful interpretation of the findings. This follows the guidelines in Babbie (2020) who stated that a 50% response rate is adequate, 60% is good while 70% and above is very good.

Effect of National Payment System Innovations on Performance of Deposit Taking SACCOs in Kenya

Three key national payment mechanisms comprising of ACH clearance, RTGS and integrated cash transfer systems were used to examine national payment system innovations. For each mechanism, respondents were asked to indicate their agreement/disagreement levels on its influence on performance of DTSS. From the results on the influence of ACH clearance services on performance of DTSS, 48.2% (205) and 26.4% (112) of the respondents agreed and strongly agreed respectively that ACH clearance contributes to improved return on equity in the SACCO. Additionally, 75.8% (322) of the respondents were in agreement that ACH clearance improves transaction cycle time in the SACCO. Also evident is that 49.9% (212) and 27.8% (118) of the respondents agreed and strongly agreed respectively that ACH clearance improves timely delivery of services to members (see Table 2).

Table 2: Influence of Automated Clearing House (ACH) Clearance on the Performance of DTSS

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ACH clearance contributes to improved return on equity in the SACCO.	1 (0.2%)	53 (12.5%)	54 (12.7%)	205 (48.2%)	112 (26.4%)
ACH clearance improves transaction cycle time in the SACCO.	2 (0.5%)	46 (10.8%)	55 (12.9%)	203 (47.8%)	119 (28.0%)
ACH clearance improves timely delivery of services to members.	0 (0.0%)	31 (7.3%)	64 (15.1%)	212 (49.9%)	118 (27.8%)

The study also required the respondents to indicate their level of agreement/disagreement on the statements regarding the influence of RTGS system on the performance of DTSS. From the results as shown in Table 3, 46.4% (197) of the respondents agreed that the use of RTGS as a national payment system improves return on equity in the SACCO; 23.1% (98) of the respondents strongly agreed. Cumulatively, 73.2% (311) of the respondents were in agreement that use of RTGS as national payment systems innovations reduces transaction cycle time in the SACCO. Further illustrated in the results is that 47.1% (200) and 25.6% (109) of the respondents agreed and strongly agreed respectively that the integration of this SACCO to RTGS platforms has improved timely delivery of services to members.

Table 3: Influence of RTGS on the Performance of DTSS

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The use of RTGS as a national payment system improves return on equity in the SACCO.	10 (2.4%)	64 (15.1%)	56 (13.2%)	197 (46.4%)	98 (23.1%)
The use of RTGS as national payment systems innovations reduces transaction cycle time in the SACCO.	6 (1.4%)	45 (10.6%)	63 (14.8%)	204 (48.0%)	107 (25.2%)
The integration of this SACCO to RTGS platforms has improved timely delivery of services to members.	12 (2.8%)	44 (10.4%)	60 (14.1%)	200 (47.1%)	109 (25.6%)

Further, Likert scale statements on the influence of integrated cash transfer systems on the performance of DTSS were presented to the respondents. Table 4 shows that 44.9% (191), 22.1% (94) and 18.1% (77) of the respondents agreed, strongly agreed and were neutral respectively that the use of integrated cash transfer as national payment systems improves SACCO's ROE. Moreover, 46.1% (196) of the respondents agreed that integrated cash transfer reduces transaction cycle time in the SACCOs; 23.3% (99) strongly agreed while 17.2% (73) were neutral. According to 48.0% (204) and 22.1% (94) of the respondents who agreed and strongly agreed respectively, the integrated cash transfer payment system improves timely delivery of services to members.

Table 4: Influence of Integrated Cash Transfer Systems on the Performance of DTSSs

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The use of integrated cash transfer as national payment systems improves SACCO's ROE.	13 (3.1%)	50 (11.8%)	77 (18.1%)	191 (44.9%)	94 (22.1%)
Integrated cash transfer reduces transaction cycle time in the SACCO.	8 (1.9%)	49 (11.5%)	73 (17.2%)	196 (46.1%)	99 (23.3%)
The integrated cash transfer payment system improves timely delivery of services to members.	6 (1.4%)	43 (10.1%)	78 (18.4%)	204 (48.0%)	94 (22.1%)

Performance of Deposit Taking SACCOs

From the findings in Table 5, 41.6% (177) of the respondents agreed that the return on equity for their respective SACCOs has improved over the past 3 years; 28.5% (121) were neutral while 21.2% (90) strongly agreed. In addition, 40.2% (171) of the respondents agreed that the cycle time of settling transactions has been improving in their SACCOs over the past 3 years; 28.2% (120) strongly agreed while 23.3% (99) were neutral. Lastly, 40.7% (173), 29.9% (127) and 21.2% (90) of the respondents agreed, strongly agreed and were neutral respectively that timely delivery of services in the SACCOs has improved over the past 3 years.

Table 5: Likert Scale Responses on Performance of Deposit Taking SACCOs

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The return on equity for this SACCO has improved over the past 3 years.	18 (4.2%)	19 (4.5%)	121 (28.5%)	177 (41.6%)	90 (21.2%)
The cycle time of settling transactions has been improving in this SACCO over the past 3 years.	18 (4.2%)	17 (4.0%)	99 (23.3%)	171 (40.2%)	120 (28.2%)
Timely delivery of services in this SACCO has improved over the past 3 years.	14 (3.3%)	21 (4.9%)	90 (21.2%)	173 (40.7%)	127 (29.9%)

Inferential Statistics

A simple linear regression model was fitted to examine the effect of national payment system innovations on the performance of deposit taking SACCOs. The model indicates a strong positive correlation between national payment system innovations and performance of deposit taking SACCOs ($R = 0.670$). The value of $R^2 = 0.449$. This shows that 44.9% of the variation in performance of DTSSs is explained by national payment system innovations (see Table 6).

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.670 ^a	.449	.448	.68807

a. Predictors: (Constant), National Payment System Innovations

The ANOVA findings showed that the regression model is statistically significant: $F(1, 423) = 344.600$, $p < 0.001$. This indicates that national payment system innovations significantly predict performance of deposit taking SACCOs as in Table 7.

Table 7: ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	163.179	1	163.179	344.600	.000 ^b
	Residual	200.248	423	.473		
	Total	363.427	424			

a. Dependent Variable: Performance of DTSS

b. Predictors: (Constant), National Payment System Innovations

The regression coefficient results in Table 8 show that national payment innovations coefficient ($B = 0.493$, $p < 0.001$). This shows that a one-unit increase in national payment system innovations is associated with a 0.493-unit increase in performance of deposit taking SACCOs when other factors are held constant. The standardized beta ($\beta = 0.670$) indicates a positive effect of national payment system innovations on performance of deposit taking SACCOs. Since national payment system innovations significantly influenced the performance of Deposit Taking SACCOs ($p < 0.001$), then the null hypothesis; H_{Null} : National payment system innovations do not have a statistically significant effect on performance of Deposit Taking SACCOs in Kenya, was rejected. The alternate hypothesis that indicated the existence of a statistically significant effect of the national payment system and performance of DTSS in Kenya was accepted.

The outcome bivariate regression equation was;

$$\text{Performance} = 1.926 + 0.493 \text{ National Payment Systems} + \epsilon$$

Table 8: Regression Coefficients Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.926	.187		10.292	.000
	National Payment System Innovations	.493	.027	.670	18.561	.000

a. Dependent Variable: Performance of DTSS

Discussion

The descriptive findings revealed that the majority of respondents agreed that national payment system innovations such as ACH clearance, RTGS and integrated cash transfer systems led to improved return on equity, reduced transaction cycle time and enhanced timely service delivery. The inferential findings further established that national payment system innovations had a

statistically significant positive effect on the performance of DTSSs. The findings align with Muhoro and Mungai (2018) who analyzed the impact of RTGS on performance of commercial banks in Kenya and established a significant positive correlation between RTGS and ROA. A study by Hillole and Warui (2021) also found a significant positive correlation between RTGS and financial performance of banks with a unit increase in RTGS utilization leading to 0.163 change in financial performance. Another Kenyan study by Keya (2021) found a positive relationship between RTGS and Automated Clearing House (ACH) with operational efficiency among 40 commercial banks.

While assessing the effect of financial innovations on performance of commercial banks in Kenya, Okoth and Muia (2020) agrees with the current study's findings. Transfers through RTGS and transactions through ACH were found to have statistically significant effects on the profitability of commercial banks in Kenya. Similarly, John and Onsomu (2022) established a progressive relationship between RTGS and ACH and efficiency in the banking sector of Kenya, thus reinforcing the findings of this study.

The positive effect of national payment systems innovations on the performance of deposit taking SACCOs can further be explained using the Transaction Cost Innovation Theory by Niehans (1983). According to theory, the primary goal for financial innovation is to reduce transaction costs which enhance organizational efficiency and financial performance. The findings of this study demonstrate that by adopting RTGS, ACH and integrated cash transfer systems, deposit taking SACCOs improve their operational efficiency, reduce payment processing cycle time and increase transaction volumes. These reflect reduction of transaction cost in terms of time, coordination and information gathering costs as the theory advocates.

Integration of SACCOs into the national payment system minimizes manual and paper-based processes such as clearing of cheques and inter-institutional settlements of payments. These findings support the argument by Kiplangat and Tibbs (2018) who applied the theory and established that information technology reduces exchange and coordination costs by enhancing real-time access to shared financial infrastructure. Further, national payment systems innovations lead to increased interconnectedness of SACCOs which lowers transaction costs related to funding access, processing of payments and liquidity management, all of which affect financial performance (Dugan, 2003). Therefore, the findings of the study affirm the applicability of Transaction Cost Innovation Theory in explaining how national payment systems innovations lead to improved performance of deposit taking SACCOs.

Conclusion

The study concludes that national payment system innovations have a significant contribution to the performance of DTSSs. Innovations such as ACH clearance services, RTGS and integrated cash transfer systems enhance efficiency in transactions, improved service delivery and strengthened return on equity. Therefore, their integration in the operations of SACCOs contributes to substantial efficiency and performance of DTSSs.

Theoretical Implications

The findings revealed that national payment systems were linked to improved operational efficiency, faster processing of transactions, increased volumes of transactions and enhanced

financial performance such as ROE. The positive effect of national payment systems innovations on the performance of deposit taking SACCOs in this research is well explained using the Transaction Cost Innovation Theory by Niehans (1983). As per to theory, the primary goal for financial innovation is to reduce transaction costs which enhances organizational efficiency and financial performance. The difference in operational capacity of the DTSS avail an opportunity for further research on DTSS cluster specific research on the applicability of this theory to individual DTS clusters.

Implications for Policy

From the findings, it was evident that national payment system innovations had a statistically significant effect on performance of DTSS. Therefore, policies should be developed to help deepen integration of SACCOs into the national payment infrastructures such as RTGs, ACH and integrated cash transfer systems. This will help ensure that SACCOs are fully recognized as key participants within the national payment ecosystem. The deeper integration into the national payment systems will results in improved service delivery, high ROE, strengthened financial stability and sustained growth in performance of DTSS.

Suggestions for Future Research

To further enhance understanding and extend knowledge in this field, the study recommends that comparative studies be conducted so as to assess the differences in the influence of payment system innovations across financial institutions such as commercial banks, microfinance institutions and non-deposit taking SACCOs. This will help establish whether the observed relationships are exceptional to deposit taking SACCOs or applicable across the financial sector. This is because these financial institutions have a major component of deposit taking that is common for all despite them falling within bank and non-bank financial institutions.

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