

**DIGITAL TRANSFORMATION AND FINANCIAL SERVICE DELIVERY  
EFFICIENCY OF COOPERATIVE SOCIETIES IN KADUNA STATE, NIGERIA:  
EVIDENCE FROM SELECTED COOPERATIVES (2019–2025)**

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**Abstract**

*This paper examines the impact of digital transformation on the efficiency of financial service delivery in cooperative societies in Kaduna State, Nigeria, covering the period from 2019 to 2025. Specifically, the study investigates the influence of digital payment systems, digital record management, online communication platforms, and the automation of financial services on lending speed, transaction cost reduction, service accessibility, and member satisfaction in selected cooperative societies. A quantitative cross-sectional survey design was adopted, and primary data were collected through a structured Likert-scale questionnaire administered to 312 respondents purposively selected from 15 cooperative societies in Kaduna Metropolis. Descriptive statistics and multiple ordinary least squares (OLS) regression analysis were employed using SPSS version 26 for data analysis. The findings revealed that digital payment systems, digital record management, online communication platforms, and the automation of financial services all significantly improved the efficiency of financial service delivery. The study further found that digital transformation enhances loan processing speed, reduces transaction costs, improves members' access to financial services, and increases overall member satisfaction. Based on these findings, the study recommends that cooperative societies adopt structured digital transformation policies, establish digitalisation support funds to strengthen technological infrastructure, and implement continuous digital literacy programmes to enhance members' and staff's capacity to effectively utilize digital financial technologies.*

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**Keywords:** digital transformation, cooperative societies, efficiency of financial service delivery, financial inclusion, Kaduna State, Nigeria.

## **Introduction**

Cooperatives are at the heart of the financial inclusion framework in developing economies, whereby they offer savings mobilisation, credit provision, insurance and welfare services to segments of the population who have historically been underserved by mainstream financial institutions (Birchall, 2023; Nwankwo, Nwankwo & Madu, 2023). The cooperative movement in Nigeria dates back, in terms of formal legislative foundation, to the Ordinance of Cooperative Societies of 1935 and has been consolidated under the Nigerian Cooperative Societies Act, Cap. N98, Legislation of the Federation of Nigeria 2004. As of 2023, the Nigeria Cooperative Federation reported that Nigeria had over 7.6 million active cooperative members, making cooperatives one of the most relevant avenues of grassroots financial intermediation in the country (NCF, 2023). Their developmental role is especially acute in states with large informal economies where access to formal banking is still constrained by documentation requirements, geographic distance, and minimum balance thresholds.

Digital transformation, in general terms, refers to the strategic integration of digital technologies into all aspects of organisational activities to significantly enhance performance, accessibility, and value delivery. It has become one of the primary drivers of efficiency in financial institutions globally (Westerman et al., 2022; Gomber et al., 2022). The increasing adoption of digital technologies has also

transformed the delivery of banking services, with traditional branch-based models increasingly complemented or replaced by technology-driven systems that emphasise convenience, speed, accessibility, and efficient service delivery (Bello & Dantsoho, 2025). In Africa, evidence of digital transformation among cooperative societies has been demonstrated through mobile-linked savings cooperatives in Kenya, rural credit unions in Ghana, and technology-enabled cooperative organisations in South Africa. These digitally transformed cooperatives have experienced faster loan processing, significantly lower administrative costs, and higher levels of member retention and satisfaction (Lashitew et al., 2022; Suri & Jack, 2022). The Central Bank of Nigeria (CBN) has reinforced this direction by implementing successive National Financial Inclusion Strategies and sustaining a cashless policy agenda that promotes digital payments across all financial institutions, including cooperative societies (CBN, 2022).

Despite the growing recognition of digital technologies within the financial sector, many cooperative societies in Nigeria, particularly at the state and grassroots levels, continue to rely heavily on manual methods of service delivery. Core operations such as member registration, savings documentation, loan application processing, financial record keeping, and member communication are often paper-based and manually executed. These traditional practices are associated with slow loan approval processes, frequent record-keeping

errors, high administrative costs, limited transparency, poor accessibility to services, and delays in responding to members' financial needs. Such operational inefficiencies reduce the ability of cooperative societies to meet members' expectations and weaken their contribution to financial inclusion and local economic development.

Kaduna State illustrates both the developmental potential and the operational constraints of the cooperative sector. With a population of approximately nine million and a broad informal economic base of smallholder agriculture, petty trade, government employment, and artisanal enterprise, demand for accessible and efficient financial services is considerable (NBS, 2022). Cooperative societies in Kaduna State serve teachers, market traders, farmers, transport workers, and civil servants by offering short-term credit and savings services that far exceed the reach of the formal banking sector. The Kaduna State Government has officially made cooperative development a pillar of its economic inclusion strategy, establishing specialised cooperative development directorates and enacting state-level cooperative development legislation (Kaduna State Government, 2022). Nevertheless, a significant gap remains between the potential of cooperative financial services and their actual operational efficiency on the ground.

It is against this background that the question of whether and how digital transformation influences the efficiency of

financial service delivery by cooperative societies in Kaduna State assumes scholarly and policy urgency. The purpose of this study is therefore to examine the effect of digital transformation specifically digital payment systems, digital record management, online communication platforms, and the automation of financial services on financial service delivery efficiency in cooperative societies in Kaduna State, Nigeria, over the period 2019 to 2025. The study is motivated by the documented gap between policy commitment to digital inclusion and the largely manual operational realities of most cooperative societies in the state, and by the limited empirical evidence on how individual dimensions of digital transformation independently influence cooperative efficiency. The findings contribute to the cooperative management literature and provide an evidence base for policy interventions directed at improving cooperative financial service delivery through targeted digitalisation.

### **Statement of the Problem**

Although the importance of cooperative societies in promoting financial inclusion in Kaduna State has been widely documented, and digital transformation has been recognised globally as a key driver of efficiency in financial institutions, many cooperative societies in the state continue to rely on manual, paper-based operational systems (CBN, 2022; NCF, 2023). Existing studies indicate that manual processes for member registration, savings records, loan application processing, financial record

keeping, and internal communication often result in operational inefficiencies, including delays in loan processing, record-keeping inaccuracies, high administrative costs, limited transparency, and restricted access to financial services (Adewale & Adebayo, 2023; Afolabi et al., 2022). These inefficiencies have been associated with reduced service quality, lower member satisfaction, and constraints on the ability of cooperative societies to effectively promote financial inclusion and local economic development (Birchall, 2023; Nwankwo et al., 2023).

Recent studies have examined digital finance, financial technology adoption, and operational efficiency within Nigeria's financial sector without systematically incorporating digital transformation as a predictor of efficiency in financial service delivery (Iwedi, 2024; Sam-Abugu et al., 2025). Furthermore, empirical research on digital adoption in Nigeria has continued to focus predominantly on commercial banks and microfinance institutions rather than cooperative societies (Ezeike-Obuna et al., 2024; Offiong et al., 2026). Consequently, there remains limited empirical evidence on how digital transformation influences the efficiency of financial service delivery among cooperative societies, particularly in Kaduna State. This study seeks to fill this gap by utilising a quantitative design to produce policy-relevant evidence from cooperatives operating during the 2019 to 2025 period.

### **Objectives of the Study**

The broad objective of this study is to examine digital transformation on financial service delivery efficiency of cooperative societies in Kaduna State, Nigeria. The specific objectives are:

1. To assess the effect of digital payment systems on the financial service delivery efficiency of cooperative societies in Kaduna State.
2. To examine the effect of digital record management on the financial service delivery efficiency of cooperative societies in Kaduna State.
3. To evaluate the effect of online communication platforms on the financial service delivery efficiency of cooperative societies in Kaduna State.
4. To determine the effect of automation of financial services on the financial service delivery efficiency of cooperative societies in Kaduna State.

### **Research Hypotheses**

The following null hypotheses are tested in this study:

**H<sub>01</sub>:** Digital payment systems have no significant effect on the financial service delivery efficiency of cooperative societies in Kaduna State.

**H<sub>02</sub>:** Digital record management has no significant effect on the financial service delivery efficiency of

cooperative societies in Kaduna State.

**H<sub>03</sub>:** Online communication platforms have no significant effect on the financial service delivery efficiency of cooperative societies in Kaduna State.

**H<sub>04</sub>:** Automation of financial services has no significant effect on the financial service delivery efficiency of cooperative societies in Kaduna State.

## Literature Review

### *Concept of Digital Transformation*

Digital transformation is a multi-faceted phenomenon that has received sustained academic attention since the introduction of internet technologies, mobile applications, and cloud services began altering the organisational landscape in the early 2000s. Westerman et al. (2022) define digital transformation as the fundamental application of digital technology to radically enhance the performance or reach of an enterprise a definition that emphasises the radical, rather than additive, nature of digitisation. Gomber et al. (2022) contextualise this within the financial services industry, characterising digital transformation as the introduction of electronic payment systems, algorithm-driven credit decisions, digital identity and records management, open data platforms, and customer-facing digital service interfaces. Arner, Barberis, and Buckley (2023) situate such developments within the broader fintech revolution, framing digital

transformation as a post-crisis imperative for financial institutions to reduce costs while democratising access to services.

In this study, digital transformation is operationalised through four dimensions as they apply to cooperative societies (World Bank, 2024; CBN, 2022). First, digital payment systems enable organisations to collect member contributions, disburse dividend payments, and process loan repayments through mobile banking applications, USSD codes, and inter-bank electronic transfers, eliminating cash-handling risks, reconciliation delays, and fiduciary vulnerabilities (CBN, 2022; GSMA, 2023). Second, digital record management involves the migration of paper-based files member registers, financial ledgers, loan portfolios, and transaction histories to electronic databases that enable real-time access, audit trails, and systematic error reduction (OECD, 2024; ISACA, 2023). Third, online communication platforms such as messaging applications, cooperative member portals, and email systems transform cooperative governance by enabling timely, verifiable, and geographically unrestricted dissemination of financial statements, meeting notices, dividend announcements, and policy updates (ICA, 2024; ILO, 2022). Fourth, automation of financial services involves the deployment of rule-based and computer-controlled processes to handle loan applications, compute interest rates, generate repayment schedules, and deliver automated payment alerts, substantially reducing human processing time and removing

subjective elements from routine financial decisions (ICA, 2023; Lashitew et al., 2022).

### **Concept of Financial Service Delivery Efficiency**

Financial service delivery efficiency refers to the ability of a financial institution to deliver financial services in a timely, cost-effective, accessible, and satisfying manner with the least wastage of institutional and member resources (Mester, 2022; Berger & Humphrey, 2022). In cooperative finance, efficiency is a multi-dimensional concept that operates simultaneously across process performance, cost management, accessibility, and service quality. This study operationalises financial service delivery efficiency across four empirically grounded sub-dimensions. Loan processing speed measures the time elapsed between loan application and disbursement, a critical performance indicator for cooperatives whose members depend on timely credit for productive investment, emergency expenditure, and household income management (Arner, Barberis & Buckley, 2022; Buchak et al., 2023). Transaction cost reduction captures the extent to which per-transaction costs incurred by the institution and its members are reduced through process improvements and digital replacement of labour-intensive manual activities (Thakor, 2023; Philippon, 2024). Service accessibility focuses on the ability of members to obtain savings, credit, and information services regardless of geographic proximity, time of day, or physical limitation. Member satisfaction aggregates subjective quality assessments

reliability, responsiveness, assurance, empathy, and tangibles as perceived by cooperative members, operationalised through the SERVQUAL framework (Parasuraman, Zeithaml & Berry, 2022).

### **Concept of Cooperative Societies**

Cooperative societies are member-owned and democratically controlled organisations formed to meet the economic, social, and cultural needs of their members through jointly owned enterprises operating on principles of self-help, mutual responsibility, and equitable benefit distribution (International Cooperative Alliance, 2024; ILO, 2025). In cooperative finance, cooperatives are widely recognised as community-based financial intermediaries that promote financial inclusion by mobilising savings and providing affordable credit to members often excluded from formal banking systems. The effectiveness of cooperative societies in delivering financial and socio-economic value is strongly linked to their ability to promote member welfare, enhance inclusive financial access, and support grassroots economic development. Efficiently managed cooperatives contribute to improved savings culture, expanded credit access, and stronger community resilience, thereby reinforcing sustainable local development outcomes (Birchall, 2025; World Bank, 2025). Conversely, weak governance structures, limited financial capacity, and poor service delivery undermine member confidence, reduce participation, and threaten the long-term sustainability of cooperative institutions.

### **Empirical Review**

Gomber et al. (2022), in a systematic review of the fintech literature, established that digital payment platforms lower the per-transaction cost of processing by an average of 40 to 60 percent compared with traditional cash-based systems in emerging market financial institutions. Suri and Jack (2022), in a longitudinal investigation of M-Pesa mobile money adoption in Kenya, demonstrated that mobile financial services enabled members of savings groups and cooperative-type organisations in rural Kenya to achieve quantifiable poverty reduction and consumption smoothing over time.

Uneze, Egor, and Otaokpukpu (2024) examined the digitalisation of agricultural cooperatives among rice value chain members in Anambra State, Nigeria. Using a multistage sampling technique, data were collected from 180 cooperative members and analysed using descriptive and inferential statistics. The study found that digital technologies, particularly mobile phones, enhanced access to financial services, market information, and agricultural inputs. However, the adoption of more advanced digital technologies remained constrained by inadequate digital skills and institutional limitations. The authors recommended increased investment in digital infrastructure and capacity building to improve cooperative service delivery.

Ekhurutomwen (2025) investigated the transformation of cooperative society governance for service delivery in Nigeria,

using Ambrose Alli University Workers/Farmers Multipurpose Cooperative Society as a case study. The study employed a survey research design and analysed the data using descriptive statistics and the t-test. The findings revealed that innovative technologies, staff training, institutional networking, and governance reforms significantly improved service delivery and organisational efficiency, concluding that digital innovation is essential for strengthening the operational performance of cooperative societies.

Usman and Haladu (2025) examined the relationship between banking satisfaction, cooperative performance, and rural service delivery in Northern Nigeria. Using survey data from 164 respondents and Spearman's rank correlation analysis, the study found a significant positive relationship between customer satisfaction, perceptions of cooperative performance, and effective rural financial service delivery. The authors concluded that improving service quality and adopting modern financial technologies could strengthen cooperative performance and enhance members' confidence.

Kamau, Mathuva, and Ndiritu (2024) investigated the adoption of digital financial services among Savings and Credit Cooperative Organisations (SACCOs) in Kenya. Using survey data analysed with regression techniques, the study established that digital financial services significantly improved operational efficiency by reducing transaction delays, strengthening financial transparency, and improving access to financial services, recommending

continuous investment in digital technologies to enhance cooperative competitiveness.

### **Research Framework/Model and Underpinning Theory**

This study is grounded in two complementary theoretical perspectives that together provide a robust and contextually appropriate explanation of the digital transformation–efficiency relationship in cooperative financial organisations.

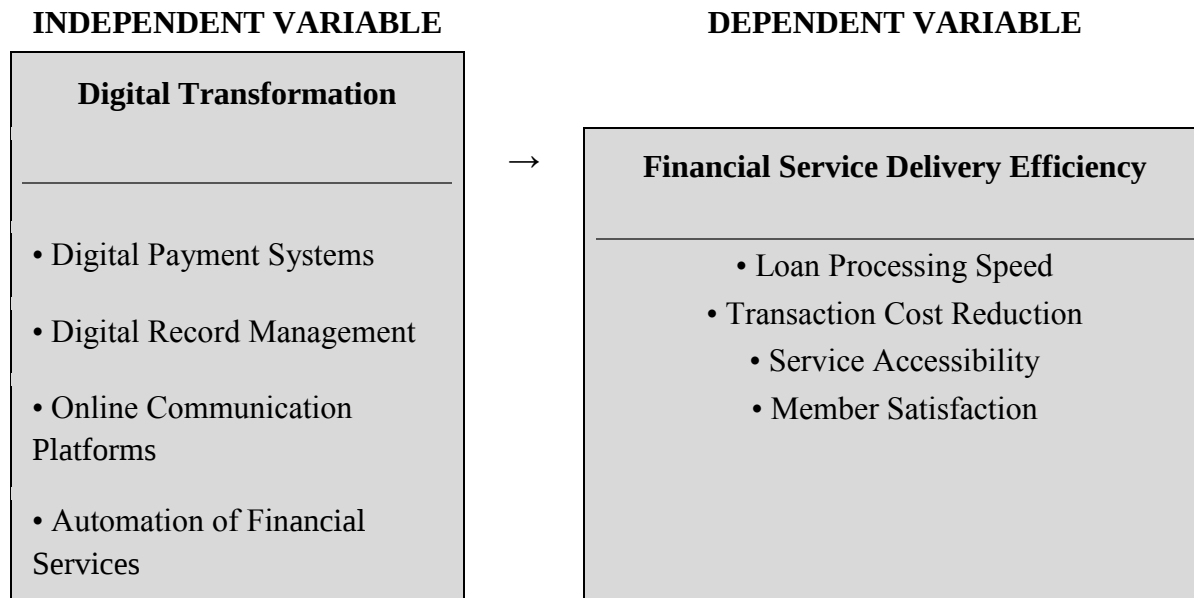
The Technology Acceptance Model (TAM), developed by Davis (2022), posits that the adoption and utilisation of information technology are primarily determined by two beliefs: perceived usefulness the extent to which users believe that a technology will improve their performance and perceived ease of use the extent to which users believe that the technology can be operated with minimal effort. TAM is directly applicable here because it explains how the adoption of digital payment systems, digital record management, online communication platforms, and automation of financial services can improve financial service delivery efficiency in cooperative societies. When cooperative managers and members perceive digital payment systems as useful and easy to use, they are more likely to adopt them, resulting in faster loan processing and lower transaction costs. Similarly, accepted digital record management systems enhance the accuracy and accessibility of financial records, reducing administrative errors and improving loan processing efficiency. Online communication platforms facilitate

timely dissemination of financial information and service updates, improving accessibility and member satisfaction. Automated financial service systems streamline routine activities such as loan processing, savings management, interest computation, and financial reporting, thereby reducing operational costs and improving service reliability.

The Resource-Based View (RBV), articulated by Barney (2022), holds that sustained competitive advantage derives from an organisation's possession and purposeful utilisation of resources that are valuable, rare, inimitable, and non-substitutable (VRIN criteria). Applied to cooperative societies, digital transformation capabilities including digital payment infrastructure, electronic record management systems, online communication platforms, and process automation tool constitute strategic organisational resources that differentiate efficiently operating cooperatives from those reliant on manual systems. The RBV explains why cooperatives that invest strategically in digital capabilities are positioned to provide faster, cheaper, and more accessible financial services, and how digital resource endowments translate into sustained service delivery performance advantages over time (Wernerfelt, 2022; Grant, 2023). The combination of TAM and RBV provides the holistic theoretical framework underpinning this study, addressing both the behavioural conditions for technology adoption and the strategic performance outcomes of digital capability accumulation in cooperative organisations.

The study conceptual framework is presented below:

**Figure 1: Conceptual Framework of the Study**



**Source:** Researcher's Illustration (2026).

## Methodology

### Research Design

This study adopts a cross-sectional survey research design with a quantitative orientation. The survey design is appropriate because the research aims to gather standardised and numerical data from a representative sample of cooperative societies in order to draw statistically valid generalisations about the population and test hypothesised relationships between the dimensions of digital transformation and the efficiency of financial service delivery (Saunders, Lewis & Thornhill, 2023; Creswell & Creswell, 2023). The cross-sectional approach was employed, with data gathered in 2026 capturing retrospective evaluations of digital adoption and service delivery experiences over the 2019 to 2025 period a timeframe that encompasses pre-

pandemic operations, the accelerated digitalisation drive during COVID-19, and the post-pandemic normalisation and consolidation phase, thereby adding important temporal depth to the analysis.

### Population and Sample

The population of the study comprised all registered and operating cooperative societies within Kaduna Metropolis, covering Kaduna North, Kaduna South, and Chikun Local Government Areas. According to the Kaduna State Cooperative Development Agency (KDSCDA, 2026), there are 247 active cooperative societies across these three Local Government Areas. The accessible population consisted of all chairpersons, secretaries, treasurers, loan officers, and active members of the selected cooperative societies who had utilised cooperative financial services within the

previous one year, amounting to approximately 1,850 respondents.

A minimum sample size of 329 respondents was determined using the Yamane (1970) formula for finite populations at a 95 percent confidence level and a 5 percent margin of error. Purposive sampling was used to select 15 cooperative societies on the basis of specified inclusion criteria: the selected cooperatives had been in active operation since at least 2019 and had either implemented digital technologies or were actively pursuing digitalisation initiatives. They also represented different cooperative categories civil service, traders', farmers', and multipurpose cooperative societies ensuring adequate variation in digital transformation practices. The sample was allocated proportionately to the selected cooperative societies based on their membership sizes. To mitigate non-response, 360 questionnaires were distributed, of which 312 were properly completed and returned, representing a response rate of 86.7 percent. According to Babbie (2022), a response rate of 70 percent or higher is considered adequate for social science research. The 312 valid responses constituted the final sample for data analysis.

### **Data Collection**

A structured questionnaire was developed as the primary data collection instrument, comprising three sections. Section A captured biographical and institutional information including gender, age,

educational level, years of membership, and organisational role. Section B assessed the four independent variable constructs through 19 Likert-scale items: digital payment systems (5 items), digital record management (5 items), online communication platforms (4 items), and automation of financial services (5 items), adapted from established scales in the extant literature (Davis, 2022; Lashitew et al., 2022; Adeyemi & Ojo, 2023). Section C measured financial service delivery efficiency using 8 items across four sub-dimensions loan processing speed, transaction cost reduction, service accessibility, and member satisfaction grounded in the SERVQUAL framework (Parasuraman et al., 2022) and cooperative efficiency literature (Mester, 2022). All items were rated on a five-point Likert scale anchored at 1 (Strongly Disagree) to 5 (Strongly Agree).

Content and face validity were established through review by three academics in banking, finance, and cooperative management, and one practitioner from the Kaduna cooperative industry. A pilot study involving 30 cooperative members (excluded from the final sample) was conducted to assess item clarity and scale consistency, leading to minor wording revisions. Internal consistency reliability was assessed using Cronbach's alpha coefficient (Table 1); all constructs exceeded the acceptable threshold of 0.70 (Nunnally, 2022).

**Table 1: Reliability Statistics**

| <b>Construct</b>                      | <b>No. Items</b> | <b>Cronbach's <math>\alpha</math></b> | <b>Interpretation</b> |
|---------------------------------------|------------------|---------------------------------------|-----------------------|
| Digital Payment Systems               | 5                | 0.843                                 | Good                  |
| Digital Record Management             | 5                | 0.817                                 | Good                  |
| Online Communication Platforms        | 4                | 0.829                                 | Good                  |
| Automation of Financial Services      | 5                | 0.856                                 | Good                  |
| Financial Service Delivery Efficiency | 8                | 0.891                                 | Good                  |
| <b>Overall Instrument</b>             | <b>27</b>        | <b>0.913</b>                          | <b>Excellent</b>      |

**Source:** Field Survey (2026). Note:  $\alpha \geq 0.70$  = Acceptable;  $\alpha \geq 0.80$  = Good;  $\alpha \geq 0.90$  = Excellent (Nunnally, 2022).

### Model Specification

To test the four null hypotheses and quantify the independent contribution of each digital transformation dimension to financial service delivery efficiency, the following multiple OLS regression model is specified:

$$FSDE = \alpha + \beta_1 DPS + \beta_2 DRM + \beta_3 OCP + \beta_4 AFS + \varepsilon \dots\dots\dots (Equation 1)$$

Where: FSDE = Financial Service Delivery Efficiency (composite mean score of Section C items); DPS = Digital Payment Systems; DRM = Digital Record Management; OCP = Online Communication Platforms; AFS = Automation of Financial Services;  $\alpha$  = constant;  $\beta_1$ – $\beta_4$  = partial regression coefficients;  $\varepsilon$  = stochastic error term.

All classical OLS regression assumptions linearity, multivariate normality, absence of multicollinearity, homoscedasticity, and independence of error terms were verified prior to estimation. Variance Inflation Factors (VIF) for all predictors were below the critical value of 5.0, confirming the absence of problematic multicollinearity. The Breusch-Pagan test ( $p = 0.317$ ) confirmed homoscedasticity, the Shapiro-Wilk test ( $p = 0.214$ ) confirmed residual normality, and the Durbin-Watson statistic (1.984) indicated the absence of serial autocorrelation. All analyses were conducted using SPSS version 26.0 at a significance level of 5 percent.

## Result and Discussion

### Descriptive Statistics

Table 2 presents descriptive statistics for all study variables based on the 312 valid responses. Mean scores are interpreted

relative to the Likert scale midpoint of 3.0: scores above 3.0 indicate general agreement with the construct items, while scores below 3.0 indicate disagreement.

**Table 2: Descriptive Statistics of Study Variables (N = 312)**

| Variable                               | N   | Min  | Max  | Mean | Std Dev | Skew  |
|----------------------------------------|-----|------|------|------|---------|-------|
| Digital Payment Systems (DPS)          | 312 | 1.00 | 5.00 | 3.74 | 0.861   | −0.31 |
| Digital Record Management (DRM)        | 312 | 1.00 | 5.00 | 3.61 | 0.923   | −0.27 |
| Online Communication Platforms (OCP)   | 312 | 1.00 | 5.00 | 3.88 | 0.794   | −0.42 |
| Automation of Financial Services (AFS) | 312 | 1.00 | 5.00 | 3.52 | 0.947   | −0.19 |
| Loan Processing Speed (LPS)            | 312 | 1.00 | 5.00 | 3.67 | 0.882   | −0.33 |
| Transaction Cost Reduction (TCR)       | 312 | 1.00 | 5.00 | 3.59 | 0.908   | −0.24 |
| Service Accessibility (SA)             | 312 | 1.00 | 5.00 | 3.71 | 0.836   | −0.36 |
| Member Satisfaction (MS)               | 312 | 1.00 | 5.00 | 3.63 | 0.871   | −0.28 |
| <b>FSDE – Composite DV</b>             | 312 | 1.00 | 5.00 | 3.65 | 0.874   | −0.30 |

**Source:** Field Survey (2026). Scale: 1 = Strongly Disagree; 5 = Strongly Agree. FSDE = Financial Service Delivery Efficiency (composite dependent variable).

The results in Table 2 show that all four dimensions of digital transformation recorded mean scores above the scale midpoint of 3.0, indicating an overall disposition towards digital adoption among the sampled cooperative societies. The

highest mean score was registered by Online Communication Platforms (M = 3.88, SD = 0.794), indicating that WhatsApp groups, email communication, and similar messaging applications are the most widely adopted digital tools among the sampled

cooperatives, consistent with Nigeria's high national penetration of mobile internet and social messaging. Digital Payment Systems ranked second ( $M = 3.74$ ,  $SD = 0.861$ ), reflecting the incremental uptake of mobile money, USSD banking, and inter-bank transfers enabled by the CBN cashless policy. The lower means of Digital Record Management ( $M = 3.61$ ,  $SD = 0.923$ ) and Automation of Financial Services ( $M = 3.52$ ,  $SD = 0.947$ ) indicate lower average adoption levels and greater variation across cooperatives, consistent with the higher capital requirements and technical complexity associated with automated loan processing systems. The aggregate Financial Service Delivery Efficiency score ( $M = 3.65$ ,  $SD = 0.874$ ) suggests that cooperative

financial services are perceived as moderately efficient by respondents, with meaningful room for improvement across all four sub-dimensions. The mildly negative skewness values across all variables (range:  $-0.19$  to  $-0.42$ ) reflect moderately left-skewed distributions that are normal and acceptable for Likert-scale survey data (Field, 2022).

### Regression Analysis

Table 3 presents the results of the multiple OLS regression model predicting the effect of the four dimensions of digital transformation on financial service delivery efficiency. All classical regression assumptions were verified prior to estimation, as described in Section 3.4.

**Table 3: Regression Results on Effect of Digital Transformation on Financial Service Delivery Efficiency**

| Predictor Variable                     | B     | Std. Error | t-value | p-value | Decision        |
|----------------------------------------|-------|------------|---------|---------|-----------------|
| (Constant)                             | 0.412 | 0.187      | 2.203   | 0.028   | —               |
| Digital Payment Systems (DPS)          | 0.287 | 0.063      | 4.556   | 0.000   | Reject $H_{01}$ |
| Digital Record Management (DRM)        | 0.214 | 0.071      | 3.014   | 0.003   | Reject $H_{02}$ |
| Online Communication Platforms (OCP)   | 0.176 | 0.058      | 3.034   | 0.003   | Reject $H_{03}$ |
| Automation of Financial Services (AFS) | 0.253 | 0.069      | 3.667   | 0.000   | Reject $H_{04}$ |

**Source:** Field Survey (2026). Dependent Variable: FSDE. B = Unstandardized regression coefficient.  $p < 0.001$ ;  $p < 0.01$ ;  $p < 0.05$ .

The overall regression model is statistically significant ( $F(4, 307) = 164.72, p < 0.001$ ) and demonstrates high explanatory power, with the four dimensions of digital transformation collectively accounting for 68.1 percent of the variance in financial service delivery efficiency ( $R^2 = 0.681$ ; Adjusted  $R^2 = 0.677$ ). This strong model fit validates digital transformation as one of the most important determinants of cooperative financial service delivery efficiency; the remaining 31.9 percent of variance is attributable to factors outside the scope of this study.

Digital Payment Systems (DPS) exert the strongest positive influence on financial service delivery efficiency among the four dimensions ( $B = 0.287, t = 4.556, p < 0.001$ ). A one-unit improvement in digital payment systems increases financial service delivery efficiency by 0.287 units, holding all other variables constant. Greater adoption of mobile banking, USSD platforms, electronic fund transfers, and other digital payment channels enhances transaction speed, facilitates timely loan repayments and savings deposits, reduces cash-handling risks, lowers transaction costs, and improves overall service quality. Since  $p < 0.05$ ,  $H_{01}$  is rejected.

Automation of Financial Services (AFS) has the second strongest positive effect ( $B = 0.253, t = 3.667, p = 0.001$ ). A one-unit increase in the automation of financial services produces a 0.253-unit increase in financial service delivery efficiency, *ceteris paribus*. Automating routine financial operations such as loan processing, savings

management, interest computation, and financial reporting improves operational consistency, reduces manual errors, shortens service delivery time, and enhances the efficiency of cooperative operations.  $H_{04}$  is therefore rejected.

Digital Record Management (DRM) has a positive and statistically significant effect ( $B = 0.214, t = 3.014, p = 0.003$ ). A one-unit improvement in digital record management increases financial service delivery efficiency by 0.214 units, holding other factors constant. The digitalisation of member records, financial ledgers, loan portfolios, and transaction histories enhances record accuracy, facilitates faster information retrieval, reduces reconciliation errors, and supports timely decision-making.  $H_{02}$  is rejected.

Online Communication Platforms (OCP) positively and significantly influence financial service delivery efficiency ( $B = 0.176, t = 3.034, p = 0.003$ ). Although the coefficient is the smallest among the four predictors, it remains statistically significant: a one-unit increase in the use of online communication platforms results in a 0.176-unit increase in financial service delivery efficiency. Communication technologies such as email, SMS, WhatsApp, and cooperative member portals improve information dissemination, facilitate prompt responses to member enquiries, enhance transparency, and increase members' access to cooperative services.  $H_{03}$  is accordingly rejected.

### **Discussion of Findings**

The finding that digital payment systems exert the greatest independent impact on financial service delivery efficiency ( $B = 0.287$ ) is consistent with the results of Gomber et al. (2022) and Mohammed and Bello (2022). By replacing physical cash-handling and manual bank remittances with instant, traceable, and auditable electronic transfers, digital payment infrastructure directly addresses the most time-intensive and error-prone phase of cooperative financial operations the collection of member contributions and the disbursement of loans. Adoption of mobile payment platforms in the sampled cooperatives appears to have significantly reduced queuing, manual reconciliation burdens, and cash mismanagement risks, translating into shorter transaction cycles and lower per-transaction costs for members. This outcome is consistent with the TAM prediction that the perceived usefulness of digital payment platforms manifested as demonstrably faster and safer transactions increases the likelihood of continued adoption and sustained performance improvement (Davis, 2022), and with the RBV thesis that digital payment capability constitutes a valuable and performance-enhancing organisational resource (Barney, 2022).

The significant impact of digital record management ( $B = 0.214$ ) supports the findings of Lashitew et al. (2022) and Adeyemi and Ojo (2023). Storing member records, loan histories, and financial accounts in digital databases enables cooperative officers to access, authenticate, and process information immediately,

replacing time-consuming searches through physical files. This reduces loan processing times, minimises data entry errors, ensures reliable financial reporting, and increases audit transparency all critical sub-dimensions of financial service delivery efficiency. The RBV explanation is particularly apt here, as digital record management is an organisational capability that cannot be replicated without deliberate investment, creating a growing performance differential between early adopters and digitally laggard cooperatives over time.

The significant positive effect of financial service automation ( $B = 0.253$ ) aligns with the East African SACCO results of Lashitew et al. (2022), in which cooperatives that underwent automation recorded substantially shorter loan-to-disbursement times. Automating loan application processing, interest computation, and repayment scheduling eliminates the bottlenecks associated with officer availability, manual calculation, and subjective credit evaluation. The lower mean adoption score of AFS ( $M = 3.52$ ) relative to the other digital dimensions suggests that service automation represents the dimension with the greatest untapped efficiency potential among sampled cooperatives, with affordable cooperative management software likely to yield the highest marginal returns to financial service delivery efficiency.

Although online communication platforms recorded the highest adoption rate ( $M = 3.88$ ) and a significant positive effect on financial service delivery efficiency ( $B =$

0.176), they have the smallest independent effect among the four predictors. This is logically consistent with the literature: while communication channels enhance information accessibility, member engagement, and governance transparency, their efficiency route is less direct than that of payment digitalisation or loan automation. They primarily reduce the information search costs faced by members seeking service details, diminish unnecessary office visits related to routine enquiries, and increase accountability through real-time digital dissemination of financial statements. This interpretation extends the results of Agyapong and Boamah (2023) from a Ghanaian setting to Kaduna State, Nigeria, confirming the cross-country validity of the positive yet comparatively indirect effect of digital communication on cooperative financial service efficiency.

### **Conclusion**

This research provides robust empirical evidence that supports the view that digital transformation is a notable positive factor in the efficiency of delivering financial services to cooperative societies in Kaduna State, Nigeria, during the given time interval of 2019–2025. Based on the survey results of 312 respondents randomly chosen representing 15 purposely selected cooperative societies in Kaduna Metropolis, and through a series of OLS regression analysis, the research determined that all four dimensions of digital transformation, which include digital payment systems, digital record management, online communication systems, and automation of

financial services, have significant positive influences that contribute to efficiency in the delivery of financial services. All the four null hypotheses were rejected, and the theoretical hypotheses of the Technology Acceptance Model and the Resource-Based View were empirically tested in the cooperative institutional setting.

### **Recommendations**

1. Cooperative management should strengthen the adoption and utilisation of digital technologies such as digital payment systems, digital record management, online communication platforms, and automation of financial services. This will further enhance loan processing speed, reduce transaction costs, improve accessibility of services, and increase member satisfaction.
2. Cooperative societies should prioritise strengthening the use of electronic payment channels such as mobile banking, USSD, and electronic transfers for member contributions, loan repayments, and other financial transactions. This will help to improve transaction speed, reduce delays associated with cash handling, and enhance operational efficiency.
3. Cooperative societies should ensure proper adoption and maintenance of electronic record systems for member information, loan records, and financial transactions. This will improve accuracy of records, reduce

errors associated with manual documentation, and enhance the speed of loan processing and financial reporting.

4. Cooperative societies should consistently utilise digital communication tools such as messaging applications, SMS alerts, email, and member portals to share financial information, loan updates, and cooperative notices. This will improve information flow, strengthen transparency, and enhance members' access to cooperative services.
5. Cooperative societies should gradually integrate automated systems for loan processing, savings management, interest calculation, and financial reporting. This will reduce manual workload, minimise processing delays, and improve consistency and reliability in service delivery.

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