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Digital Information Systems and Operational Performance of Microfinance Institutions in Nairobi City County, Kenya

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A B S T R A C T :

This study examined the effect of digital information systems on the operational performance of microfinance institutions (MFIs) in Nairobi City County, Kenya. It assessed four systems: tablet banking, mobile money, online banking and automated credit scoring. The study was anchored on Dynamic Capabilities Theory, supported by Diffusion of Innovation and Task-Technology Fit theories. A descriptive research design was used. From a target population of 506 respondents drawn from 23 MFIs (top management, middle management and operational staff), a stratified random sample of 224 was selected using Slovin's formula, and 170 questionnaires were completed (response rate 75.9%). Data were analyzed in SPSS version 30 using descriptive statistics and multiple regression. The model was significant, $F(4, 165) = 69.95$, $p < .001$, and explained 62.9% of the variation in operational performance ($R = 0.793$; adjusted $R^2 = 0.620$). Mobile money ($B = 0.208$, $p = .013$) and automated credit scoring ($B = 0.238$, $p < .001$) had positive and significant effects. Tablet banking ($B = 0.119$, $p = .149$) and online banking ($B = 0.150$, $p = .069$) were positively related to performance but not significantly so. Descriptive results showed that the systems were seen as accessible and, in several cases, easy to use, but were weakly integrated, unevenly used and less satisfying to staff. The study recommends that MFIs integrate tablet banking with core ICT systems, improve the speed, cost and accuracy of mobile money, invest in network infrastructure and customer education for online banking, and improve the data quality and integration of automated credit scoring.

Keywords: digital information systems; operational performance; microfinance institutions; tablet banking; mobile money; online banking; automated credit scoring; Nairobi City County

Introduction

Microfinance institutions (MFIs) extend financial services to low-income households and micro and small enterprises that conventional banks often do not reach. Their value depends on how efficiently they run: how quickly they serve clients, how accurately they process transactions and loans, what each transaction costs, and how many clients and transactions they can handle (Chaulagain & Lamichhane, 2022). Technology is increasingly seen as a way to improve these outcomes, through tablet-based front-end systems, mobile money, online banking and automated credit scoring (Aliong'o & Waithaka, 2024).

Kenya has one of the most developed digital financial ecosystems in Africa, and Nairobi City County hosts most licensed MFIs. Even so, the benefits of digital systems are not automatic. Systems may be installed but weakly integrated, rarely used or poorly supported, and empirical evidence on their effect on the operational performance of MFIs in Nairobi is limited. Existing Kenyan studies mostly address commercial banks, SMEs, retailers or a single digital channel, and tend to measure financial rather than operational performance (Mutea, 2022; Mbugua & Suva, 2024; Maina et al., 2023).

This study therefore evaluated the effect of digital information systems on the operational performance of MFIs in Nairobi City County. Its specific objectives were to evaluate the effect of (i) tablet banking, (ii) mobile money, (iii) online banking and (iv) automated credit scoring on operational performance.

1. Theoretical and empirical background

1.1. Theoretical anchors

The study is anchored on Dynamic Capabilities Theory (Teece et al., 1997), which holds that sustained performance comes from an organization's ability to sense opportunities, seize them through timely investment and transform its resources as the environment changes (Teece, 2007). For MFIs facing fast technological change and competition from banks and fintech firms, digital systems are one way of renewing capabilities. Diffusion of Innovation Theory (Rogers, 2003) explains why adoption and use vary across organizations, and Task-Technology Fit Theory (Goodhue & Thompson, 1995) predicts that technology improves performance only where it matches the tasks users must perform. Together they imply that having a system is not enough; it must be adopted, used and fitted to operational tasks.

1.2. Empirical evidence and gap

Tablet banking. Studies of ICT in Kenyan organizations link ICT adoption and investment to efficiency and fewer operational delays (Atisa & Mose, 2024; Chesaina & Murigi, 2025), and to better service delivery (Lokaale et al., 2025), while noting barriers to adoption. Barakabitze et al. (2019) report that tablet technologies can improve task execution and administration.

Mobile money. Mbugua and Suva (2024) found that mobile transfers, online transactions and mobile payments significantly influenced the financial performance of businesses in Kiambu County. Njenga et al. (2021) reported a significant effect of mobile payment systems on supermarket performance in Nairobi, and Mwaura and Makori (2024) a positive effect of mobile banking on the financial performance of Tier 1 banks.

Online banking. Ndirangu et al. (2022) found a positive and significant effect of online banking on the performance of microfinance banks in Kenya ($p = 0.018$). Obunga et al. (2021) reached a similar conclusion for SMEs, and Komuhangi (2021) for a single microfinance institution (Pride Microfinance Limited).

Automated credit scoring. Wanjiru and Lugalia (2022) found that automated credit scoring lowered non-performing loan ratios and approval times in Kenyan MFIs; Maina et al. (2023) linked credit scoring technology to operational efficiency among Nairobi SMEs; and Leung and Mathews (2021) reported faster loan processing and lower operating costs in European credit unions.

Most of these studies address one system, use financial rather than operational performance measures, or are set in banks, SMEs or other countries. None tests the four systems together against operational performance in MFIs in Nairobi City County, which is the gap this study addresses.

Methodology

1.3. Design, population and sample

A descriptive research design was adopted. The target population was 506 respondents from 23 licensed MFIs in Nairobi City County, in three categories: top management (115; five senior managers per institution), middle management (115) and operational staff who use the systems daily (276; twelve per institution). Customers were excluded because the study concerns internal management of the systems. A sample of 224 was computed using Slovin's formula,

$$n = N / [1 + N(e^2)] = 506 / [1 + 506(0.05)^2] \approx 224 \quad (1)$$

and allocated proportionately (sampling ratio 0.44) by stratified random sampling: 51 top managers, 51 middle managers and 122 operational staff.

1.4. Instrument, pilot and data collection

Primary data were collected with a structured questionnaire of closed-ended items, five for each system and for operational performance. A pilot test with 22 employees of Jitahidi Microfinance Bank, Kiambu, who were excluded from the main study, was used to check validity and reliability (Cooper & Schindler, 2010). Content validity was established through review by the research supervisor and microfinance experts. Cronbach's alpha for each variable exceeded the 0.70 threshold (Table 1). After obtaining a NACOSTI research permit and permission from the human resource managers of the institutions, questionnaires were delivered and collected by the drop-and-pick-later method, with respondents assured of confidentiality.

Table 1 - Reliability of the instrument (pilot, n = 22; 5 items per variable)

Variable	Cronbach's alpha	Alpha, standardized items
Tablet banking	0.742	0.744
Mobile money	0.761	0.746
Online banking	0.767	0.741
Automated credit scoring	0.766	0.764

1.5. Data analysis

Data were analyzed in SPSS version 30 using means, standard deviations and percentages, and multiple linear regression of the form

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad (2)$$

where Y is operational performance, X_1 tablet banking, X_2 mobile money, X_3 online banking, X_4 automated credit scoring, β_0 the constant and ε the error term.

Results and discussion

1.6. Response rate and respondent profile

Of 224 questionnaires distributed, 170 were returned and usable, a response rate of 75.9%, which exceeds the 70% that Mugenda and Mugenda (2019) regard as excellent. Table 2 summarizes the respondents. Two-thirds were male (65.9%), 67.1% held a bachelor's degree and a further 17.6% a master's degree or PhD, 37% were aged 31 to 48 years, and 57.6% had worked in their institution for six to ten years. Respondents were therefore educated, experienced and able to assess the systems they use.

Table 2 - Profile of respondents (N = 170)

Characteristic	Category	n	%
Gender	Male	112	65.9
	Female	58	34.1
Age	18–25 years	–	12
	25–30 years	–	30
	31–48 years	–	37
	49–54 years	–	10
	55 years and above	–	11
Education	Diploma	26	15.3
	Bachelor's degree	114	67.1
	Master's degree / PhD	30	17.6
Years in institution	5 years and below	28	16.5
	6–10 years	98	57.6
	11–15 years	15	8.8
	16–20 years	7	4.1
	Above 21 years	22	12.9

Age was reported as percentages only.

1.7. Descriptive results

Table 3 gives the mean and standard deviation of each item on the five-point scale. The pattern is one of perceived potential but weak realization. Tablets were seen as reducing transaction time (M = 4.000) and as user-friendly (M = 3.950), yet were not often used (M = 2.225), were poorly integrated with ICT systems (M = 1.575) and left staff dissatisfied (M = 1.175). Mobile money was rated highly for ease of access (M = 4.571) but low for speed (M = 2.023), cost (M = 2.000), error reduction (M = 1.175) and transaction volume (M = 1.323). Online banking was credited with faster processing (M = 4.013), better customer access (M = 3.012) and secure transactions (M = 3.000), but network stability (M = 2.000) and regular customer use (M = 1.175) were rated low. Automated credit scoring was rated moderately for use in credit transactions (M = 3.175) and risk assessment (M = 3.004), but lower for quick loan approval (M = 2.013), reducing non-performing loans (M = 2.000) and assessment accuracy (M = 2.000). Operational performance itself was rated best for low transaction cost (M = 4.000) and weakest for service speed and transaction volume (both M = 2.012).

Table 3 - Descriptive statistics (n = 170; 1 = strongly disagree, 5 = strongly agree)

Variable / statement	Mean	SD
Tablet banking		
Tablets are often used by staff in their operations	2.225	0.4125
The tablet system is user-friendly for staff	3.950	1.2009
Tablet systems are well integrated into institutional ICT systems	1.575	0.0235
Tablets help to reduce transaction processing time	4.000	0.4712
Staff are satisfied with the use of tablets	1.175	0.0124
Mobile money		
Mobile money transactions are done fast	2.023	0.0121
Access to the institution's mobile money services is easy	4.571	0.4125
The cost of mobile money transactions is lower	2.000	1.2110
Mobile money helps to reduce transaction errors	1.175	0.4731
The institution facilitates a large number of mobile money transactions	1.323	0.0124

Variable / statement	Mean	SD
Online banking		
Online banking has improved customer access to services	3.012	0.4632
Online banking has improved the speed of transaction processing	4.013	0.0121
The online banking system provides secure transactions	3.000	0.4125
Stable network connectivity supports online banking	2.000	0.3261
Most customers regularly use online banking services	1.175	0.4731
Automated credit scoring		
It improves the accuracy of assessing credit risk	3.004	0.4632
Loans are approved quickly through automated credit scoring	2.013	0.0021
It helps reduce non-performing loans	2.000	0.4125
It ensures accurate loan assessments	2.000	0.3261
The institution uses automated systems for many credit transactions	3.175	0.4731
Operational performance		
The institution provides services to clients quickly	2.012	0.4101
The institution has a high number of customers	3.013	0.0314
The cost of processing a transaction is low	4.000	0.3261
The institution processes a large number of transactions in a given period	2.012	1.219
The institution has fewer operational errors	3.032	0.3421

1.8. Regression results

The model summary (Table 4) shows R = 0.793 and R^2 = 0.629: the four digital information systems together explained 62.9% of the variation in operational performance (adjusted R^2 = 0.620; standard error of the estimate = 0.401). The model was statistically significant, F(4, 165) = 69.95, p < .001 (Table 5), so the four systems jointly predict operational performance.

Table 4 - Model summary

Model	R	R^2	Adjusted R^2	Std. error of estimate
1	0.793	0.629	0.620	0.401

Table 5 - Analysis of variance

Source	Sum of squares	df	Mean square	*F*	*p*
Regression	45.060	4	11.265	69.95	<.001
Residual	26.622	165	0.161		
Total	71.682	169			

Dependent variable: operational performance.

Table 6 - Regression coefficients

Predictor	B	Std. error	Beta	*t*	*p*
(Constant)	–0.893	0.179	–	–4.989	<.001
Tablet banking	0.119	0.082	0.286	1.451	.149
Mobile money	0.208	0.083	0.142	2.506	.013
Online banking	0.150	0.082	0.231	1.829	.069
Automated credit scoring	0.238	0.063	0.278	3.778	<.001

Dependent variable: operational performance.

The fitted model is: operational performance = –0.893 + 0.119 (tablet banking) + 0.208 (mobile money) + 0.150 (online banking) + 0.238 (automated credit scoring). All four coefficients were positive, but only mobile money and automated credit scoring were significant at the 5% level.

1.9. Discussion

Tablet banking. The positive but non-significant coefficient (B = 0.119, p = .149) matches the descriptive picture: tablets are seen as fast and easy but are little used, weakly integrated and unpopular with staff. Atisa and Mose (2024) and Chesaina and Murigi (2025) found that ICT improves efficiency where it is adopted effectively, and the present findings suggest that the benefit is not yet being realized because adoption is shallow. In the terms of Dynamic Capabilities Theory, institutions appear to have seized the technology but not yet transformed their processes around it.

Mobile money. Mobile money had a significant positive effect (B = 0.208, p = .013), consistent with Mbugua and Suva (2024), Njenga et al. (2021) and Mwaura and Makori (2024), although those studies used financial performance measures. This sits uneasily with the low descriptive ratings for speed, cost and error reduction. A likely explanation is that access, which respondents rated highly, matters most for operations, but the study cannot test this directly. The low ratings indicate considerable room for improvement.

Online banking. Online banking was positive but not significant at the 5% level (B = 0.150, p = .069), unlike the significant effect reported for Kenyan microfinance banks by Ndirangu et al. (2022). The weak network connectivity and low customer use reported here are plausible reasons, since a channel that customers rarely use cannot do much for operations. The p-value is close to the threshold, so a larger sample could change the conclusion.

Automated credit scoring. Automated credit scoring had the largest unstandardized coefficient and a highly significant effect (B = 0.238, p < .001), in line with Wanjiru and Lugalia (2022), Maina et al. (2023) and Leung and Mathews (2021). Respondents were less convinced about loan approval speed and reduction of non-performing loans, which suggests that the benefit comes mainly through risk assessment and processing of credit transactions. It also fits Task-Technology Fit Theory, since credit assessment is a well-defined, repetitive task for which automation suits the work.

Conclusions and recommendations

Digital information systems explain a large share (62.9%) of the variation in operational performance of MFIs in Nairobi City County. Mobile money and automated credit scoring contribute significantly. Tablet banking and online banking are positively related to performance but not significantly, which the descriptive results attribute to weak integration, uneven use and infrastructure and uptake constraints. The study is a cross-sectional survey of self-reported perceptions in one county, and some respondents were hesitant about confidentiality, so the findings show association rather than causation and should be generalized with care.

The study recommends that MFIs and their regulators:

- Integrate tablet banking with core ICT systems so that field data flow into records without duplication, train and support staff, and target tablets at high-value activities such as onboarding, loan application and repayment collection.
- Make mobile money faster and more accurate by tracking and resolving failed or wrong-number transactions, reviewing transaction costs with service providers, planning capacity for peak periods and integrating mobile money with loan, accounting and reporting systems.
- Invest in reliable network infrastructure and security for online banking, and run customer and staff awareness campaigns to raise use.
- Improve the quality of client data used in credit scoring, review scoring models regularly, train credit officers to interpret scores, and build scoring into lending procedures.

Future studies should replicate the model in banks and SACCOs, examine emerging technologies such as artificial intelligence, agency banking, blockchain and digital lending platforms, and test other influences on operational performance such as ICT infrastructure, employee digital skills, cybersecurity, customer digital literacy and institutional readiness.

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