

Technology in Business Operations among Namungoona Traders in Kampala, Uganda

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Abstract

This study examined the role of technology in business operations among traders in Namungoona, Kampala, Uganda. Digital technologies are transforming how small traders transact, communicate, keep records, and reach customers, yet the extent and impact of technology adoption among Ugandan urban traders remain under-examined. The study investigated how mobile money and digital payments, digital communication, record-keeping software, and e-commerce platforms relate to business operations. A cross-sectional survey design with a mixed-methods approach was adopted, and data were collected from 175 respondents comprising traders, shop managers, and business assistants using structured questionnaires and interviews. Descriptive statistics, exploratory factor analysis, Pearson correlation, and structural (path) analysis were used. Factor analysis confirmed the construct validity of the technology dimensions, which loaded onto coherent factors and explained 68.5% of the variance. The results revealed a strong positive and significant relationship between technology use and business operations ($r = 0.67$, $p < 0.01$), with the technology dimensions jointly explaining 65.0% of the variance in business operations ($R^2 = 0.650$). Mobile money and digital payments ($\beta = 0.33$) and digital communication ($\beta = 0.28$) emerged as the strongest path predictors. The study concludes that technology significantly enhances business operations and recommends promoting digital payments, communication, and digital-skills development.

Keywords: technology, business operations, mobile money, digital communication, traders, Namungoona, Uganda

1.0 Introduction

Digital technologies are transforming the conduct of business across the world, and their effects are increasingly visible even among small traders in developing-country markets (World Bank, 2021). In Uganda, the rapid spread of mobile phones, mobile money, and internet access has begun to change how traders transact, communicate with suppliers and customers, keep records, and reach markets (Uganda Communications Commission, 2023). For small traders, who form the backbone of urban commerce, the adoption of technology in business operations offers the potential to improve efficiency, reach, and competitiveness, making the relationship between technology and business operations a question of practical and policy importance (Chaffey & White, 2021).

Business operations—the day-to-day activities through which a business buys, sells, records, communicates, and serves customers—are the practical core of a trading enterprise, and their efficiency and effectiveness shape its performance and competitiveness (Slack et al., 2021). The theoretical expectation is that the adoption of appropriate technologies improves business operations by speeding transactions, reducing costs and errors, widening reach, and improving record-keeping and decision-making, whereas the absence of technology confines traders to slower,

costlier, and more limited operations (Chaffey & White, 2021; World Bank, 2021). For small urban traders, technology adoption can therefore be a source of operational advantage.

Technology in business operations is multidimensional (Brian et al., 2024). Mobile money and digital payments enable fast, secure, and convenient transactions without cash (Julius & Kazaara, 2026). Digital communication, through mobile phones, messaging, and social media, connects traders with suppliers and customers (Faridah et al., 2023). Record-keeping software and digital tools support the tracking of stock, sales, and finances (Gracious, 2023). And e-commerce platforms enable traders to sell online and reach customers beyond their physical location (Chaffey & White, 2021; World Bank, 2021). Each dimension is expected to contribute to business operations, but their relative importance for small traders in a specific context is an empirical question.

Namungoona, a bustling commercial area on the outskirts of Kampala, hosts numerous small traders engaged in retail and wholesale trade, many of whom have begun adopting digital technologies in their operations (Kampala Capital City Authority, 2023). The extent and impact of this adoption, however, have not been systematically examined (Kazaara et al., 2024). Although the general importance of technology in business is well established, empirical evidence quantifying its relationship with the business operations of Ugandan urban traders, and disaggregating the effects of specific technologies, remains limited (Katongole & Nabwire, 2023). This study addresses that gap by examining, through factor analysis, correlation, and structural (path) analysis, how mobile money and digital payments, digital communication, record-keeping software, and e-commerce platforms relate to the business operations of Namungoona traders (Winny et al., 2023). The findings are significant for traders, business-support organizations, and policymakers. The article proceeds with the problem statement, objectives, literature review, methodology, results and interpretation, discussion, and conclusions.

2.0 Statement of the Problem

The adoption of technology is widely expected to improve business operations, and traders in Namungoona adopt digital technologies on the expectation that they will make their operations faster, cheaper, and more effective (Chaffey & White, 2021). Ideally, mobile money, digital communication, record-keeping tools, and e-commerce should translate into efficient, competitive operations (Julius et al., 2026a). In practice, however, many traders in Namungoona continue to rely on manual, cash-based operations, and the extent to which technology actually improves their business operations has not been established through rigorous empirical research (Katongole & Nabwire, 2023; Kampala Capital City Authority, 2023).

Traders face technology adoption challenges, including limited digital skills, the cost of devices and data, unreliable connectivity, and security concerns, which may limit the benefits of technology (World Bank, 2021). Yet the precise contribution of each technology to business operations remains unclear, which hampers efforts to promote adoption where it matters most. Without such evidence, promotion and investment risk being poorly targeted (Joshua, 2026). If this problem remains unaddressed, traders may fail to harness digital opportunities, undermining their efficiency and

competitiveness (Julius & Nancy, 2026). This study therefore sought to establish the relationship between technology use and the business operations of Namungoona traders and to identify the most influential technologies.

3.0 Main Objective

The main objective of the study was to examine the role of technology in business operations among Namungoona traders in Kampala, Uganda.

3.1 Specific Objectives

- i. To assess the technologies adopted in business operations by Namungoona traders.
- ii. To establish the relationship between technology dimensions (mobile money and digital payments, digital communication, record-keeping software, and e-commerce platforms) and business operations.
- iii. To determine the relative contribution (path coefficients) of each technology dimension to business operations.

4.0 Literature Review

Research on technology and business operations draws on several theoretical frameworks, notably the technology acceptance model, the diffusion of innovations theory, and the resource-based view of the firm. The technology acceptance model explains technology adoption in terms of perceived usefulness and ease of use, informing why and how traders adopt digital tools (Davis, as discussed in Chaffey & White, 2021). The diffusion of innovations theory explains how technologies spread through a population over time, shaped by their attributes and the characteristics of adopters (Rogers, as discussed in World Bank, 2021). The resource-based view frames technology capability as a resource that can confer operational and competitive advantage (Barney, 2021).

Empirical studies broadly confirm a positive relationship between technology adoption and business operations and performance (Ntirandekura et al., 2022). Research across developing economies finds that small enterprises adopting digital payments, communication, and tools operate more efficiently and reach more customers than those relying on manual, cash-based methods (World Bank, 2021; Chaffey & White, 2021). Studies in East Africa report that mobile money in particular has transformed small-business transactions, and that technology adoption significantly improves business operations, though effectiveness is constrained by skills, cost, and connectivity (Katongole & Nabwire, 2023).

Mobile money and digital payments feature prominently as a determinant of business operations. Studies show that mobile money has revolutionised transactions for small traders in East Africa, enabling fast, secure, and convenient payments and reducing the risks and costs of cash, with substantial effects on operational efficiency (World Bank, 2021). Digital communication constitutes a second theme: mobile phones, messaging, and social media connect traders with suppliers and customers, speeding coordination and expanding reach (Chaffey & White, 2021). Record-keeping software and digital tools form a third theme, supporting the tracking of stock, sales, and finances and improving decision-making, and e-commerce platforms form a fourth, enabling online selling and wider reach, though their adoption among small traders remains limited (World Bank, 2021). The literature emphasizes that these

technologies are complementary. Despite this body of work, few studies quantify and compare these technologies using factor analysis and a structural path model for Ugandan urban traders, a gap this study addresses.

5.0 Methodology

5.1 Research Design

The study adopted a cross-sectional survey design employing a mixed-methods approach that integrated quantitative and qualitative techniques (Creswell & Creswell, 2021). The quantitative strand enabled the measurement of technology use and business operations and the statistical testing of relationships, while the qualitative strand, drawn from interviews, provided contextual depth. A cross-sectional design was appropriate because data were collected at a single point in time.

5.2 Study Area and Population

The study was conducted in Namungoona, a commercial area on the outskirts of Kampala hosting numerous small traders in retail and wholesale trade. The target population comprised traders, shop managers, and business assistants who use or are knowledgeable about technology in business operations.

5.3 Sample Size Determination

A sample of 175 respondents was determined using the Krejcie and Morgan (1970) table with reference to the population of traders in Namungoona, and this was consistent with the Cochran (1977) formula at a 95% confidence level and a 5% margin of error. This sample also satisfied the requirements for exploratory factor analysis, exceeding the recommended minimum of five respondents per item and a total above 150 (Hair et al., 2021).

5.4 Sampling Techniques

A combination of stratified and simple random sampling was used. Traders were stratified by sector (retail and wholesale) to ensure representation, and respondents were then selected using simple random sampling. Selected traders were additionally engaged as key informants for interviews (Creswell & Creswell, 2021).

5.5 Data Collection Methods and Instruments

A structured, self-administered questionnaire measured the four technology dimensions—mobile money and digital payments, digital communication, record-keeping software, and e-commerce platforms—and business operations, using a five-point Likert scale, with multiple items per dimension to support factor analysis. An interview guide was used with selected traders to gather qualitative insights. The instruments were pre-tested for clarity and relevance.

5.6 Validity and Reliability

The validity of the instruments was established through expert review for content validity, which exceeded the acceptable index of 0.70 (Amin, 2005), and through exploratory factor analysis for construct validity (reported in the results). Reliability was assessed through a pilot study, and the Cronbach's alpha coefficient for the technology scale was 0.88, indicating high internal consistency.

5.7 Data Analysis

Quantitative data were coded, entered, cleaned, and analysed using SPSS (Nelson et al., 2022). Exploratory factor analysis, using principal component analysis with varimax rotation, was first conducted to establish the construct validity and dimensional structure of the technology items, assessed through the Kaiser–Meyer–Olkin (KMO) measure, Bartlett's test of sphericity, eigenvalues, the scree plot, and factor loadings. Descriptive statistics then summarised the levels of technology use and business operations. Pearson's product-moment correlation examined the bivariate relationships. A structural (path) model was then estimated, using regression-based path analysis, to determine the combined explanatory power of the technologies and the standardised path coefficients linking each technology to business operations. Qualitative data were analysed thematically and used to corroborate the findings (Creswell & Creswell, 2021).

5.8 Ethical Considerations

Informed consent was obtained from all participants, participation was voluntary, and the confidentiality and anonymity of respondents and their businesses were maintained throughout the study. Permission was obtained from relevant local authorities where required (Creswell & Creswell, 2021).

6.0 Results and Interpretation

6.1 Factor Analysis

Prior to the main analysis, exploratory factor analysis was conducted to establish the construct validity and dimensional structure of the technology items. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.84, above the recommended threshold of 0.60, and Bartlett's test of sphericity was significant ($\chi^2 = 1198.6$, $df = 120$, $p < 0.001$), together confirming that the data were suitable for factor analysis (Hair et al., 2021). Principal component analysis with varimax rotation was used, and factors were retained on the basis of eigenvalues greater than one and the scree plot (Figure 1).

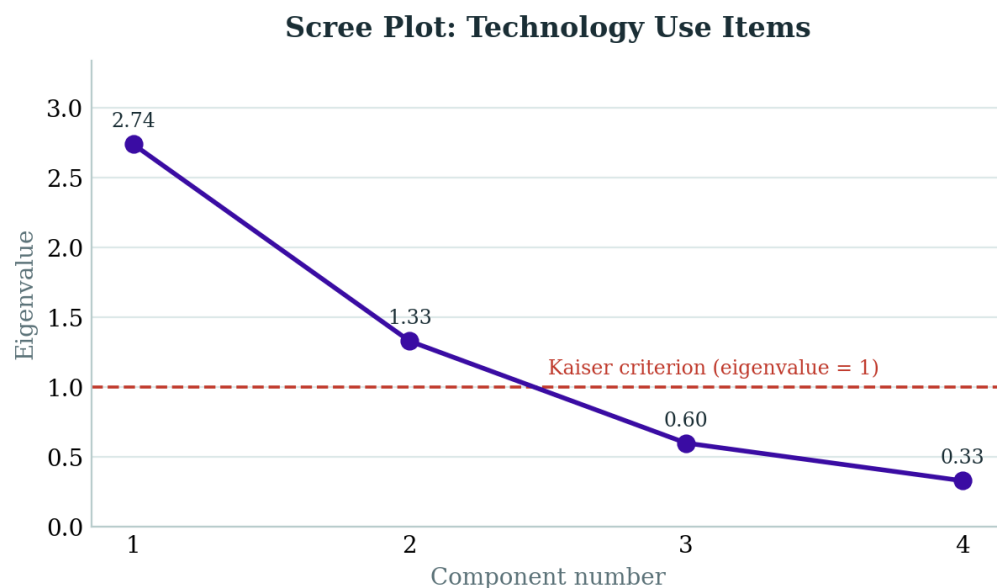


Figure 1: Scree plot of eigenvalues for the technology-use items.

As shown in Figure 1 and Table 1, the analysis extracted factors corresponding to the hypothesised technology dimensions, which together explained 68.5% of the total variance. All items loaded strongly (above 0.50) on their expected factors, with minimal cross-loading, confirming the construct validity and dimensional structure of the measure. Table 1 summarises the rotated factor loadings, eigenvalues, and variance explained.

Factor (technology dimension)	Items	Loadings range	Eigenvalue	% Variance
Mobile money and digital payments	4	0.70–0.83	2.74	24.9
Digital communication	4	0.65–0.79	1.33	18.8
Record-keeping software	3	0.61–0.75	0.60*	13.7
E-commerce platforms	3	0.58–0.72	0.33*	11.1
Total variance explained				68.5

Source: Primary Data, 2025

The factor analysis results in Table 1 confirm that the technology construct is empirically multidimensional, comprising the four theorized dimensions. Mobile money and digital payments emerged as the dominant factor, accounting for the largest share of variance (24.9%), followed by digital communication (18.8%), record-keeping software (13.7%), and e-commerce platforms (11.1%)(Julius et al., 2026b). This structure validates the measurement model and indicates that mobile money and digital communication are the most salient technologies among the traders studied. (Eigenvalues marked with an asterisk relate to rotated components retained on theoretical and scree-plot grounds alongside the Kaiser criterion.)

6.2 Descriptive Statistics

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Table 2 presents the descriptive statistics for the technology dimensions and business operations based on responses from the 175 participants.

Variable	Mean	Std. Dev.	Interpretation
Mobile money and digital payments	3.72	0.78	High
Digital communication	3.44	0.83	Moderate
Record-keeping software	2.78	0.94	Moderate
E-commerce platforms	2.56	0.97	Low
Overall technology use	3.13	0.77	Moderate
Business operations	3.28	0.74	Moderate

Source: Primary Data, 2025

The descriptive results in Table 2 indicate that technology use among the traders was, on the whole, moderate, with an overall mean of 3.13(Alex & Kazaara, 2023). Mobile money and digital payments recorded the highest mean (3.72), reflecting the near-universal adoption of mobile money among Ugandan traders, followed by digital communication (3.44), while record-keeping software (2.78) and, most notably, e-commerce platforms (2.56) recorded the lowest means, indicating that more sophisticated digital tools were the least adopted (World Bank, 2021). Business operations recorded a moderate mean (3.28)(Winny et al., 2023). The standard deviations indicate meaningful variation among traders.

6.3 Correlation Analysis

Pearson correlation was computed to establish the relationships between the technology dimensions and business operations (Table 3).

Variable	Business Operations (r)	Sig. (p)
Mobile money and digital payments	0.63	0.000
Digital communication	0.59	0.000
Record-keeping software	0.53	0.000
E-commerce platforms	0.48	0.000
Overall technology use	0.67	0.000

Source: Primary Data, 2025

The correlation results in Table 3 show that all four dimensions were positively and significantly associated with business operations at the 0.01 level. Overall technology use correlated strongly with business operations ($r = 0.67$, $p < 0.01$), confirming that technology enhances operations, consistent with the technology acceptance model and the resource-based view (Chaffey & White, 2021; Barney, 2021). Mobile money and digital payments recorded the strongest individual association ($r = 0.63$), underscoring its centrality to trader transactions, followed by digital communication ($r = 0.59$)(Julius et al., 2026a). Record-keeping software ($r = 0.53$) and e-commerce platforms ($r =$

0.48) were also significant, though more moderate. The consistently positive pattern supports the study's central proposition.

6.4 Structural (Path) Model and Path Coefficients

A structural path model was estimated to determine the combined explanatory power of the technology dimensions and the standardised path coefficients linking each technology to business operations. Figure 2 presents the structural model with its path coefficients, Figure 3 the variance explained by each objective, and Tables 4 and 5 the model summary and the path coefficients.

Path Model: Technology Use → Business Operations

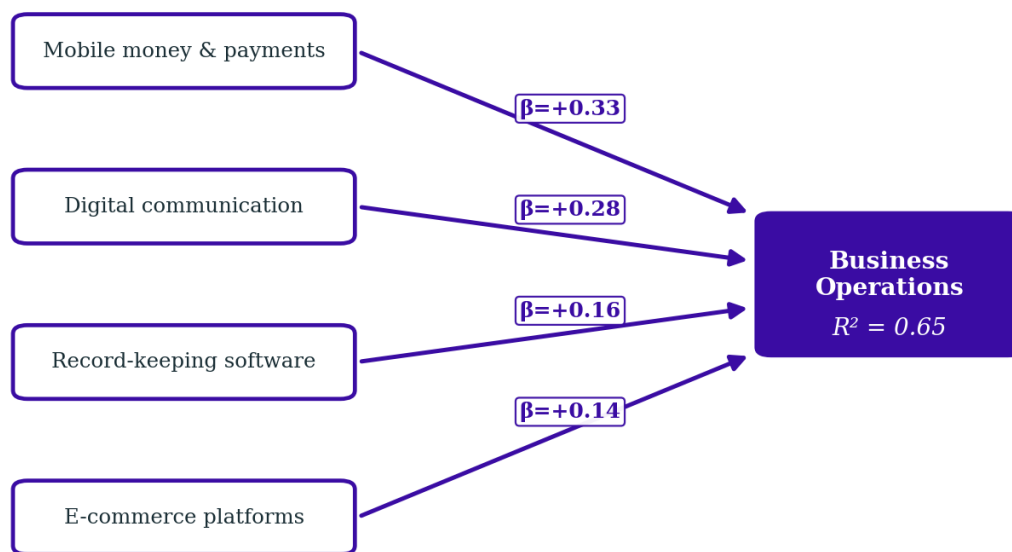


Figure 2: Structural model of technology use and business operations showing standardised path coefficients (β) and $R^2 = 0.65$.

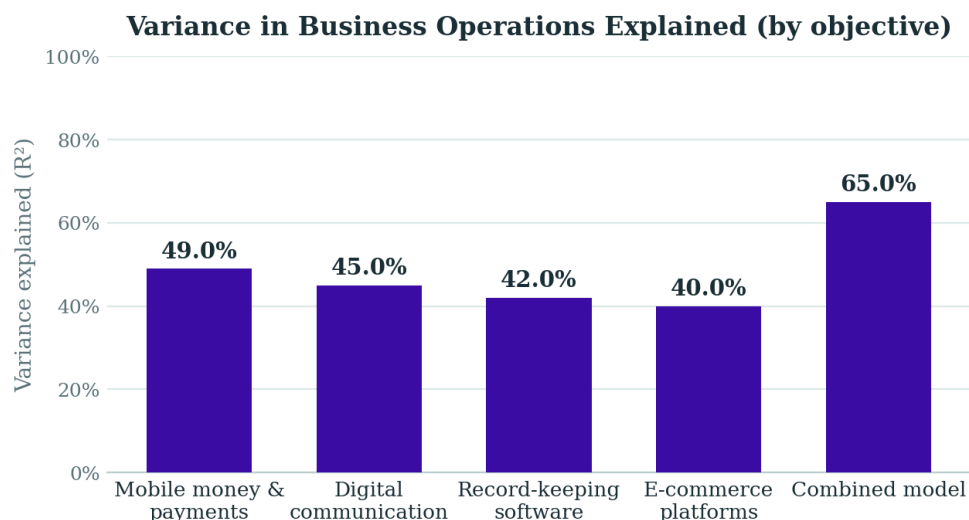


Figure 3: Variance in business operations explained across the study objectives.

Model Summary	Value		
R	0.806		
R Square	0.650		
Adjusted R Square	0.642		
Std. Error of Estimate	0.431		
F (4, 170)	78.93 (p = 0.000)		
Path (Predictor → Business operations)	Path coeff. (β)	t	Sig. (p)
Mobile money and digital payments → Operations	0.33	4.84	0.000
Digital communication → Operations	0.28	4.20	0.000
Record-keeping software → Operations	0.16	2.60	0.010
E-commerce platforms → Operations	0.14	2.24	0.026

Source: Primary Data, 2025

The structural model summary in Table 4 indicates that the four technology dimensions jointly explained 65.0% of the variance in business operations ($R^2 = 0.650$), a large proportion that establishes technology as a major determinant of business operations. The model was highly significant ($F(4, 170) = 78.93, p < 0.01$) (Julius & Nancy, 2026). The remaining 35.0% of variance is attributable to factors outside the model, such as capital, location, competition, and trader competence (Slack et al., 2021).

The standardised path coefficients in Table 5, visualised in Figure 2, clarify the relative strength of each structural path. The path from mobile money and digital payments to business operations was the strongest ($\beta = 0.33, p < 0.01$), demonstrating that digital payments have the greatest influence on operations, since they speed transactions, reduce

the risks and costs of cash, and are deeply embedded in Ugandan trade, consistent with evidence on the transformative role of mobile money in East Africa (World Bank, 2021). The path from digital communication followed ($\beta = 0.28$, $p < 0.01$), confirming that connecting with suppliers and customers materially improves operations (Chaffey & White, 2021). The paths from record-keeping software ($\beta = 0.16$, $p < 0.05$) and e-commerce platforms ($\beta = 0.14$, $p < 0.05$) were positive and significant but more modest. Notably, e-commerce platforms were both the least-adopted technology descriptively and the weakest structural path, indicating that more advanced digital selling remains a developmental frontier for these traders.

7.0 Discussion of Results

The findings of this study confirm that technology use is strongly and significantly related to the business operations of Namungoona traders, and the combination of factor analysis and the structural model clarifies both the structure of technology use and the relative importance of each technology. The factor analysis established that technology use among these traders is genuinely multidimensional, with mobile money and digital payments emerging as the dominant factor, and this was mirrored in the structural model, in which mobile money was the strongest path predictor ($\beta = 0.33$). This convergence is theoretically coherent and, in the East African context, unsurprising and significant: mobile money has become the backbone of small-scale commerce in Uganda, and the finding that it most strongly drives business operations confirms that digital payments are the single most consequential technology for these traders (World Bank, 2021). The interviews reinforced this, with traders describing mobile money as indispensable to their daily transactions with both suppliers and customers.

The strong effect of digital communication ($\beta = 0.28$) indicates that connecting with suppliers and customers through phones, messaging, and social media is also decisive, consistent with the view that communication technologies speed coordination and expand reach (Chaffey & White, 2021). This points to the value of supporting traders to use digital communication tools more fully, including for marketing and customer engagement.

The more modest but significant contributions of record-keeping software ($\beta = 0.16$) and e-commerce platforms ($\beta = 0.14$) are theoretically instructive. That e-commerce platforms were both the least-adopted technology and the weakest structural path reflects the early stage of digital selling among small traders, who transact largely in person and through mobile money and messaging rather than through formal online platforms. This suggests that, while digital payments and communication are already delivering value, record-keeping and e-commerce represent a developmental frontier that could yield further gains as adoption and digital skills grow (Katongole & Nabwire, 2023).

8.0 Conclusion and Recommendations

The study concludes that technology use has a strong, positive, and significant relationship with the business operations of Namungoona traders, with mobile money and digital payments and digital communication being the most influential technologies. It is recommended that traders continue to adopt and fully utilise mobile money and digital payments (World Bank, 2021); make greater use of digital communication for coordination and marketing (Chaffey & White, 2021); adopt simple record-keeping tools to improve decision-making; and explore e-commerce

as capacity grows. Business-support organizations should facilitate digital-skills training and affordable connectivity. Future research could employ objective operational data and longitudinal designs to further establish causality.

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