

Adoption of E-Commerce and The Growth of Small and Medium Enterprises in Nairobi Central Business District, Kenya

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Abstract

Small and Medium Enterprises (SMEs) are central to employment creation, economic growth, and inclusive development, particularly in emerging economies. However, high business failure rates continue to constrain their contribution to sustainable economic development. This study examined the influence of e-commerce adoption on the growth of SMEs in Nairobi Central Business District (CBD), focusing on electronic payments, e-procurement, e-banking, and e-logistics. The study was anchored on Diffusion of Innovation Theory, Behavioral Theory of the Firm, and the Technology Acceptance Model. An explanatory research design was adopted, targeting 21,100 SMEs. A stratified random sample of 393 SME managers was selected, of whom 368 provided valid responses, representing a 93.6% response rate. Data were collected using questionnaires and analyzed using descriptive statistics, correlation analysis, and multiple linear regression in SPSS Version 22. Diagnostic tests confirmed compliance with the assumptions of Ordinary Least Squares regression. The findings revealed significant positive relationships between SME growth and e-logistics ($r = 0.73$), e-payment ($r = 0.71$), e-banking ($r = 0.69$), and e-procurement ($r = 0.66$). Regression results indicated that the four e-commerce dimensions jointly explained 66% of the variation in SME growth. E-logistics ($\beta = 0.34$) and e-payment ($\beta = 0.30$) demonstrated the strongest effects. The findings indicate that e-commerce adoption enhances transaction efficiency, reduces operational costs, improves service delivery, and strengthens SME profitability. The study concludes that e-commerce is an important driver of SME growth in Nairobi CBD. It recommends strengthening digital competencies, ICT infrastructure, and secure digital platforms to support effective adoption of e-commerce technologies.

Keywords: *E-commerce adoption; SMEs; E-payment; E-procurement; E-banking; E-logistics; SME growth*

1.1 Introduction

Small and medium-sized enterprises (SMEs) are important drivers of national economic development because they create employment, reduce poverty, stimulate innovation, and contribute to GDP (Adam & Alarifi, 2021). However, sustaining competitive advantage has become increasingly difficult amid global digital transformation, prompting firms to adopt new technologies and alternative growth strategies (Sołoducho-Pelc & Sulich, 2020; Ofori-Amanfo et al., 2024). E-commerce has emerged as an important mechanism through which SMEs can expand markets, increase sales, improve efficiency, and strengthen competitiveness (Ugwu, 2022). Technological advances have expanded online marketplaces, enabling firms to reach consumers beyond physical locations. Global e-commerce sales increased from USD 4.28 trillion in 2020 to a projected USD 6.39 trillion in 2024 (Statista, 2021). Online platforms support customer acquisition, while artificial intelligence and platforms such as Alibaba provide opportunities for SMEs to access wider markets (Saravanan & Pooja Shri, 2020; Song et al., 2019; Mensah et al., 2023).

Evidence from developing economies demonstrates uneven e-commerce adoption. In Pakistan, SMEs constitute about 90% of registered enterprises, but contribute approximately 40% of GDP, partly because limited technology investment and innovation constrain their development (Grimmer et al., 2019; Hussain et al., 2022). SMEs contribute about 52% of Sri Lanka's GDP, yet limited awareness of e-commerce benefits and underutilization of digital technologies have constrained expansion (Kuruwitaarachchi et al., 2020; Gunawardana, 2020). Nigerian SMEs similarly face slow technological adoption, with online sales remaining limited despite substantial e-commerce activity in developed markets (Ajao et al., 2019; Okoye et al., 2023). In Uganda, SMEs contribute substantially to GDP, manufacturing, employment, and the private sector, but weak survival rates and slow adoption of e-commerce continue to constrain growth (Lule & Tusiime, 2019; Wanzu et al., 2019; Niyongere & No, 2022).

In Kenya, e-commerce has expanded, with the country ranked among Sub-Saharan Africa's fastest-growing e-commerce economies (Muthee, 2021). Nevertheless, SME growth has remained constrained, indicating the need to examine whether digital commerce translates into enterprise expansion. SMEs constitute more than 95% of Kenyan businesses and contribute substantially to employment, GDP, innovation, competition, and support for larger enterprises. Businesses with annual revenues between Ksh 500,000 and Ksh 5,000,000 are classified as small enterprises (Aondo, 2019). The SME sector accounts for approximately 80% of

employment and 18.4% of GDP, while Nairobi Central Business District hosts about 21,100 SMEs facing financing, innovation, market-access, and regulatory challenges (Kimana, 2020). SME growth represents improvements in enterprise scale, financial position, profitability, assets, investment, sales, market share, employment, and customer satisfaction (Wijewardena & Cooray, 2019; Wathegi, 2019). Growth is constrained by finance, technology, markets, regulations, implementation costs, inadequate IT skills, weak internet infrastructure, cybersecurity concerns, and limited understanding of e-commerce benefits (Kimana, 2020; Thiongo, 2024). It can be measured through profitability, liquidity, solvency, sales, market share, and customer-related indicators (Mwaniki, 2019; Wathegi, 2019). This study focuses on profitability arising from changes in sales volume. Sales growth reflects annual increases in revenue and indicates market demand and competitive capacity (Goh et al., 2022; Iskandar, 2021).

E-commerce adoption refers to integrating internet-based technologies into buying, selling, advertising, ordering, and other business transactions (Orori, 2021; Ausat & Peirisal, 2021). It can expand customer bases, improve productivity, reduce costs, strengthen partnerships, and enhance business performance (Lule & Tusiime, 2019; Mensah et al., 2023). This study examines four dimensions: e-procurement, e-payment, e-banking, and e-logistics. E-procurement digitizes purchasing, improves supplier communication, broadens supplier access, and reduces transaction costs (Mutunga, 2020; Ugwu, 2022). E-payment improves transaction speed, transparency, convenience, tracking, and operational efficiency (Fatonah et al., 2018; Kwabena et al., 2019). E-banking facilitates financial transactions and access to credit while potentially improving revenue and profitability (Khavere Kitigin, 2021; Makworo et al., 2019; Saridakis et al., 2018). E-logistics uses internet technologies to manage transportation, distribution, and storage, thereby improving delivery efficiency, market access, customer service, and SME competitiveness (Mawiyoo, 2023; Al Naim & Bhatti, 2022). The reported regional pattern further indicates rising SME contributions between 2020 and 2024, although these figures should be interpreted alongside differences in measurement and national economic structures. SME expansion can transform incomes and create opportunities for wealth accumulation (Apuoyo, 2020). Consequently, examining e-commerce adoption among Nairobi CBD SMEs is important for understanding how digital capabilities influence long-term enterprise growth and business sustainability.

1.2 Problem Statement

SMEs are central to economic development, employment creation, and inclusive growth, particularly in developing countries. However, their survival and expansion remain challenging. Kidali (2020) reported that more than 70% of SMEs fail within their first three years of operation, despite substantial government efforts to promote the sector. Increasing operating costs and declining sales have further constrained SME profitability and growth. Kyalo (2024) observed that declining profits have limited the financial resources available for business expansion. In Nairobi County, most SMEs recorded sales-volume declines exceeding 5% in 2022 compared with the previous year. Slow adoption of e-commerce may therefore constrain SME growth and business effectiveness. Empirically, Ausat and Peirisal (2021) examined e-commerce adoption and business success among SMEs in Malang City, Indonesia, but the different geographical setting limits applicability to Nairobi. Ajao et al. (2019) examined e-commerce development among Nigerian small businesses but did not specifically address SME growth. Wanzu et al. (2019) investigated e-commerce utilization and SME growth in Uganda using secondary data, creating a methodological gap. Awinja and Fatoki (2021) focused on digital banking and SME growth in Kenya, leaving a conceptual gap regarding e-commerce. Therefore, this study examines how e-commerce adoption affects SME growth in Nairobi Central Business District, Kenya.

1.3 Objectives

To determine the effect of e-commerce adoption on SME growth in Nairobi's CBD, Kenya.

The specific objectives of this study were to:

- i. To determine the effect of E-payment adoption on growth of SMEs in Nairobi CBD, Kenya
- ii. To determine the effect of E-procurement adoption on growth of SMEs in Nairobi CBD, Kenya
- iii. To determine the effect of E-banking adoption on growth of SMEs in Nairobi CBD, Kenya
- iv. To determine the effect of E-logistics adoption on growth of SMEs in Nairobi CBD, Kenya

2.0 Literature Review

2.1 Theoretical Review

The theoretical framework synthesizes tested knowledge and identifies variables and relationships relevant to a study (Zou et al., 2022). This study was guided by the Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT), and Behavioral Theory of the Firm, which collectively explain technology adoption and small business growth. Davis (1989) developed TAM to explain technology acceptance and usage based mainly on perceived usefulness (PU) and perceived ease of use (PEU). Perceived usefulness refers to the extent to which an individual believes that technology can improve task performance, while perceived ease of use concerns the perceived simplicity of operating a system. These beliefs influence attitudes and intentions toward technology adoption. TAM is widely applied in social science research on emerging technologies and digital services, with meta-analyses supporting its credibility and effectiveness (Bertrand & Bouchard, 2008).

The model is relevant because it provides a foundation for understanding e-commerce adoption. Consumers are more likely to use and purchase through e-commerce platforms when they perceive such platforms as useful, practical, accessible, and easy to navigate. Thus, TAM explains how perceived benefits and usability can shape consumers' intentions and adoption of e-commerce services. Rogers (1962) proposed Innovation Diffusion Theory to explain how new ideas and technologies spread within social systems over time. The theory examines why some individuals and groups adopt innovations earlier than others and emphasizes adoption as a process. Rogers (1962) identifies stages through which individuals progress from awareness and interest to evaluation, trial, and adoption. These stages help explain how users develop knowledge of digital technologies and subsequently incorporate services as e-banking, e-payment, e-procurement, and e-logistics into activities.

Diffusion also occurs through communication networks and intermediaries, including opinion leaders, gatekeepers, and change agents, who can influence adoption decisions. IDT is relevant to this study because it explains factors affecting the speed and extent of e-banking adoption and how consumers move from awareness to sustained technology use. Cyert and March first advanced the Behavioral Theory of the Firm in 1963 (Cyert & March, 1992). The theory explains organizational behavior where individuals and groups may have conflicting objectives and where decisions are shaped by negotiation, cooperation, bounded rationality, and imperfect

information (Dew et al., 2008). According to Zahra et al. (2006), the theory can help explain small business expansion and relationships within firms.

The theory emphasizes organizational goals such as sales, revenue, production, and records, while recognizing that firms often pursue satisfactory rather than optimal outcomes (Bromiley & Rau, 2022). Its relevance lies in explaining how small businesses make decisions, manage competing interests, and pursue growth under uncertainty and limited information. Consequently, the theory provides a basis for understanding small business growth as the dependent variable and links organizational behavior with decisions supporting business expansion.

2.2 Review of Empirical Studies

Alzoubi and Ghazal (2022) examined electronic payments and online shopping in the banking sector. They found a relationship between online purchasing and sales growth, while e-payment sales growth and online shopping demonstrated an indirect effect. In Nigeria, Chima (2023) established a strong relationship between point-of-sale systems and increased retail sales volumes and turnover, while electronic funds transfer systems were significantly associated with increased sales. Ntukanyagwe and Deya (2024) identified ease of use, security and privacy, transaction costs, customer acceptance, technical infrastructure, government support, awareness and training, management support, flexibility, and convenience as determinants of e-payment adoption among Rwandan SMEs. In Nairobi, Kimonye and Muchelule (2024) found a significant relationship between electronic payment systems and financial performance among commercial banks, with automated teller machines showing a statistically significant effect and electronic cards and bank agents producing positive effects. Chepkoech et al. (2022) found that e-services, e-banking, and mobile payment channels influenced the sustainability of tax revenue collection in Nairobi City County. These indicate that digital payments can enhance transactions and sales, although most examined banks, retail establishments, or public institutions rather than SME growth directly.

Mélon and Spruk (2020) examined mandated e-procurement and institutional quality across 108 countries, 1996–2017. The analysis found stronger corruption control in Denmark and the Netherlands, whereas Portugal experienced different outcomes, suggesting that effects may depend on institutional conditions. Perez (2022) examined e-procurement adoption among SMEs and found that security concerns, technical immaturity, inadequate resources and competence, and resistance to change constrained adoption, while respondents understood

implementation requirements. Shatta et al. (2020), studying Tanzania, found that legal frameworks and relative benefits indirectly influenced adoption of e-procurement for green purchasing. In Nairobi, Mutunga (2020) found that e-tendering did not significantly affect SME performance, whereas e-sourcing, e-invoicing, and e-payment significantly influenced SME efficiency and productivity. Maina (2023) found that online ordering, bidding, invoicing, sourcing, payment, and cataloguing improved procurement efficiency among Kenyan telecommunications firms, while supporting employee retention, environmental sustainability, competitive positioning, and lower operating costs. Thus, e-procurement can improve operations, but adoption barriers and institutional conditions remain important.

Fliginskih et al. (2020) analyzed panel data from 10 Russian banks between 2004 and 2018 and found that e-banking initially reduced performance but became positive after three years. Hossain (2021) reported that e-banking adoption initially reduced ROA, ROE, and net interest margin, although subsequent periods showed improved returns on assets. Nduta and Wanjira (2019) found that e-banking strategies influenced commercial bank performance, with agency and mobile banking being significant predictors, unlike internet and ATM banking. Odhiambo and Ngaba (2019), studying 43 Kenyan commercial banks, found that mobile, agency, internet, and ATM banking improved profitability. Kavila and Kilika (2023) established significant relationships between agency, mobile, ATM, and internet banking and bank performance. However, their concentration on banks leaves limited evidence concerning SME growth outcomes.

Buyko (2022) found that e-logistics technologies improved efficiency and highlighted information technology's contribution to logistics management. Masudin et al. (2021) established that top-management support significantly influenced e-procurement deployment and that information quality was related to implementation. Mawiyoo (2023) found a positive but marginal relationship between e-logistics practices and operational performance among international humanitarian organizations. Ndwiga et al. (2021) established that single-window systems, electronic cargo tracking, and cargo scanning significantly improved logistics performance among transport operators at Nairobi Inland Container Depot. Kamaru and Were (2018) found that state corporations improved efficiency and effectiveness following e-sourcing and e-informing. Muhalia et al. (2021) found that inventory and warehouse management systems significantly influenced supply chain performance among FMCG firms in Nairobi County. Overall, evidence supports digital logistics for operational efficiency, while few studies connect e-logistics adoption with SME growth.

3.0 Methodology

The study adopted an explanatory research design to examine how e-commerce usage affects SME growth and to explain relationships among the study variables (Tan, 2022; Skinner & Dancis, 2020; Kumar & Praveenakumar, 2025). The target population comprised 21,100 SMEs in Nairobi Central Ward, including 12,560 small and 8,540 medium enterprises, with SME managers serving as respondents because of their knowledge of e-commerce practices and enterprise growth (Nairobi County Report, 2025). Using Yamane's formula at a 5% margin of error and 95% confidence level, a sample of 393 SME managers was obtained, comprising 234 managers from small enterprises and 159 from medium enterprises through stratified random sampling (Lakens, 2022). Primary data were collected using semi-structured questionnaires containing closed- and open-ended questions (Mazhar et al., 2021; Bell et al., 2022). A pilot study involving 39 SME managers was conducted, while reliability was assessed using Cronbach's alpha with 0.70 as the minimum acceptable threshold, and validity was established through construct alignment and expert review (Lowe, 2019; Teresi et al., 2022; Rosli et al., 2021; Ahmed & Ishtiaq, 2021). Data were collected using the drop-and-pick method and analyzed using descriptive statistics, content analysis, correlation, regression and ANOVA. The empirical model examined the effects of e-payment, e-procurement, e-banking and e-logistics adoption on SME growth measured through profitability. Diagnostic tests included Kolmogorov-Smirnov for normality, Variance Inflation Factor for multicollinearity, Durbin-Watson for autocorrelation and tests for heteroscedasticity (Kwak & Park, 2019; Khatun, 2021; Shrestha, 2020; Đalić & Terzić, 2021; Schmidt et al., 2019). The researcher obtained the required data collection letter and NACOSTI permit, secured informed consent and maintained confidentiality and academic integrity throughout the study.

4.0 Results

This section presents the findings on the effect of e-commerce adoption on the growth of SMEs in Nairobi Central Business District. The findings are presented through inferential analysis and qualitative findings. Inferential analysis comprises correlation and regression analyses, while qualitative findings provide additional insights from the open-ended responses.

4.1 Inferential Analysis

Inferential analysis was conducted to determine the relationships between e-commerce adoption and SME growth and to establish the extent to which e-payment, e-procurement, e-

banking and e-logistics adoption predicted SME growth. Pearson correlation analysis and multiple linear regression analysis were used.

4.1.1 Correlation Analysis

Pearson correlation analysis was conducted to establish the direction and strength of the relationship between the four dimensions of e-commerce adoption and SME growth. The results are presented in Table 1.

Table 1: Pearson Correlation between E-Commerce Adoption and SME Growth

Variable	1	2	3	4	5
1. SME Growth (Profit after tax)	1				
2. E-Payment Adoption	0.71**	1			
3. E-Procurement Adoption	0.66**	0.62**	1		
4. E-Banking Adoption	0.69**	0.64**	0.60**	1	
5. E-Logistics Adoption	0.73**	0.65**	0.61**	0.67**	1

Note. $p < 0.01$ (2-tailed).

Table 1 shows that all four dimensions of e-commerce adoption had positive relationships with SME growth. E-logistics adoption had the strongest positive correlation with SME growth ($r = 0.73$, $p < 0.01$), followed by e-payment adoption ($r = 0.71$, $p < 0.01$), e-banking adoption ($r = 0.69$, $p < 0.01$), and e-procurement adoption ($r = 0.66$, $p < 0.01$). These findings indicate that increased adoption of e-payment, e-procurement, e-banking and e-logistics was associated with increased SME growth. The findings are consistent with Buyko (2022), Mawiyoo (2023), Chima (2023), Alzoubi and Ghazal (2022), Nduta and Wanjira (2019), Odhiambo and Ngaba (2019), Maina (2023), and Shatta et al. (2020), who similarly associated different forms of e-commerce adoption with improved enterprise performance and growth.

4.1.2 Regression Analysis

Multiple linear regression analysis was conducted to determine the combined and individual effects of e-payment, e-procurement, e-banking and e-logistics adoption on SME growth. The regression results are presented through the model summary, ANOVA and regression coefficients in Tables 2, 3 and 4, respectively.

Table 2: Regression Results

Model	R	R²	Adjusted R²	Std. Error of the Estimate		
1	0.81	0.66	0.65	0.38		
Model	Sum of Squares		df	Mean Square	F	p-value
Regression	52.41		4	13.10	52.8	0.000
Residual	26.90		363	0.074		
Total	79.31		367			
Variable	B		Std. Error		t-value	p-value
Constant	0.41		0.18		2.28	0.023
E-Payment Adoption (X ₁)	0.30		0.07		4.29	0.000
E-Procurement Adoption (X ₂)	0.25		0.08		3.13	0.002
E-Banking Adoption (X ₃)	0.27		0.07		3.86	0.000
E-Logistics Adoption (X ₄)	0.34		0.07		4.86	0.000

Note. R² = 0.66, F = 52.8, p < 0.001.

Table 2 shows that the regression model recorded an R value of 0.81, indicating a strong relationship between the combined e-commerce adoption dimensions and SME growth. The coefficient of determination was R² = 0.66, indicating that e-payment, e-procurement, e-banking and e-logistics adoption collectively explained 66% of the variation in SME growth, while the remaining 34% was attributable to factors not included in the model. The adjusted R² of 0.65 further indicates that the explanatory capacity of the model remained strong after adjusting for the number of predictors. This finding agrees with Kimonye and Muchelule (2024), who similarly established that digital and e-commerce-related practices contributed to enterprise performance.

Table 3 further shows that the regression model was statistically significant, with the reported F = 52.8 and p < 0.001. This indicates that the four dimensions of e-commerce adoption jointly provided a statistically significant explanation of SME growth. The regression coefficients in Table 4 show that all four predictors had positive and statistically significant effects on SME growth. E-logistics adoption recorded the largest coefficient (B = 0.34, p < 0.001), followed by e-payment adoption (B = 0.30, p < 0.001), e-banking adoption (B = 0.27, p < 0.001), and e-procurement adoption (B = 0.25, p = 0.002). Therefore, increases in each dimension of e-commerce adoption were associated with increases in SME growth while holding the other predictors constant. The findings are consistent with Alzoubi and Ghazal (2022), Chima

(2023), Nduta and Wanjira (2019), Perez (2022), and Maina (2023), who associated electronic business practices with improved organizational and SME performance.

4.2 Qualitative Findings

The qualitative findings from the open-ended responses reinforced the quantitative results by showing how different aspects of e-commerce adoption contributed to SME operations and growth. Respondents indicated that e-payment adoption reduced transaction costs, accelerated payment processing, improved convenience and widened market reach, thereby supporting sales and cash-flow stability. These findings are consistent with Alzoubi and Ghazal (2022) and Chima (2023). E-procurement adoption was associated with improved transparency, supplier comparison, competitive pricing and accountability, while also reducing procurement delays and operational leakages. These findings support Shatta et al. (2020) and Maina (2023), who linked electronic procurement practices with improved efficiency and organizational performance.

The qualitative findings further showed that e-banking strengthened financial control, access to credit, transaction monitoring and financial decision-making, consistent with Nduta and Wanjira (2019) and Odhiambo and Ngaba (2019). E-logistics adoption improved real-time tracking, inventory management, delivery accuracy, supply-chain coordination and customer satisfaction, supporting the findings of Buyko (2022) and Mawiyoo (2023). Taken together, the qualitative findings complemented the correlation and regression results by indicating that e-commerce adoption supported SME growth through improved efficiency, financial management, market access, transaction processes and supply-chain operations in Nairobi Central Business District.

5.0 Conclusions

The findings established that e-payment, e-procurement, e-banking, and e-logistics systems jointly exerted a positive effect on the performance of SMEs, particularly profitability, operational efficiency, transaction cost reduction, and market responsiveness. SMEs that effectively integrated this digital business solutions demonstrated improved efficiency and sustained business growth. E-payment adoption contributed significantly to SME growth by reducing transaction costs, accelerating payments, improving cash flow management, and enhancing customer convenience, thereby supporting higher sales turnover and profitability. E-procurement systems, including e-tendering, e-invoicing, and e-sourcing, improved procurement efficiency by reducing delays, increasing transparency, lowering operational

costs, and supporting informed purchasing decisions. Similarly, e-banking positively influenced SME performance through improved financial accessibility and transaction efficiency. Organizational culture, technological access, internet connectivity, and credit availability further supported effective financial management. E-logistics enhanced supply-chain efficiency through real-time tracking, improved information sharing, and advanced technologies, strengthening supply-chain reliability and customer satisfaction. Overall, the findings demonstrated that e-commerce adoption and integration of digital financial and operational systems were important drivers of SME growth, profitability, efficiency, competitiveness, and sustained performance in Nairobi CBD.

6.0 Recommendations

The study recommends that SMEs in Nairobi Central Business District strengthen capacity building in e-commerce technologies, e-payment, e-procurement, e-banking, and e-logistics systems. Training should equip managers and employees with digital competencies for online transactions, supplier coordination, financial management, and logistics tracking. SMEs should enhance secure e-payment platforms, promote awareness of digital security, and integrate e-tendering, e-invoicing, and e-sourcing to improve procurement transparency and supplier relationships. Collaboration with financial institutions is recommended to improve technological access, internet connectivity, digital banking, and access to credit. SMEs should invest in e-logistics technologies supporting real-time tracking, analytics, supply-chain visibility and traceability. Investment in ICT infrastructure, updated software, technical support, and integrated e-commerce systems is necessary to minimize operational disruptions. Regular assessment of e-commerce implementation and user satisfaction can help identify gaps and sustain business development.

Further research should examine the long-term effects of e-commerce adoption on SME survival, profitability, growth, and sustainability. Future studies could examine moderating organizational factors, including management competence, digital literacy, and innovative culture. Research should also assess outcomes beyond financial performance, such as customer satisfaction, market expansion, operational efficiency, and competitiveness. Comparative, longitudinal, and mixed-method studies across Kenyan regions and urban-rural settings are recommended to capture contextual differences and effects.

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