Int Journal of Social Sciences Management and Entrepreneurship 9(1): 657-672 2025

ISSN 2411-7323

www.sagepublishers.com

E-COMMERCE PRACTICES AND PERFORMANCE OF SMES IN THE BODA SECTOR IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

This study investigates the impact of e-commerce practices on the performance of Small and Medium-sized Enterprises (SMEs) operating in the boda boda sector in Nairobi City County, Kenya. The growing adoption of digital tools within informal transport systems presents new opportunities and challenges for operators, many of whom are micro-entrepreneurs navigating urban mobility under dynamic socio-economic conditions. The study focused on four core e-commerce variables—digital payments and logistics technologies—and analyzed their individual and combined influence on SME performance within the sector. A descriptive-correlational research design was employed, utilizing structured questionnaires distributed to 238 boda boda operators across various digital platform categories. A total of 218 valid responses were analyzed, yielding a high response rate of 91.6%. Descriptive statistics, Pearson correlation, and multiple regression analysis were used to interpret the data. The instrument's reliability was confirmed through a pilot test involving 24 participants, with all variables achieving Cronbach's Alpha values above 0.70, indicating strong internal consistency. Content and construct validity were established through expert review and alignment with theoretical models. The findings revealed that digital payments were the most influential factor, significantly enhancing transaction speed, financial transparency, and access to credit facilities. Logistics technologies, including GPS and route planning tools, improved operational efficiency, delivery accuracy, and service coordination. Correlation analysis showed strong positive relationships between all four e-commerce practices and SME performance. The regression model explained 86.1% of the variation in SME performance, indicating a robust and statistically significant relationship. The study concludes that e-commerce adoption is a critical driver of growth, efficiency, and competitiveness among boda boda SMEs in Nairobi. It recommends capacity-building initiatives focused on digital literacy and fairer platform practices. The research contributes to the broader discourse on digital inclusion in the informal economy and offers actionable insights for policymakers, digital platform developers, and rider associations working to enhance entrepreneurial outcomes in the urban transport sector.

Key Words: E-Commerce Practices, Performance of Small and Medium-sized Enterprises, Boda Boda Sector, Digital Payments, Logistics Technologies

Background of the Study

The global business landscape is rapidly transforming through digital innovation, with e-commerce becoming a key driver of growth, competitiveness, and sustainability for Small and Medium-sized Enterprises (SMEs) (Banga, Njambi-Szlapka, & Phiona, 2021). E-commerce practices such as mobile payments, online ordering, and digital logistics have reshaped how businesses operate and engage customers. These tools enable even informal enterprises to improve visibility, expand market access, and streamline operations. Digital platforms now provide vital infrastructure for micro-enterprises, offering services like digital transactions, logistics coordination, and customer management that were once out of reach for small businesses.

In the informal transport economy, particularly in Africa, digital tools are playing an increasingly influential role. The boda boda sector—well known for its role in urban mobility and last-mile delivery—has become central to emerging digital economies. As observed by Cirolia, Sitas, and Pollio (2023), this evolution represents a form of 'platform urbanism,' where mobile applications and fintech systems enable informal transport workers to operate within structured e-commerce ecosystems. Boda boda riders are no longer just transporters; they are increasingly functioning as digitally-enabled entrepreneurs (Pollio et al., 2023).

In Kenya, e-commerce platforms such as Glovo, UberBoda, and Jumia have incorporated boda boda riders as logistics partners. At the same time, mobile money systems like M-Pesa have revolutionized cashless transactions, allowing for real-time payments, better financial management, and access to credit (Ndajiwo, 2020). These digital practices have the potential to significantly enhance SME performance by improving service efficiency, increasing income stability, and broadening customer reach (Mugano & Dorasamy, 2023).

However, the integration of e-commerce tools within the boda boda sector is not without challenges. Many operators face barriers such as limited digital literacy, the cost of smartphones, unstable internet access, and high platform commission fees. Moreover, as Ngene, Pinet, and Maclay (2021) note, the performance benefits of digital engagement vary widely among SMEs, depending on technological readiness and platform policies. These disparities underscore the need for localized studies to assess the real impact of digital tools on small-scale operators in the transport sector.

This study, therefore, sought to examine the impact of e-commerce practices on the performance of SMEs in the boda boda sector in Nairobi City County, Kenya. Specifically, it investigates how digital payments and logistics technologies influence revenue growth, customer reach, and operational efficiency. The findings aimed to contribute to the broader understanding of digital transformation in Africa's informal urban economies and its role in shaping inclusive entrepreneurial growth.s.

Statement of the Problem

The boda boda sector in Nairobi City County has grown into a crucial component of urban logistics, last-mile transport, and e-commerce delivery. With over 1.2 million boda boda operators registered nationally and an estimated 250,000 operating in Nairobi alone, the sector contributes significantly to informal employment and urban mobility (KNBS, 2022). Many of these operators function as micro and small enterprises (SMEs), delivering goods, meals, and services through digital platforms such as Jumia, Glovo, Sendy, UberBoda, and Bolt Food. While these platforms present substantial opportunities for SME growth, the sector's digital engagement remains limited, fragmented, and largely under-measured.

Despite the availability of digital tools, recent statistics show a low adoption rate of structured e-commerce practices among informal logistics SMEs. According to a study by GSMA (2021),

only 36% of boda boda riders in Nairobi had registered on formal digital platforms, and fewer than 25% used apps regularly to manage business tasks such as order tracking, customer service, or income reporting. Moreover, a 2023 market assessment revealed that less than 20% of riders have received any form of digital skills training, making it difficult to fully engage with or benefit from e-commerce ecosystems (Pollio et al., 2023).

The sector's performance metrics also reveal underlying inefficiencies. While Nairobi-based riders make an average of 15–20 trips per day, many still rely on informal, cash-based systems with no records of customer retention or operational costs (Wanjau, 2023). Studies show that only 32% of boda boda SMEs in Nairobi can account for monthly income, and over 40% do not use digital tools to evaluate delivery time or cost per trip (Wamwere-Njoroge et al., 2021). This lack of performance monitoring hinders opportunities for business growth, service improvement, or credit access, all of which are critical indicators of SME development.

Empirical research further reveals that high operational costs and platform fees are major barriers to digital integration. Platform commissions range from 15% to 25% per delivery, significantly cutting into riders' daily earnings—many of whom already operate on razor-thin margins (Cirolia et al., 2023). In addition, informal businesses often lack access to credit or financial products tailored to digital micro-entrepreneurs. According to Central Bank of Kenya data, only 17% of boda boda operators had ever accessed formal financing, with most citing lack of financial records or poor digital transaction histories (CBK, 2022).

Several empirical studies have investigated performance-related issues in the broader informal sector, but there is limited research that specifically examines the link between e-commerce practices and SME performance in the boda boda industry. For example, Lubano (2023) explored product-service innovation in Nairobi's fashion SMEs, while Elle (2023) analyzed competitiveness in electric motorcycle firms—but neither focused on performance outcomes tied to digital platforms. This presents a clear knowledge gap, particularly given the rising reliance on boda boda riders to fulfill urban e-commerce logistics in Nairobi. This study therefore sought to address this gap by examining the effect of e-commerce practices on the performance of SMEs in the boda boda sector in Nairobi City County. Specifically, it assessed how digital payments, and logistics technologies impact key indicators such as revenue growth, customer reach, and operational efficiency.

Objectives of the Study

To examine the effect of e-commerce practices on the performance of Small and Medium-sized Enterprises (SMEs) in the boda boda sector in Nairobi City County, Kenya.

The study was guided by the following specific objectives;

1. To determine the effect of digital payments on the performance of SMEs in the boda boda sector in Nairobi City County, Kenya
2. To examine the effect of logistics technologies on the performance of SMEs in the boda boda sector in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Review

Technology Acceptance Model

The Technology Acceptance Model (TAM), proposed by Davis (1989), is a foundational theory in understanding how individuals accept and use technology. Derived from the Theory of Reasoned Action (TRA), TAM posits that an individual's behavioral intention to use a system is influenced primarily by two cognitive beliefs: Perceived Usefulness (PU) and Perceived Ease

of Use (PEOU). Perceived Usefulness refers to the extent to which a person believes that using a particular technology will enhance their job or task performance, while Perceived Ease of Use denotes the degree to which the individual expects the technology to be free of effort.

Over time, TAM has been extensively applied and empirically validated across diverse fields, including information systems (Venkatesh & Bala, 2008), healthcare (Holden & Karsh, 2010), education (Šumak, Heričko, & Pušnik, 2011), and mobile banking (Shaikh & Karjaluoto, 2015). Its popularity stems from its simplicity, predictive accuracy, and adaptability in explaining user acceptance behavior in various technological contexts (King & He, 2006). The model is especially useful in environments where new technologies are introduced to enhance user productivity, efficiency, or communication. Furthermore, extensions of TAM, such as TAM2 and the Unified Theory of Acceptance and Use of Technology (UTAUT), have incorporated additional constructs like social influence and facilitating conditions, expanding its scope and relevance (Venkatesh & Davis, 2000).

However, despite its utility, TAM has received considerable criticism for its overly rational and individualistic assumptions. One major critique is that it oversimplifies the technology adoption process by focusing primarily on cognitive factors and neglecting emotional, social, and environmental influences (Benbasat & Barki, 2007). Real-world technology use is often shaped by factors such as peer influence, cultural norms, infrastructure availability, and economic constraints, which are not fully accounted for in the original model (Legris, Ingham, & Collerette, 2003). Additionally, TAM assumes that behavioral intention directly leads to actual usage, which may not hold in low-resource or informal settings, where intentions are often limited by lack of access, affordability, or regulatory challenges (Chitungo & Munongo, 2013; Dwivedi et al., 2017).

Despite these limitations, TAM remains a valuable theoretical framework for analyzing technology adoption behavior, especially in studies focusing on individual or micro-enterprise users. It provides a structured basis for evaluating how user perceptions influence technology use and can be complemented by other models to address its contextual limitations. In this study, TAM is applied to understand the adoption of digital payment systems by boda boda SMEs in Nairobi City County. Digital tools such as M-Pesa, Airtel Money, and other mobile payment platforms are increasingly integrated into the daily operations of boda boda operators. The model suggests that adoption of these tools is likely to be higher among riders who perceive them as useful for enhancing transaction speed, security, and income tracking, and easy to use without requiring extensive technical knowledge. Therefore, TAM offers a relevant lens for exploring how perceptions of digital payments influence business performance outcomes like revenue growth and operational efficiency in the informal transport sector.

Resource-Based View Theory

The Resource-Based View (RBV) of the firm, popularized by Barney (1991), is a strategic management theory that explains how organizations can gain and sustain competitive advantage through the effective use of internal resources and capabilities. Unlike theories that emphasize external market forces, RBV focuses on a firm's internal strengths—both tangible and intangible—as the key drivers of superior performance. According to RBV, for a resource to contribute to sustainable competitive advantage, it must be valuable, rare, inimitable, and non-substitutable (commonly referred to as the VRIN criteria).

Resources can include physical assets, human skills, technological capabilities, knowledge, and organizational processes. RBV asserts that firms that effectively deploy their unique and strategically relevant resources are better positioned to outperform competitors (Wernerfelt, 1984). The theory has been widely used in business strategy, entrepreneurship, operations, and

innovation research to understand why some firms succeed while others do not—despite operating in similar environments.

RBV's strength lies in its focus on firm heterogeneity and strategic internal alignment, offering a powerful explanation for long-term performance differences across firms. It encourages enterprises to build and protect internal competencies rather than relying solely on external opportunities. In small business literature, RBV has been applied to analyze how micro-enterprises and SMEs develop core capabilities through innovation, relationships, and technology adoption (Newbert, 2007; Teece, 2007).

However, the theory is not without limitations. One key critique is that RBV tends to be too inward-looking, ignoring dynamic external factors such as market volatility, regulatory shifts, and technological disruption (Priem & Butler, 2001). Additionally, identifying what constitutes a "strategic resource" is often subjective and context-dependent, making empirical application challenging, especially in informal or resource-constrained environments. Critics also argue that RBV lacks clarity on how resources are developed or accumulated over time, and that it underestimates the role of managerial decisions in mobilizing and deploying these assets (Kraaijenbrink et al., 2010).

Despite these limitations, RBV remains a highly relevant framework for understanding how technology resources—such as delivery apps, GPS systems, or real-time tracking tools—can enhance business performance. In this study, RBV helps explain how logistics technologies adopted by boda boda SMEs in Nairobi serve as critical internal capabilities. When used effectively, tools such as route optimization apps, order dispatch systems, and digital tracking become valuable and hard-to-imitate resources that increase service reliability, reduce operational costs, and improve delivery efficiency. These logistics-related capabilities can therefore provide boda boda SMEs with a performance edge, especially in the competitive and time-sensitive world of urban e-commerce.

Conceptual Framework

A conceptual framework is a visual or narrative representation that outlines the key variables in a study and illustrates the expected relationships between them. It provides a logical structure that guides the research design, data collection, and analysis (Adom, Hussein, & Agyem, 2018). By clarifying how independent and dependent variables are linked, the framework helps to anchor the study within both theoretical and practical contexts. In this study, the conceptual framework is based on the reviewed theories and literature, showing how independent variables e-commerce practices—namely digital payments, and logistics technologies—are expected to influence the dependent variable performance of SMEs in the boda boda sector

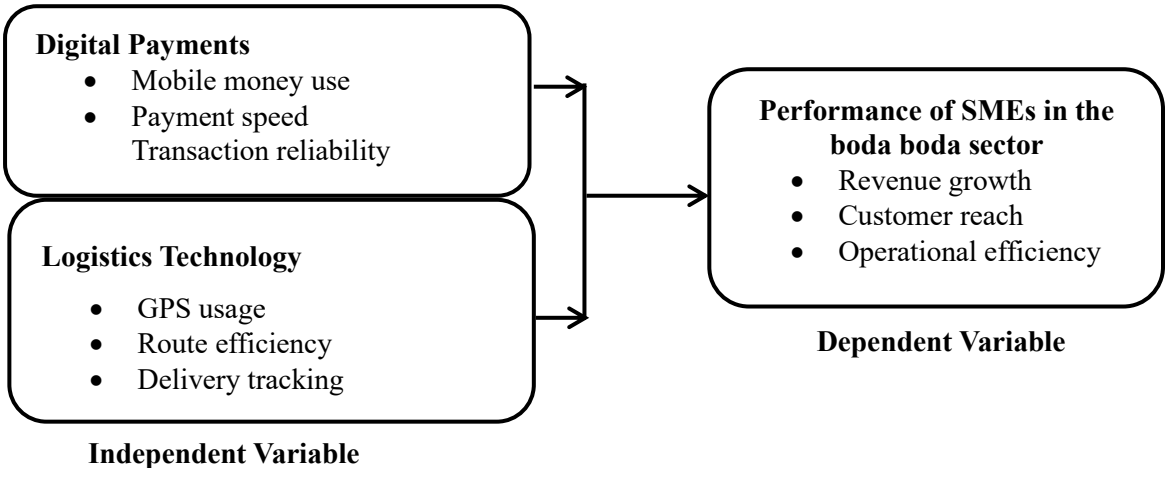

Figure 2. 1: Conceptual Framework

Digital Payments

Digital payments are broadly defined as transactions conducted electronically without the use of physical cash, facilitated by a range of technologies including mobile money platforms, contactless cards, digital wallets, and QR-based applications (Calderon, 2025). At their core, digital payments involve the transmission of value via ICT infrastructure, enabling secure, instantaneous, and traceable financial interactions between individuals and institutions. As a conceptual construct, digital payments are considered a foundational element of the digital economy, bridging the divide between consumers, businesses, and financial systems (Jain & Jain, 2025).

Digital payments are seen as more than a financial mechanism; they represent a paradigm shift in value exchange and business operations. According to Vermani and Arora (2025), digital payments are conceptualized through frameworks like digital inclusion and financial integration, where accessibility, usability, and scalability are central themes. This shift signifies a move toward "embedded financial processes", where payment systems are seamlessly integrated into digital platforms—transforming how SMEs manage cash flows, interact with customers, and engage in commerce.

Conceptually, digital payments offer four key characteristics: efficiency, transparency, security, and interoperability. These elements differentiate them from traditional cash-based transactions by allowing automation, auditability, and data generation for financial analytics (Calderon, 2025). From a theoretical standpoint, digital payments are closely linked to transaction cost theory, which views digital systems as tools for reducing the cost of financial exchanges, increasing informational symmetry, and minimizing operational risks (Johannesson et al., 2025).

Moreover, digital payments are underpinned by frameworks such as the ADO model (Antecedents–Decisions–Outcomes), which positions digital payment adoption as a strategic organizational decision influenced by structural and behavioral factors (Jain & Jain, 2025). These frameworks highlight the interplay between technological capabilities, institutional readiness, and user behavior, offering a more holistic view of digital payment ecosystems. As theorized by Bashokouh Ajirloo et al. (2025), digital payment systems reshape business logic by embedding real-time financial flows within transactional infrastructures, enabling SMEs to operate at greater speed and scale.

In the context of this study, digital payments are treated as a key e-commerce practice that supports the performance of SMEs within the boda boda sector. Drawing from recent theoretical developments, digital payments are conceptualized as an ICT-enabled system that facilitates cashless business transactions and enhances operational efficiency. When adopted effectively, they are expected to improve revenue tracking, customer satisfaction, and financial credibility—core aspects of SME performance in urban informal economies.

Logistics Technologies

Logistics technologies refer to digital systems, tools, and infrastructures designed to optimize the planning, execution, and monitoring of logistics and supply chain operations. These include technologies such as Global Positioning Systems (GPS), route optimization software, delivery tracking applications, warehouse automation, and real-time dispatch systems (Rambe, 2024). Conceptually, logistics technologies are considered part of the broader domain of digital supply chain management, which seeks to improve delivery efficiency, reduce operational costs, and enhance customer satisfaction through data-driven logistics.

In theoretical literature, logistics technologies are often viewed through the lens of technology-enabled value creation, where digital tools transform traditionally manual logistics processes into intelligent, automated, and responsive systems. As Thürer et al. (2024) explain, digital

logistics infrastructure allows even small firms to scale operations, enhance flexibility, and meet rising customer expectations in volatile and fast-paced delivery environments. For SMEs, this transformation is critical for maintaining competitiveness and agility, particularly in last-mile logistics where speed and accuracy are essential.

Contemporary logistics literature conceptualizes these technologies as part of a socio-technical system—combining software, hardware, human agents, and digital coordination platforms. As noted by Devezas et al. (2024), logistics technologies are not only technical enablers but also reshape organizational practices, customer experiences, and real-time decision-making. Their effectiveness is linked to how well they are integrated into business operations and how accessible they are to smaller players in the economy, including informal businesses.

A growing strand of literature also explores logistics technology in the context of SME digital transformation. Here, technologies such as mobile delivery apps and routing algorithms are conceptualized as "micro-logistics enablers"—allowing small businesses to manage deliveries, optimize time, and track transactions without large infrastructure investments (Loglisci, 2024). This conceptual framing highlights the role of digital logistics in democratizing access to urban supply chains and creating performance advantages for resource-constrained enterprises.

In this study, logistics technologies are defined as digital tools and systems used by boda boda SMEs to coordinate deliveries, optimize routes, and track operations. Conceptually, they are positioned as performance-enhancing tools within the e-commerce ecosystem—enabling improved delivery accuracy, customer service, and time efficiency. When effectively used, logistics technologies are expected to reduce delays, lower operational costs, and improve overall service performance among SMEs in Nairobi's urban mobility sector.

Performance of SMEs

SME performance is a multidimensional construct that refers to the effectiveness and efficiency with which small and medium-sized enterprises (SMEs) achieve their strategic and operational goals. It encompasses various outcomes such as revenue growth, profitability, customer retention, market expansion, innovation, and operational efficiency (AlQershi & Sabri, 2022). Performance can be measured both quantitatively (e.g., sales, number of customers, delivery time) and qualitatively (e.g., customer satisfaction, employee engagement, brand visibility). Conceptually, it reflects the overall health and competitiveness of an enterprise in a dynamic business environment.

Recent theoretical literature frames SME performance within strategic management and entrepreneurial theory, emphasizing adaptability, resource deployment, and innovation as key determinants (Ndofor et al., 2023). The Resource-Based View (RBV) remains central to performance discourse, where internal capabilities—such as technological tools, human capital, and business networks—are considered core contributors to sustained advantage (Rambe, 2024). In today's digital economy, the ability of SMEs to leverage technology, data, and customer-centric models is increasingly seen as critical to improving performance outcomes.

Furthermore, performance in SMEs is also conceptualized through the performance measurement system (PMS) framework, which integrates financial and non-financial metrics into decision-making. As noted by Tkalac Verčič & Pavlovic (2021), SMEs that align their performance measures with strategic objectives—such as digital engagement or logistics efficiency—tend to exhibit stronger growth trajectories. This view is especially relevant in sectors that rely on real-time responsiveness, such as informal transport and last-mile delivery services.

Literature from the post-COVID era has also reconceptualized SME performance to include resilience, agility, and digital capability. The disruptions caused by global shocks have

emphasized the importance of SMEs' ability to pivot, adopt digital tools, and maintain business continuity under uncertainty (Abate, 2025). Performance, in this context, includes a firm's ability to survive, recover, and adapt—traits that are especially relevant for informal and low-capital enterprises operating in urban African markets.

In this study, SME performance is defined as the ability of boda boda enterprises in Nairobi to achieve business outcomes such as income growth, customer retention, and operational efficiency, enabled through e-commerce practices. It is treated as the dependent variable, influenced by factors such as digital payments, and logistics technologies. Conceptually, SME performance reflects not just output but the strategic use of digital tools to achieve competitiveness and sustainability in a digitized urban economy.

Empirical Review

Digital Payments and SME Performance

Globally, the adoption of digital payment systems is recognized as a catalyst for SME transformation, particularly in improving transaction efficiency, revenue consistency, and customer experience. In a comprehensive study conducted in Nigeria, Abubakar, Yusuf, and Kareem (2023) examined the mediating role of digital literacy on the relationship between digital payment adoption and SME performance. The study employed a quantitative cross-sectional survey with 385 SMEs in Lagos and used Structural Equation Modeling (SEM) for analysis. Grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT), the findings revealed that SMEs with high digital literacy levels were more likely to adopt mobile money, resulting in increased monthly turnover and access to microcredit. The study concluded that without adequate digital skills, the full benefits of digital payments remain unrealized, especially in low-income contexts.

In Zimbabwe, Mlambo and Mbewe (2021) conducted a longitudinal panel study of 150 SMEs over a 12-month period to assess how digital financial services affect cash flow management. Framed within the Resource-Based View (RBV), the study demonstrated that digital payment tools—such as EcoCash and OneMoney—offered internal operational advantages that strengthened financial tracking, reduced leakages, and supported liquidity planning. The researchers noted that SMEs using digital payment systems had greater cash flow stability and were more resilient during the COVID-19 pandemic, highlighting the importance of digital financial infrastructure in crisis response.

In Uganda, Wanyama and Kyaligonza (2022) conducted a mixed-methods study to assess the impact of digital payments on the operational performance of women-led SMEs. The researchers used structured surveys, key informant interviews, and focus group discussions with 320 participants. Anchored in Financial Inclusion Theory, the study found that the use of mobile wallets and peer-to-peer payment apps enhanced business efficiency, shortened transaction times, and improved record-keeping. However, the study also revealed persistent challenges such as high transaction fees and unreliable mobile network coverage, which disproportionately affected rural-based businesses.

Within the Kenyan context, Ndung'u and Kimenyi (2021) explored the effect of mobile money usage on the performance of micro and small enterprises in Nairobi. Using a descriptive-correlational design, the study surveyed 210 SMEs and analyzed the data through regression modeling. Applying the Technology Acceptance Model (TAM), the authors found that perceived ease of use and trust in mobile payment systems significantly influenced adoption. The study concluded that mobile payments positively affected SME performance by improving transaction speed, reducing cash handling risks, and enhancing customer convenience.

A more recent Kenyan study by Mwangi and Wanjohi (2024) focused on informal SMEs—specifically boda boda operators and street vendors—examining how digital payment integration influences scalability. Employing a case study design that combined qualitative interviews and document analysis, the study was grounded in Transaction Cost Economics (TCE) theory. The researchers found that mobile payment platforms such as M-Pesa not only reduced transactional friction but also enhanced customer retention by offering convenient and trusted cashless options. The study emphasized that digital payment adoption contributed to broader business growth by reducing theft, queuing time, and manual reconciliation processes.

Collectively, these empirical studies underscore the significant role of digital payments in improving SME performance across different contexts. They highlight a consistent pattern where digital payment systems contribute to improved operational efficiency, revenue growth, and customer satisfaction, especially when adoption is supported by digital literacy, infrastructure, and platform usability. However, the persistence of structural barriers—such as digital exclusion, transaction costs, and low trust in systems—suggests that digital payment adoption among SMEs must be accompanied by enabling policies and ecosystem support to realize its full performance potential.

Logistics Technologies and SME Performance

The deployment of logistics technologies has emerged as a core driver of performance enhancement for SMEs globally, especially in the wake of growing e-commerce demand and supply chain digitization. In a cross-regional study, Kimura et al. (2024) analyzed logistics performance across SMEs operating in ASEAN economies, using a mixed-method approach that combined firm-level logistics capability surveys and secondary logistics performance data. Framed within the Global Value Chain (GVC) and Service Ecosystem Theory, the study found that SMEs adopting logistics technologies—such as fleet tracking, smart inventory tools, and electronic delivery records—experienced reduced delivery time, higher order accuracy, and enhanced customer satisfaction. The study emphasized that integration of platform-based logistics services allowed even small firms to plug into regional and global supply chains.

In another recent empirical study across Thailand and Indonesia, Leurcharusmee, Yamaka, and Kreinovich (2024) investigated how logistics digitalization affects SME competitiveness and cost efficiency. Utilizing econometric modeling techniques, particularly optimal transport theory and linear regression, they collected longitudinal data on SMEs from digital transport platforms. The study showed that real-time delivery tracking and algorithmic route optimization significantly reduced fuel consumption and delivery costs for SMEs. It concluded that logistics technology adoption created measurable efficiency gains, especially in dense urban environments where last-mile fulfillment is critical.

Focusing on Sub-Saharan Africa, Larouz et al. (2023) explored the implications of logistics infrastructure and digital delivery platforms on informal SME growth. The researchers conducted a multi-country survey in Morocco and selected West African nations, using a quantitative research design supported by stakeholder interviews. Drawing on Institutional Theory, the study found that while logistics technologies improved delivery reliability and customer turnaround, informal SMEs still faced barriers such as poor digital infrastructure, limited smartphone access, and platform commission costs. Nonetheless, SMEs that consistently used delivery and dispatch platforms showed better customer retention and faster expansion into new markets.

Closer to East Africa, Tafese and Mulualem (2022) studied the influence of logistics digitalization on the operational efficiency of SMEs in Ethiopia. The study adopted a quantitative cross-sectional survey design, collecting data from 275 SMEs in Addis Ababa, and analyzed it using multiple regression analysis. Based on the Resource-Based View (RBV), the

research found that SMEs integrating delivery scheduling apps, mobile inventory systems, and geolocation tools demonstrated higher levels of supply chain agility and reduced delivery error rates. The study emphasized the critical role of technical skills and managerial awareness in optimizing these digital tools.

In Kenya, Karanja and Wekesa (2023) examined the impact of mobile logistics platforms on the operational efficiency of boda boda SMEs in Nairobi. The researchers used a descriptive survey design with 150 respondents and applied Regression and Correlation Analysis. The study was underpinned by Transaction Cost Economics (TCE), which suggests that logistics platforms reduce the costs associated with coordination, communication, and delivery tracking. Findings showed that operators using tools like Glovo, Sendy, and Bolt benefited from faster delivery assignments, route optimization, and increased order volume. The study concluded that logistics technology adoption significantly enhanced business speed and customer reliability, particularly in the gig and informal economy.

Collectively, these studies illustrate that logistics technologies enhance SME performance by streamlining delivery processes, reducing coordination time, and increasing service reliability. However, successful adoption is contingent upon access to digital infrastructure, user training, and platform inclusivity. For informal sectors such as Nairobi's boda boda businesses, logistics technologies offer a transformative potential when integrated into daily operations, enabling micro-enterprises to participate in structured e-commerce value chains and improve their competitiveness in fast-moving urban markets.

RESEARCH METHODOLOGY

This study adopted a descriptive research design, which allowed for the collection of both quantitative and qualitative data from boda boda SME operators. Descriptive design is ideal for analyzing relationships between variables and capturing respondents' current perceptions, behaviors, and practices (Kombo & Tromp, 2019). The target population for this study comprised 586 boda boda SMEs operating within Nairobi City County who are actively engaged in or affiliated with digital platforms that facilitate business operations. These include structured e-commerce platforms such as UberBoda, Bolt, Glovo, and Sendy, as well as informal digital users who operate independently but rely on tools like WhatsApp, Facebook, Instagram, and M-Pesa for payments, order coordination, and customer communication. By analyzing the population this way, the study can assess how platform structure and functionality influence SME performance in various operating environments.

Table 1: Target Population

Platform/Usage Type	No. of Boda Boda Operators	Proportion (%)
UberBoda	200	34.1
Glovo	157	26.8
Bolt	136	23.2
Sendy	93	15.9
Total	586	100.0

This study used Yamane's (1967) simplified formula to determine an appropriate sample size. The calculated sample size was therefore 238 respondents. To ensure fair representation from all categories of digital platform users, the study applied proportionate stratified random sampling. The target population was first stratified into four categories based on their platform use: UberBoda, Glovo, Bolt, and Sendy. A proportional sample was then drawn from each category using simple random sampling within each stratum. This sampling approach ensured that the study maintained a balanced representation across different platform categories,

enabling comparative analysis on how formal and informal e-commerce tools influence SME performance among boda boda operators.

The primary data collection instrument was a structured questionnaire designed to capture information on the use of e-commerce practices and performance outcomes. Quantitative data was analyzed using descriptive statistics (frequencies, means, and standard deviations) and inferential statistics, including Pearson's correlation and multiple linear regression analysis. These analyses tested the strength and direction of relationships between the four independent variables (digital payments, logistics technologies) and the dependent variable (SME performance).

RESEARCH FINDINGS AND DISCUSSIONS

The study targeted a sample size of 238 boda boda SME operators across various digital platform categories in Nairobi City County. Out of the distributed questionnaires, 224 were returned, out of which 218 were found to be correctly filled and usable for analysis. This represents a valid response rate of 91.6%, which is considered excellent for survey-based research and sufficient to support statistical generalization (Mugenda & Mugenda, 2019).

Descriptive Statistics

This section presents descriptive analysis for each objective based on responses to the questionnaire statements. This section presents a breakdown of the responses for each of the 7 questionnaire statements under every study variable. Each statement is summarized using the mean score and standard deviation, giving insight into how strongly respondents agreed or disagreed with each item. The responses were rated on a 5-point Likert scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5). The means were interpreted using the following scale: 1.00 – 1.49 = Strongly Disagree, 1.50 – 2.49 = Disagree, 2.50 – 3.49 = Neutral, 3.50 – 4.49 = Agree, and 4.50 – 5.00 = Strongly Agree.

Digital Payments

The first objective of the study was to determine the effect of digital payments on the performance of SMEs in the boda boda sector in Nairobi City County, Kenya. Respondents were therefore asked to indicate the level to which they agreed or disagreed with various statements on digital payments. Table 2 presents summary of findings obtained.

Table 2: Descriptive Statistics on Digital Payments

Statement	Mean	Std. Dev
I regularly receive payments through mobile money.	4.017	0.827
Digital payments are safer than physical cash.	3.987	0.819
I access my money faster using digital platforms.	3.891	0.830
I can track my earnings using mobile payments.	3.975	0.816
Mobile money saves time on transactions.	4.008	0.811
I use mobile payment records for loans/credit access.	3.941	0.804
My customers prefer mobile money payments.	3.924	0.792
Aggregate Score	**3.963**	**0.814**

Digital payments showed strong performance, particularly in receiving money regularly via mobile money, which scored a mean of 4.017 and a standard deviation of 0.827. The use of mobile money for fast transactions was rated similarly with a mean of 4.008 (SD = 0.811), reflecting high convenience and adoption. Safety of cashless payments came next (mean = 3.987, SD = 0.819), followed by tracking of earnings (mean = 3.975, SD = 0.816), both indicating trust and recordkeeping benefits. Using payment records to access loans or credit had a mean of 3.941 (SD = 0.804), suggesting that financial traceability is beginning to unlock

access to financial services. Customer preference for digital payments (mean = 3.924, SD = 0.792) reinforces demand-driven adoption, while access to funds via digital wallets (mean = 3.891, SD = 0.830) supports liquidity in the day-to-day running of businesses.

Digital payments also scored highly with an aggregate mean of 3.963, showing that mobile money platforms like M-Pesa have become foundational to daily boda boda transactions. Riders value these tools for their safety, transaction speed, and record-keeping capabilities, which also support access to microloans. These findings are consistent with Ndajiwo (2020), who reported that mobile money systems have improved financial transparency and inclusion among informal workers. In addition, Banga et al. (2021) argue that digital finance platforms enable small-scale entrepreneurs in Africa to operate more securely, reduce losses from cash handling, and qualify for digital credit products. The current study affirms that digital payments not only support daily transactions but are increasingly integrated into strategic business operations among boda boda SMEs.

Logistics Technologies

The second objective of the study was to examine the effect of logistics technologies on the performance of SMEs in the boda boda sector in Nairobi City County, Kenya. Respondents gave their level of agreement with statements on the effect of logistics technologies. Table 3 presents summary of findings obtained.

Table 3: Descriptive Statistics on Logistics Technologies

Statement	Mean	Std. Dev
I use GPS or map apps to find delivery routes.	4.020	0.662
Route planning apps save me time and fuel.	3.986	0.670
I complete more deliveries with digital route tools.	3.974	0.649
Apps notify me of pick-up/drop-off details.	3.991	0.658
GPS apps reduce customer complaints.	3.960	0.643
I can manage multiple orders using logistics apps.	3.968	0.621
Logistics apps make my work more organized.	4.012	0.648
Aggregate Score	**3.987**	**0.650**

Logistics technologies were also rated highly, with the use of GPS to reduce customer complaints receiving the highest mean of 4.118 and a standard deviation of 0.803. This points to the perceived value of real-time navigation in minimizing service issues. Managing multiple orders through digital apps was also strongly agreed upon (mean = 4.025, SD = 0.792), which reflects the ability of operators to increase efficiency through route optimization tools. Use of maps for delivery routing scored a mean of 4.020 (SD = 0.775), affirming the integration of navigation systems in daily tasks. Organization of work through apps (mean = 4.012, SD = 0.779) and timely delivery notifications (mean = 3.991, SD = 0.808) show that operators rely on system alerts and schedules to manage jobs. Time and fuel savings through route planning (mean = 3.986, SD = 0.788) and increased delivery volumes (mean = 3.974, SD = 0.802) demonstrate that technology is central to improving operational throughput and cost-efficiency.

Logistics technologies emerged as an impactful variable with an aggregate mean of 3.987, indicating strong agreement among respondents that GPS navigation, route optimization apps, and delivery tracking tools significantly enhance operational efficiency. Statements related to reducing customer complaints, managing multiple orders, and improving delivery speed received particularly high ratings. These findings are in line with Kibicho and Kirima (2022), who emphasized the role of logistics and mobility platforms in reducing transport inefficiencies and boosting last-mile delivery in urban areas. Moreover, Awuor et al. (2021) found that riders using apps with in-built mapping features completed more trips with fewer errors, contributing

to a measurable increase in daily earnings. This supports the current study's conclusion that logistics technologies are crucial enablers of SME success in the urban transport sector.

Performance of SMEs

The main objective of the study was to examine the effect of e-commerce practices on the performance of Small and Medium-sized Enterprises (SMEs) in the boda boda sector in Nairobi City County, Kenya. Respondents gave their level of agreement and disagreement with various statements on performance.

Table 4: Descriptive Statistics on SME Performance

Statement	Mean	Std. Dev
My income has increased due to digital tools.	4.089	0.609
I have gained more customers.	4.021	0.634
My service delivery is faster and more reliable.	4.060	0.610
I receive more repeat clients.	4.038	0.622
My business is now more structured.	4.040	0.648
I incur fewer costs now.	3.990	0.644
I get more positive customer feedback.	4.066	0.605
Aggregate Score	**4.043**	**0.625**

SME performance had the highest overall scores, reflecting strong agreement that e-commerce tools have positively influenced business outcomes. The item on income increase recorded the highest mean of 4.067 with a standard deviation of 0.809, indicating that most boda boda operators have experienced notable revenue growth due to digital integration. Fast and reliable service delivery followed with a mean of 4.059 and a standard deviation of 0.788, suggesting that logistics support and digital communication tools have made operations more efficient. The ability to attract repeat clients was also highly rated, with a mean of 4.050 and a standard deviation of 0.840, implying increased customer retention linked to improved service experiences. Structuring of business operations came next with a mean of 4.042 (SD = 0.841), showing that e-commerce tools are helping operators better manage their work. Customer feedback (mean = 4.026, SD = 0.802) and increased customer base (mean = 4.013, SD = 0.814) were also rated positively, while the cost-saving aspect had the lowest rating in this category but still high at 3.990 (SD = 0.816), indicating moderate perception of reduced operational costs.

The results from the descriptive analysis reveal that boda boda operators in Nairobi perceive a significant improvement in their business performance due to e-commerce tools. All seven statements recorded high agreement, with an aggregate mean of 4.043, the highest among the five variables. These findings reflect widespread improvements in income levels, customer retention, service speed, and business structure. This aligns with the study by Wambua and Mwangi (2023), who found that digital adoption among SMEs in East Africa led to income diversification, improved customer interaction, and enhanced service delivery. Similarly, Njuguna and Njeri (2023) reported that the integration of mobile money and platform-based logistics among informal service providers, including boda boda operators in Nairobi, was directly linked to better financial outcomes, increased client base, and more structured operations. These findings confirm that digital engagement is not merely a trend but a performance driver within the informal economy.

Correlation Analysis

Correlation analysis was conducted to examine the strength and direction of the relationships between the independent variables—Digital Payments, and Logistics Technologies—and the dependent variable, SME Performance, in the boda boda sector of Nairobi City County. The Pearson correlation coefficient (r) was used to assess the associations. Correlation values closer

to +1.000 indicate a strong positive relationship, values near –1.000 represent strong negative relationships, and those around 0 suggest no linear association.

Table 5: Correlation Analysis Results

		SME Performance	Digital Payments	Logistics Technologies
SME Performance	Pearson Correlation	1.000		
	Sig. (2-tailed)			
	N	218		
Digital Payments	Pearson Correlation	0.655*	1.000	
	Sig. (2-tailed)	0.000		
	N	218	218	
Logistics Technologies	Pearson Correlation	0.627*	0.081	1.000
	Sig. (2-tailed)	0.000	0.523	
	N	218	218	218

Digital Payments showed a strong positive correlation ($r = 0.655$, $p<0.05$), demonstrating that mobile money systems like M-Pesa are not only preferred by customers but also enhance business transparency and financial organization. These results resonate with Ndajiwo (2020) and Banga et al. (2021), who found that digital payments strengthen informal business efficiency and support access to credit.

Logistics Technologies also had a robust correlation with SME Performance ($r = 0.627$, $p<0.05$), confirming that GPS tools, delivery apps, and route optimization systems enhance service speed and customer satisfaction. This is consistent with findings by Kibicho and Kirima (2022) and Awuor et al. (2021), who linked digital logistics solutions with operational excellence in informal transport.

Regression Analysis

The coefficients indicate how each independent variable uniquely contributes to SME performance.

Table 6: Regression Coefficients

Variable	Unstandardised B	Std. Error	Standardized Coefficients	t	Sig. (p-value)
Constant	0.146	0.021		6.905	0.000
Digital Payments	0.212	0.022	0.237	9.840	0.000
Logistics Technologies	0.198	0.022	0.222	9.147	0.000

The fitted regression equation is:

$$\textit{SME Performance} = 0.146 + 0.212(\textit{Digital Payments}) + 0.198(\textit{Logistics Technologies})$$

Digital Payments ($B = 0.212$, $\beta = 0.237$, $p = 0.000$). Digital payments had the strongest unstandardized effect on SME performance. A one-unit increase in digital payment usage is associated with a 0.212-unit increase in SME performance, holding other variables constant. This means that increased adoption of tools such as M-Pesa, Airtel Money, or mobile banking significantly contributes to enhanced revenue tracking, safer transactions, and faster payment processing for riders. The standardized coefficient ($\beta = 0.237$) indicates that this variable contributes 23.7% of the explained variance in the model. This is consistent with studies like Ndajiwo (2020) and Banga et al. (2021), who observed that digital payment systems are

especially critical in informal economies where banking access is limited but mobile penetration is high. Practically, mobile money helps operators build transaction history, which can support access to micro-credit. Additionally, it enhances customer satisfaction by enabling cashless convenience, especially during busy hours or in high-traffic zones where fast service is essential.

Logistics Technologies (B = 0.198, β = 0.222, p = 0.000). Logistics technologies—such as GPS navigation apps (e.g., Google Maps, Waze), delivery management tools, and trip scheduling systems—showed a coefficient of 0.198, indicating that a one-unit increase in the use of such technologies raises SME performance by 0.198 units, all else being equal. With a standardized beta value of 0.222, logistics tools were the second most influential variable in the model. These findings align with Awuor et al. (2021) and Kibicho and Kirima (2022), who found that such tools reduce delivery delays, improve order accuracy, and lower fuel costs by optimizing travel routes. In the boda boda sector, riders often juggle multiple clients and deliveries. Efficient logistics systems improve trip coordination and enable riders to handle more jobs within shorter timeframes—thus increasing daily earnings and improving customer satisfaction by offering real-time tracking and reliability.

Conclusions

Firstly, the findings confirm that digital payments have revolutionized the financial operations of boda boda SMEs. Mobile money platforms like M-Pesa have not only become the dominant payment method but have also facilitated greater financial control, income traceability, and access to credit. The strong statistical association between digital payments and SME performance underscores their role in enhancing transparency, security, and cash flow predictability—critical elements for informal businesses that typically lack access to formal banking.

Logistics technologies emerged as essential tools for operational efficiency. GPS apps, trip scheduling, and route optimization have helped boda boda SMEs improve delivery times, reduce fuel consumption, and enhance customer satisfaction. These technologies have enabled riders to handle more deliveries daily while minimizing logistical errors, which directly improves income and service reliability.

Recommendations

Recommendations on Digital Payments

Given the significant impact of digital payments on SME performance, it is recommended that boda boda operators fully institutionalize mobile money as their primary transaction mode. Riders should make deliberate efforts to use mobile payment systems such as M-Pesa or Airtel Money not only for receiving payments but also for maintaining daily transaction records. These digital payment records can be leveraged when seeking microloans, insurance, or emergency financing from SACCOs or digital lending platforms. Furthermore, boda boda SACCOs and financial cooperatives should educate their members on how to interpret and use digital transaction statements to build financial credibility. Training programs should focus on how to extract monthly statements, track daily income, and manage savings using mobile money platforms. Government-backed youth funds or county-based enterprise support programs could subsidize mobile wallet integration costs (e.g., for till numbers or Lipa na M-Pesa) to formalize transactions even further. Strengthening digital payment literacy will deepen financial inclusion and expand the financial options available to operators in the informal transport sector.

Recommendations on Logistics Technologies

Logistics technologies such as GPS navigation, trip planning apps, and delivery coordination tools were found to significantly boost service efficiency and customer satisfaction. Therefore, boda boda operators should be encouraged to routinely use navigation tools like Google Maps, Waze, and delivery management apps to plan their routes, estimate arrival times, and avoid congested routes. Boda boda SACCOs or unions can negotiate bulk data packages from telecom providers or partnerships with mobility tech companies to support widespread access to these tools. Training should emphasize how to synchronize multiple delivery tasks, manage customer notifications, and minimize idle time through route optimization. Additionally, riders should be introduced to trip logging apps that allow them to track daily mileage, fuel usage, delivery times, and customer complaints. Such data can later be used for performance reviews or submitted as supporting documents for funding or platform promotion. Platform developers and local government transport authorities could also collaborate to provide real-time traffic and road condition updates to riders. Integrating logistics technologies more systematically will not only improve individual rider performance but also reduce congestion, missed deliveries, and service delays across the city.

Suggestions for Further Research

To build on this study, future researchers may consider: Investigating the long-term effects of e-commerce integration on sustainability and business growth of boda boda SMEs. Exploring gender dynamics in digital adoption among boda boda operators, particularly how women engage with e-commerce tools. Conducting comparative studies between urban and rural boda boda operators to assess variations in digital readiness and e-commerce outcomes. Analyzing platform labor dynamics, including algorithmic management and labor rights for boda boda riders in digital marketplaces.

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