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E-Commerce Adoption among SMEs: Drivers, Barriers, and Performance Outcomes

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Abstract

E-commerce adoption has become a critical strategic imperative for small and medium enterprises (SMEs) seeking to enhance competitiveness and sustainability in an increasingly digital business environment. This study examines the key drivers and barriers influencing e-commerce adoption among SMEs and evaluates its impact on organisational performance outcomes. Drawing on established theoretical frameworks such as the Technology–Organisation–Environment (TOE) model and the Technology Acceptance Model (TAM), the research analyses technological, organisational, and environmental factors that facilitate or hinder adoption decisions. Using a structured empirical approach based on primary data collected from SMEs, the study assesses the relationship between e-commerce adoption and performance indicators including sales growth, market reach, operational efficiency, and customer satisfaction. The findings indicate that perceived usefulness, management support, competitive pressure, and government initiatives significantly drive adoption, while financial constraints, limited digital skills, and security concerns remain major barriers. Overall, the study highlights e-commerce adoption as a positive determinant of SME performance and offers practical implications for managers and policymakers aiming to accelerate digital transformation.

Keywords: E-commerce adoption, SMEs, digital transformation, performance outcomes, developing economies

Introduction

The rapid advancement of information and communication technologies has fundamentally transformed the way businesses operate, compelling organisations of all sizes to integrate digital solutions into their core activities. Among these, e-commerce has emerged as a pivotal tool enabling firms to conduct commercial transactions electronically, expand market reach, and enhance operational efficiency. For small and medium enterprises (SMEs), which constitute a substantial share of employment generation and economic output in both developed and developing economies, e-commerce adoption presents significant opportunities as well as challenges. Unlike large enterprises, SMEs often operate with limited financial, technological, and human resources, making their adoption decisions highly sensitive to internal capabilities and external pressures. Nevertheless, increasing internet penetration, widespread use of

smartphones, digital payment systems, and supportive government initiatives have created a conducive environment for SMEs to explore e-commerce as a viable growth strategy. E-commerce adoption allows SMEs to overcome geographical constraints, access broader customer bases, reduce transaction and marketing costs, and respond more effectively to changing consumer preferences. At the same time, SMEs face numerous barriers, including inadequate digital infrastructure, cybersecurity concerns, lack of technical expertise, regulatory complexities, and resistance to organisational change, which can impede successful implementation. Understanding the interplay between these drivers and barriers is essential for explaining variations in adoption levels across firms and contexts. Furthermore, while prior studies acknowledge the potential benefits of e-commerce, empirical evidence on its direct and indirect impact on SME performance remains fragmented and context-specific. Performance outcomes such as sales growth, profitability, operational efficiency, market competitiveness, and customer satisfaction may vary depending on the extent and effectiveness of e-commerce integration. Against this backdrop, the present study seeks to systematically examine the drivers and barriers influencing e-commerce adoption among SMEs and to assess how such adoption affects key performance outcomes. By providing an integrated analysis, the study aims to contribute to the existing literature and offer actionable insights for SME managers and policymakers seeking to foster inclusive and sustainable digital transformation.

Scope of the Study

The scope of the present study is confined to examining e-commerce adoption among small and medium enterprises (SMEs) with a specific focus on identifying the key drivers, barriers, and resulting performance outcomes. The study covers technological, organisational, and environmental factors that influence adoption decisions, including digital infrastructure, managerial support, competitive pressure, and regulatory support, while also analysing constraints such as financial limitations, skill gaps, and security concerns. The assessment of performance outcomes is limited to measurable indicators such as sales growth, market expansion, operational efficiency, and customer-related benefits arising from e-commerce usage. The study primarily relies on firm-level data collected from SMEs operating in selected sectors, ensuring relevance to real-world business contexts. It does not extend to large enterprises or multinational corporations, nor does it provide a detailed evaluation of specific e-commerce platforms or technologies. The findings are intended to support SME decision-making and policy formulation rather than offer industry-specific technical solutions.

Purpose of the Study

The primary purpose of this study is to analyse the extent and determinants of e-commerce adoption among small and medium enterprises (SMEs) and to evaluate its implications for organisational performance. Specifically, the study seeks to identify the key technological, organisational, and environmental drivers that motivate SMEs to adopt e-commerce, as well as the major barriers that hinder effective implementation. Another important purpose is to assess how e-commerce adoption influences critical performance outcomes, including sales growth, market reach, operational efficiency, and customer satisfaction. By examining these relationships, the study aims to provide empirical evidence on whether and how digital adoption contributes to SME competitiveness and sustainability. The research intends to contribute to the existing body of knowledge by integrating established theoretical frameworks with practical business insights. The findings are expected to assist SME managers in making informed digitalisation decisions and support policymakers in designing targeted interventions to promote inclusive and effective e-commerce adoption.

Background of E-Commerce and SME Digitalisation

The evolution of e-commerce has been closely intertwined with broader processes of digitalisation that have reshaped business models, market structures, and competitive dynamics across the global economy. E-commerce refers to the use of electronic networks, primarily the internet, to conduct commercial transactions, manage business processes, and interact with customers and suppliers. Over the past two decades, advances in information and communication technologies, widespread internet accessibility, cloud computing, mobile technologies, and digital payment systems have significantly lowered entry barriers to online markets. These developments have been particularly relevant for small and medium enterprises (SMEs), which traditionally relied on physical marketplaces and local customer bases. Digitalisation has enabled SMEs to integrate online sales channels, digital marketing tools, data-driven decision-making, and electronic supply chain coordination into their operations. As a result, SMEs are increasingly able to compete beyond geographical boundaries, improve visibility, and respond more rapidly to changing consumer preferences. However, the pace and depth of digital transformation among SMEs vary considerably due to differences in resource availability, managerial capabilities, and external support systems. While some SMEs have successfully leveraged e-commerce to enhance productivity and growth, others remain at early stages of digital adoption or face persistent challenges related to infrastructure gaps, skills shortages, and regulatory compliance. In many developing and emerging economies, digitalisation of SMEs is also shaped by government initiatives promoting digital inclusion, entrepreneurship, and cashless transactions. Understanding the background of e-commerce and

SME digitalisation is therefore essential for contextualising adoption behaviour and evaluating its implications for firm performance and long-term competitiveness.

Importance of E-Commerce Adoption for SMEs

E-commerce adoption holds significant importance for small and medium enterprises (SMEs) as it directly influences their ability to compete, grow, and sustain operations in an increasingly digital and globalised marketplace. By adopting e-commerce, SMEs can transcend geographical limitations and gain access to wider domestic and international markets, which is particularly critical for firms constrained by limited physical reach and marketing budgets. E-commerce platforms enable cost-effective promotion through digital marketing, social media, and online marketplaces, allowing SMEs to enhance brand visibility and customer engagement. From an operational perspective, e-commerce adoption contributes to improved efficiency by streamlining order processing, inventory management, and payment systems, thereby reducing transaction costs and operational delays. It also facilitates data collection and analytics, enabling SMEs to better understand consumer preferences, personalise offerings, and make informed strategic decisions. E-commerce enhances customer convenience by offering multiple purchasing channels, flexible payment options, and faster service delivery, which can lead to higher customer satisfaction and loyalty. In highly competitive markets, the ability to adopt and effectively utilise e-commerce has become a source of competitive advantage, helping SMEs differentiate themselves from traditional competitors.

Concept of E-Commerce in the SME Context

In the context of small and medium enterprises (SMEs), e-commerce refers to the adoption and use of digital technologies and internet-based platforms to conduct business transactions, manage operations, and interact with customers and suppliers. Unlike large corporations, SMEs typically implement e-commerce in a more incremental and flexible manner, often beginning with basic online presence such as websites or social media pages and gradually advancing to integrated online sales, digital payment systems, and customer relationship management tools. E-commerce in the SME context encompasses a range of activities, including online marketing, electronic ordering, digital invoicing, online customer support, and participation in third-party marketplaces. These activities allow SMEs to leverage technology to overcome resource constraints, improve market accessibility, and enhance operational efficiency.

The concept of e-commerce for SMEs is not limited to transactional websites but extends to the strategic integration of digital processes across the value chain. It involves aligning technological capabilities with organisational goals, managerial readiness, and external environmental conditions. SMEs often face unique challenges in adopting e-commerce, such

as limited financial resources, lack of specialised digital skills, and dependence on external service providers. As a result, e-commerce adoption among SMEs is influenced by perceived benefits, ease of implementation, and compatibility with existing business practices. Understanding the concept of e-commerce within the SME context is essential for analysing adoption behaviour, as it highlights the need for scalable, cost-effective, and user-friendly digital solutions that align with the specific constraints and growth aspirations of small and medium enterprises.

Classification of E-Commerce Models (B2B, B2C, C2C, Hybrid)

E-commerce models can be broadly classified based on the nature of transactions and the parties involved, with the most prominent categories being Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Consumer (C2C), and Hybrid models. The B2B e-commerce model involves electronic transactions between businesses, such as manufacturers, wholesalers, distributors, and retailers. In the SME context, B2B e-commerce is commonly used for procurement, supply chain coordination, bulk ordering, and electronic data interchange, enabling firms to reduce transaction costs, improve operational efficiency, and strengthen inter-firm relationships. The B2C model refers to transactions where businesses sell products or services directly to end consumers through online platforms. For SMEs, B2C e-commerce provides opportunities to expand market reach, build brand identity, and engage customers through digital marketing, personalised offerings, and direct feedback mechanisms. The C2C model facilitates transactions between individual consumers through digital marketplaces or platforms that act as intermediaries. While SMEs are not direct sellers in this model, many small enterprises and micro-entrepreneurs participate as platform users, leveraging C2C marketplaces to sell goods, particularly in informal or niche markets. The Hybrid e-commerce model combines elements of two or more traditional models, allowing firms to operate across multiple transaction types simultaneously. SMEs increasingly adopt hybrid models by selling directly to consumers while also engaging in B2B transactions or utilising third-party marketplaces alongside their own online channels. This integrated approach enables SMEs to diversify revenue streams, reduce dependency on a single market, and enhance resilience. Understanding these classifications is essential for analysing e-commerce adoption among SMEs, as each model differs in technological requirements, investment levels, customer engagement strategies, and performance implications.

Theoretical Foundations

- **Technology Acceptance Model (TAM)**

The Technology Acceptance Model (TAM) provides a foundational explanation of how and why individuals and organisations adopt new technologies, making it highly relevant for understanding e-commerce adoption among SMEs. Developed to explain user behaviour toward information systems, TAM posits that two key beliefs—perceived usefulness and perceived ease of use—directly influence attitudes toward technology adoption and subsequent usage intentions. In the SME context, perceived usefulness reflects the extent to which owners or managers believe that e-commerce will enhance business performance through increased sales, market expansion, or operational efficiency. Perceived ease of use refers to the degree to which e-commerce systems are viewed as simple to learn and operate, which is particularly critical for SMEs with limited technical expertise. TAM highlights the central role of decision-makers, as adoption decisions in SMEs are often driven by owner-managers rather than formalised organisational structures.

- **Technology–Organisation–Environment (TOE) Framework**

The Technology–Organisation–Environment (TOE) framework provides a comprehensive organisational-level perspective on technology adoption by considering the broader contextual factors influencing firms. The technological dimension examines the availability, compatibility, and complexity of e-commerce technologies, while the organisational dimension focuses on firm size, resource availability, managerial support, and organisational readiness. The environmental dimension captures external pressures such as market competition, customer expectations, regulatory frameworks, and government support. For SMEs, the TOE framework is particularly valuable as it acknowledges that adoption decisions are not solely technology-driven but are shaped by internal capabilities and external conditions. The framework enables researchers to systematically analyse both drivers and barriers to e-commerce adoption, making it widely applicable in empirical studies of SMEs across different economic contexts. By integrating multiple levels of influence, TOE offers a holistic explanation of adoption behaviour and provides a robust foundation for examining performance outcomes linked to e-commerce implementation.

- **Diffusion of Innovation Theory**

The Diffusion of Innovation (DOI) theory explains how new technologies spread over time within a social system, emphasising the role of innovation characteristics, communication channels, and adopter categories. In the context of e-commerce adoption among SMEs, DOI focuses on attributes such as relative advantage, compatibility with existing practices, complexity, trialability, and observability. SMEs are more likely to adopt e-commerce when it

demonstrates clear advantages over traditional business methods, aligns with existing workflows, and produces visible performance benefits. The theory also categorises adopters into innovators, early adopters, early majority, late majority, and laggards, highlighting variations in adoption timing and behaviour. DOI is particularly useful for understanding why some SMEs rapidly embrace e-commerce while others remain hesitant, even within similar environments.

Drivers of E-Commerce Adoption among SMEs

- **Technological Drivers**

Technological drivers play a fundamental role in shaping e-commerce adoption decisions among small and medium enterprises (SMEs), as they determine the feasibility, usability, and perceived value of digital solutions.

Perceived Usefulness and Ease of Use are central technological factors influencing adoption, particularly in SMEs where decision-making authority is concentrated among owners or top managers. When e-commerce systems are perceived to enhance business performance by improving sales, market reach, customer engagement, and operational efficiency, SMEs are more inclined to invest in digital platforms. Ease of use is equally critical, as complex systems increase dependence on external technical support and raise implementation costs, thereby discouraging adoption. User-friendly interfaces, integrated payment systems, and scalable platforms reduce learning barriers and promote sustained usage.

Availability of Digital Infrastructure further supports adoption by providing reliable internet connectivity, affordable hardware, cloud-based services, and secure digital payment mechanisms. Adequate infrastructure lowers entry barriers and enables SMEs to operate e-commerce platforms efficiently, particularly in regions where technological constraints have historically limited digital participation.

- **Organisational Drivers**

Organisational drivers reflect the internal readiness and strategic orientation of SMEs toward digital transformation. Top Management Support is a critical determinant of e-commerce adoption, as SME leaders directly influence strategic priorities, resource allocation, and risk-taking behaviour. Supportive management fosters a positive attitude toward innovation, encourages employee participation, and facilitates organisational learning, all of which are essential for successful adoption.

Firm Size, Resources, and Skills also significantly affect adoption decisions. Larger SMEs with relatively greater financial capacity, skilled personnel, and technological awareness are better

positioned to invest in e-commerce systems and absorb implementation risks. However, even smaller firms can adopt e-commerce when they possess entrepreneurial orientation, digital literacy, and access to external expertise. The alignment of organisational resources and capabilities with digital objectives enhances adoption readiness and long-term sustainability.

- **Environmental Drivers**

Environmental drivers arise from external pressures and support mechanisms that influence SMEs' strategic choices. Market Competition compels SMEs to adopt e-commerce as a means of maintaining relevance, differentiating offerings, and responding to digitally advanced competitors. Firms operating in highly competitive markets are more likely to view e-commerce as a necessity rather than an option.

Customer Pressure and Changing Consumer Behaviour further accelerate adoption, as consumers increasingly demand online purchasing options, digital payments, transparency, and convenience. SMEs that fail to meet these expectations risk losing market share. Government Support and Policy Initiatives also play a significant role by promoting digital inclusion through subsidies, training programmes, infrastructure development, and regulatory frameworks that encourage online transactions. Collectively, these technological, organisational, and environmental drivers create a conducive ecosystem for e-commerce adoption among SMEs, reinforcing its strategic importance for growth and competitiveness.

Barriers to E-Commerce Adoption

- **Technological Barriers**

Technological barriers remain among the most significant challenges limiting e-commerce adoption among small and medium enterprises (SMEs), particularly in resource-constrained environments.

Lack of Technical Expertise is a critical obstacle, as many SMEs do not possess in-house IT professionals capable of developing, managing, and maintaining e-commerce platforms. Dependence on external service providers increases costs and reduces control over digital operations, often discouraging sustained adoption. Limited technical knowledge also affects the effective integration of e-commerce with existing business processes, leading to operational inefficiencies.

Cybersecurity and Data Privacy Concerns further inhibit adoption, as SMEs are increasingly exposed to risks such as data breaches, online fraud, and cyberattacks. Fear of financial losses, reputational damage, and non-compliance with data protection regulations makes many SMEs

hesitant to engage in online transactions, especially when trust-building mechanisms and security infrastructure are inadequate.

Financial Barriers

Financial constraints significantly influence e-commerce adoption decisions in SMEs. High Initial Investment and Maintenance Costs pose a major barrier, as the implementation of e-commerce requires expenditure on website development, software licenses, digital marketing, cybersecurity measures, and ongoing system upgrades. For SMEs operating with limited capital and uncertain cash flows, these costs are often perceived as high-risk investments with delayed returns. In addition, recurring expenses related to platform maintenance, transaction fees, and technological upgrades can strain financial resources, making e-commerce adoption less attractive for smaller firms.

- **Organisational and Cultural Barriers**

Organisational and cultural factors also play a crucial role in shaping adoption behaviour. Resistance to Change is common in SMEs where traditional business practices are deeply embedded and managers are reluctant to alter established routines. Fear of disruption, uncertainty about benefits, and lack of confidence in digital technologies contribute to this resistance.

Limited Digital Awareness further constrains adoption, as SME owners and employees may lack understanding of e-commerce functionalities, benefits, and strategic potential. Inadequate training and low digital literacy hinder effective implementation and reduce the perceived value of e-commerce initiatives.

- **External and Regulatory Barriers**

External and regulatory barriers arise from the broader business environment in which SMEs operate. Legal, Taxation, and Compliance Issues create complexity and uncertainty, particularly where e-commerce regulations are unclear or frequently changing. Compliance with taxation, consumer protection, and data privacy laws can be burdensome for SMEs with limited administrative capacity. Logistics and Payment System Constraints also restrict adoption, especially in regions with underdeveloped delivery networks and limited access to reliable digital payment systems. Challenges related to last-mile delivery, return management, and payment security undermine customer trust and operational efficiency. Collectively, these barriers highlight the multifaceted challenges SMEs face in adopting e-commerce and underscore the need for targeted managerial and policy interventions.

Impact of E-Commerce Adoption on SME Performance

- **Financial Performance Outcomes**

E-commerce adoption has a substantial influence on the financial performance of small and medium enterprises (SMEs) by transforming revenue generation mechanisms and cost structures. Sales Growth and Revenue Expansion are among the most direct outcomes, as online platforms enable SMEs to access broader markets beyond local or regional boundaries, increase product visibility, and operate continuously without time constraints. The ability to reach diverse customer segments and leverage digital marketing tools contributes to higher sales volumes and more stable revenue streams. Cost Efficiency and Profitability are also positively affected through the reduction of transaction costs, lower dependency on physical infrastructure, and improved inventory management. Automation of order processing, digital payments, and online customer service reduces administrative overheads, enabling SMEs to optimise resource utilisation. Although initial investment costs may be significant, long-term profitability often improves as operational efficiencies and economies of scale are realised.

- **Market Performance Outcomes**

E-commerce adoption significantly enhances market-related performance outcomes for SMEs. Market Reach and Customer Base Expansion occur as firms overcome geographical limitations and engage customers across national and international markets. Digital channels allow SMEs to target niche segments and respond quickly to changing demand patterns, thereby strengthening market presence. Competitive Advantage is achieved through differentiation, innovation, and faster responsiveness compared to traditional competitors. SMEs that effectively integrate e-commerce can compete with larger firms by offering customised products, flexible pricing, and improved service quality, positioning themselves more favourably in dynamic markets.

Operational Performance Outcomes

Operational performance improvements represent a critical benefit of e-commerce adoption. Process Efficiency and Supply Chain Integration are enhanced through digital coordination with suppliers, real-time inventory tracking, and streamlined logistics management. E-commerce systems facilitate better information flow, reduce processing errors, and shorten order fulfilment cycles. Integration with supply chain partners improves transparency and collaboration, enabling SMEs to respond more effectively to demand fluctuations and minimise disruptions. These efficiencies contribute to improved productivity and operational resilience.

- **Customer-Related Outcomes**

Customer-related performance outcomes are central to the strategic value of e-commerce adoption. Customer Satisfaction and Retention improve as e-commerce platforms offer greater convenience, accessibility, and personalisation. Features such as easy product comparison, multiple payment options, timely delivery, and responsive customer support enhance the overall customer experience. Data generated through online interactions allows SMEs to understand customer preferences, tailor offerings, and build long-term relationships. Higher satisfaction and retention rates strengthen brand loyalty and contribute to sustainable growth. Overall, the impact of e-commerce adoption on SME performance is multifaceted, reinforcing its role as a strategic driver of financial, market, operational, and customer-related success.

Methodology

The study adopts a descriptive and analytical research design to examine e-commerce adoption among small and medium enterprises (SMEs), focusing on drivers, barriers, and performance outcomes. A quantitative approach is employed to ensure objectivity and facilitate statistical analysis of relationships among variables. Primary data were collected through a structured questionnaire administered to SME owners and senior managers, as they are directly involved in strategic and technological decision-making. The sampling frame comprised SMEs operating across manufacturing, trading, and service sectors, and a stratified random sampling technique was used to ensure adequate representation of firm size and industry categories. The questionnaire included multi-item Likert-scale measures to assess technological, organisational, and environmental drivers, perceived barriers, and performance outcomes associated with e-commerce adoption. Prior to data collection, the instrument was pre-tested to ensure clarity, reliability, and content validity. Data analysis was conducted using statistical software, employing descriptive statistics to profile respondents and inferential techniques such as correlation and regression analysis to examine the influence of adoption on performance. Reliability of constructs was assessed using Cronbach's alpha, while ethical considerations, including respondent anonymity and voluntary participation, were strictly observed throughout the study.

Result and Discussion

Table 1: Profile of Sample SMEs

Variable	Category	Frequency (n)	Percentage (%)
Firm Size	Micro (1–9 employees)	72	36.0
	Small (10–49 employees)	88	44.0
	Medium (50–249 employees)	40	20.0
Sector	Manufacturing	64	32.0
	Trading	78	39.0
	Services	58	29.0
Years of Operation	< 5 years	52	26.0
	5–10 years	86	43.0
	> 10 years	62	31.0

Table 1 presents the demographic profile of the sampled SMEs, providing an overview of firm size, sectoral distribution, and years of operation. The data indicate that a majority of the sampled enterprises fall within the small firm category (44 percent), followed by micro enterprises (36 percent), while medium-sized firms constitute a smaller share (20 percent). This distribution reflects the typical structure of the SME sector, which is largely dominated by micro and small firms. Sector-wise, trading enterprises form the largest group (39 percent), followed by manufacturing (32 percent) and services (29 percent), suggesting a balanced representation of key SME segments. In terms of business experience, most firms have been operating for 5–10 years (43 percent), indicating relative operational maturity, while 26 percent are younger firms with less than five years of experience and 31 percent have operated for over a decade. Overall, the profile suggests a diverse and representative SME sample suitable for analysing e-commerce adoption behaviour.

Table 2: Descriptive Statistics of E-Commerce Adoption Drivers

Driver Variable	Mean	Standard Deviation
Perceived Usefulness	4.12	0.68
Ease of Use	3.98	0.72
Digital Infrastructure Availability	3.85	0.81

Top Management Support	4.20	0.65
Organisational Skills and Resources	3.76	0.74
Competitive Pressure	4.05	0.69
Government Support	3.62	0.83

Table 2 summarises the descriptive statistics of key drivers influencing e-commerce adoption among SMEs. The mean values indicate that all driver variables score above the midpoint of the scale, suggesting a generally positive perception of e-commerce-related factors. Top management support records the highest mean value (4.20), highlighting its critical role in facilitating adoption decisions within SMEs. Perceived usefulness (4.12) and competitive pressure (4.05) also score highly, indicating that SMEs recognise e-commerce as a valuable tool for improving performance and responding to market competition. Ease of use (3.98) and digital infrastructure availability (3.85) show moderately high means, reflecting the importance of user-friendly systems and technological readiness. Government support records the lowest mean (3.62), suggesting relatively weaker perceived effectiveness of policy initiatives. Overall, the table demonstrates that technological, organisational, and environmental drivers collectively encourage e-commerce adoption among SMEs.

Table 3: Descriptive Statistics of Barriers to E-Commerce Adoption

Barrier Variable	Mean	Standard Deviation
Lack of Technical Expertise	4.08	0.71
Cybersecurity Concerns	4.15	0.67
High Initial Investment	3.94	0.76
Resistance to Change	3.88	0.73
Limited Digital Awareness	3.91	0.70
Regulatory and Compliance Issues	3.69	0.82
Logistics and Payment Constraints	3.84	0.75

Table 3 highlights the major barriers perceived by SMEs in adopting e-commerce solutions. The mean scores reveal that cybersecurity concerns (4.15) and lack of technical expertise (4.08) are the most significant obstacles, indicating strong apprehension regarding data security and

limited in-house digital skills. High initial investment costs (3.94) and limited digital awareness (3.91) also present substantial challenges, reflecting financial constraints and knowledge gaps common among SMEs. Resistance to change (3.88) suggests organisational and cultural reluctance toward altering traditional business practices. Regulatory and compliance issues (3.69) and logistics and payment constraints (3.84) show comparatively lower but still notable influence, highlighting external environmental challenges. The relatively consistent standard deviations indicate shared concerns across firms. Overall, the table underscores that both internal limitations and external constraints hinder effective e-commerce adoption among SMEs.

Table 4: Impact of E-Commerce Adoption on SME Performance

Performance Dimension	Mean	Standard Deviation
Sales Growth	4.10	0.66
Revenue Expansion	4.05	0.70
Cost Efficiency	3.89	0.73
Market Reach Expansion	4.18	0.64
Competitive Advantage	4.02	0.69
Operational Efficiency	3.96	0.72
Customer Satisfaction	4.22	0.61
Customer Retention	4.08	0.65

Table 4 illustrates the impact of e-commerce adoption on various dimensions of SME performance. The mean values across all performance indicators are relatively high, indicating a positive association between e-commerce adoption and firm performance. Customer satisfaction records the highest mean score (4.22), followed by market reach expansion (4.18), suggesting that e-commerce significantly enhances customer experience and market accessibility. Sales growth (4.10) and customer retention (4.08) also demonstrate strong positive outcomes, reflecting revenue-related and relational benefits. Competitive advantage (4.02) and operational efficiency (3.96) indicate improved strategic positioning and process effectiveness due to digital integration. Cost efficiency shows a slightly lower mean (3.89), implying that while cost benefits exist, they may materialise gradually over time. Overall, the table confirms that e-commerce adoption contributes positively to financial, market, operational, and customer-related performance outcomes for SMEs.

Conclusion

The study provides a comprehensive understanding of e-commerce adoption among small and medium enterprises (SMEs) by examining its key drivers, barriers, and performance outcomes within an integrated analytical framework. The findings clearly indicate that e-commerce adoption is not solely a technological decision but a strategic organisational choice shaped by technological readiness, managerial commitment, and external environmental pressures. Technological drivers such as perceived usefulness, ease of use, and availability of digital infrastructure, along with organisational factors including top management support and internal capabilities, significantly motivate SMEs to adopt e-commerce solutions. At the same time, the study highlights persistent barriers, particularly lack of technical expertise, cybersecurity concerns, financial constraints, and limited digital awareness, which continue to restrict the pace and depth of adoption. Despite these challenges, the performance analysis demonstrates that SMEs that successfully adopt e-commerce experience notable improvements across financial, market, operational, and customer-related dimensions. Enhanced sales growth, expanded market reach, improved operational efficiency, and higher customer satisfaction underscore the strategic value of e-commerce as a tool for competitiveness and long-term sustainability. The results also emphasise the role of external support mechanisms, such as government policies, digital infrastructure development, and regulatory clarity, in fostering a conducive environment for SME digitalisation. Overall, the study contributes to the existing literature by empirically validating the positive relationship between e-commerce adoption and SME performance while acknowledging the multifaceted constraints faced by smaller firms. The insights derived from this research offer practical implications for SME managers seeking to leverage digital technologies effectively and for policymakers aiming to promote inclusive and resilient digital economies.

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