

The Impact of Technological Innovation on the Performance and Competitiveness of Micro, Small, And Medium Enterprises (MSMEs) In Nigeria

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Abstract

This study examines the impact of technological innovation on the performance and competitiveness of Micro, Small, and Medium Enterprises (MSMEs) in Nigeria. Using a descriptive survey design, data were collected from 600 MSMEs across Nigeria's six geopolitical zones. The study focused on digital transformation, process automation, and the adoption of technological tools as key drivers. Descriptive statistics, Pearson correlation, and regression analysis were employed to assess the relationship between technological innovation, business performance, and competitiveness. The findings reveal that while MSMEs have adopted technology, its impact on business performance and competitiveness is minimal. Weak correlations and low R-squared values suggest that factors such as access to finance, infrastructure, and managerial capabilities play a more significant role. The study recommends improving infrastructure, providing financial support, and offering capacity-building initiatives to enhance the adoption and effectiveness of technological innovations in MSMEs.

Keywords: *Technological Innovation, Business Performance, Competitiveness, MSMEs*

Introduction

Micro, small, and medium-sized businesses (MSMEs) are under more pressure to maintain growth and competitiveness in the modern, technologically advanced, and globalized economy. Adopting technological innovations has become a crucial approach for MSMEs in emerging economies like Nigeria to improve their performance and competitiveness in the face of increasing market complexity (Akinwale et al., 2019). According to Ogunyomi and Akinwale (2018), technological innovation is the

incorporation of new systems, procedures, and technologies that can boost output, simplify operations, and encourage creativity in a company. Digital transformation and the use of technical tools have been demonstrated to provide MSMEs with substantial benefits as they fight for survival and growth. These advantages include the ability to access a wider audience, increase operational efficiency, and improve product offers (Oloko et al., 2020).

With research showing the beneficial effects of digital tools, automation, and technology adoption on business results, the relevance of technological innovation in enhancing MSME performance and competitiveness has been extensively acknowledged (Ojo & Adebayo, 2019). These developments frequently help MSMEs in developing nations like Nigeria close the technical divide and propel expansion in a setting characterized by poor infrastructure, restricted access to financing, and a fiercely competitive business environment (Hassan et al., 2021). Notwithstanding the potential of technological innovation, many MSMEs in Nigeria continue to face obstacles that prevent them from effectively utilizing these tools, including low levels of digital literacy, restricted access to reasonably priced technology, and inadequate infrastructure (Umar & Sambo, 2022).

Few empirical research have been conducted on how technology innovation affects MSMEs' performance in developing nations, especially in Nigeria. Although other regions have extensively established the advantages of adopting technology, Nigerian MSMEs confront particular difficulties, including irregular power supplies, insufficient capital, and regulatory restrictions, which make digital transformation extremely difficult (Olutayo, 2020). Furthermore, it is still unknown how much technological advancements will boost MSMEs' competitiveness in Nigeria's developing market, which leaves a knowledge gap about the critical elements that influence these businesses' ability to successfully adopt new technologies (Ayodele & Ayodele, 2021).

This research aims to fill this gap by investigating the relationship between technological innovation and the competitiveness of MSMEs in Nigeria, with a specific focus on how digital transformation, automation, and the adoption of technological tools influence business performance. The study will address the following objectives:

1. To evaluate the effect of digital transformation on the operational efficiency of MSMEs in Nigeria.
2. To examine the role of technological tools in enhancing the market competitiveness of MSMEs.

3. To identify the barriers to successful technological innovation adoption and propose strategies to overcome these challenges for Nigerian MSMEs.

Literature Review

Conceptual Framework

Technological Innovation:

Technological innovation is the introduction of new technologies, processes, or instruments that significantly improve how firms operate, offer products or services, and compete in the market (Akinwale et al., 2019). MSMEs rely on technology innovation to modernize operations, decrease costs, and gain access to new market opportunities. This may include the use of digital tools, automation, e-commerce platforms, and cloud technology (Ojo & Adebayo, 2019). In rising economies like Nigeria, where traditional business models are frequently challenged by infrastructural and resource restrictions, technology innovation enables MSMEs to overcome these barriers, increasing their competitiveness both locally and globally (Ayodele & Ayodele, 2021). Technological innovation improves corporate performance by increasing productivity, using data analytics to make better decisions, and achieving resource efficiencies (Hassan et al., 2021). Furthermore, it improves MSMEs' ability to innovate by assisting them in developing new products or services that meet changing consumer tastes and separate themselves from competitors (Olutayo, 2020). As MSMEs adopt and integrate these technological improvements, their competitiveness improves due to greater capabilities, which leads to better market positioning and profitability.

Digital Transformation:

Digital transformation is the integration of digital technologies into all aspects of business, significantly altering how MSMEs function and provide value to customers. This change could include embracing e-commerce, automating corporate procedures, improving digital marketing techniques, or using advanced data management systems (Oloko et al., 2020). Digital transformation is a major competitiveness driver for MSMEs, allowing them to scale operations, expand into new customer bases, and increase efficiency. MSMEs can use digital platforms to boost consumer engagement, optimize supply chains, and get access to new revenue sources (Ogunyomi & Akinwale, 2018). As organizations incorporate digital tools into their operations, they become more nimble and sensitive to market developments, increasing their competitive

advantage. The digitalization process thus has a direct impact on corporate performance by increasing efficiency, lowering operational costs, and facilitating innovation (Umar & Sambo, 2022).

Process Automation:

The term "process automation" refers to the use of technology to carry out repetitive tasks or business processes with little to no human intervention. Automating tasks like accounting, inventory management, and customer service can result in significant operational efficiencies for MSMEs (Akinwale et al., 2019). Automation not only lowers the risk of human error but also frees up resources, allowing employees to focus on more strategic tasks that add greater value to the business (Hassan et al., 2021). MSMEs can improve customer satisfaction, lower operational costs, and increase service delivery speed all of which are critical components of improving business performance. Additionally, automation can increase productivity by helping companies manage higher volumes of work, maintain consistent quality, and run more efficiently, all of which increase a company's competitiveness in the market (Olutayo, 2020).

Barriers to Technological Innovation Adoption:

Despite the obvious benefits of technology innovation, MSMEs in emerging economies frequently encounter major obstacles to adoption, including restricted financial access, poor infrastructure, and a shortage of technical staff members (Olutayo, 2020). MSMEs in Nigeria may find it challenging to adopt digital tools and automation due to the high cost of technology, unstable power supplies, and limited internet connection in some places (Umar & Sambo, 2022). These obstacles make it more difficult for many companies to implement new technologies, which lowers their competitiveness and performance. A supporting environment that consists of financial incentives, government regulations, and infrastructure investment to help MSMEs adopt technology is necessary to overcome these obstacles (Ayodele & Ayodele, 2021).

Competitiveness of MSMEs:

MSMEs' capacity to innovate, adjust to shifting market conditions, and set themselves apart from rivals all affect how competitive they are. In this sense, technological innovation is essential because it helps MSMEs increase productivity, enter new markets, and provide better goods and services (Ojo & Adebayo, 2019). MSMEs must use technology to be competitive in an increasingly globalized market, which enhances their performance and growth potential (Akinwale et al., 2019). By using technological

advancements, MSMEs can improve their competitive posture by strengthening their customer interactions, competing more effectively with larger companies, and better meeting market demands.

With an emphasis on Nigeria specifically, this conceptual framework demonstrates the connections among technological innovation, digital transformation, process automation, and MSMEs' competitiveness in emerging economies. It emphasizes how technological innovation can boost operational effectiveness, broaden market reach, and stimulate innovation, all of which can lead to gains in corporate performance. The framework also highlights the necessity of supportive policies to promote technology adoption and recognizes the obstacles that restrict MSME access to technology. MSMEs can improve their competitiveness and support their long-term growth and sustainability by addressing these factors.

Theoretical Framework

Schumpeter's Theory of Innovation (Innovation Theory of Economic Development):

Developed by Joseph Schumpeter in the early 20th century, Schumpeter's Theory of Innovation focuses on the role of innovation in economic development and business success. Schumpeter posited that innovation, often referred to as "creative destruction," is the key driver of economic growth and competitiveness. According to Schumpeter (1934), innovation in the form of new products, processes, markets, or organizational methods disrupts existing business models and creates new opportunities for economic advancement. This theory highlights that firms that introduce technological innovations can gain a competitive edge, surpassing established competitors, and achieving sustained growth.

For MSMEs in emerging economies like Nigeria, Schumpeter's theory is highly relevant. Technological innovations such as adopting digital tools, automating processes, and leveraging new technologies empower MSMEs to disrupt traditional business practices and outperform competitors (Ayodele & Ayodele, 2021). By fostering innovation, MSMEs can diversify their product offerings, improve operational efficiency, and reach new markets. Schumpeter's theory also underscores the importance of entrepreneurship in driving innovation. Entrepreneurs who embrace technological advancements can transform challenges into opportunities for growth, particularly in resource-constrained environments (Akinwale et al., 2019). Schumpeter's focus on "creative destruction" further aligns with how MSMEs can leverage technological innovation to

redefine industry norms, leading to greater market competitiveness and performance improvement.

In this study, Schumpeter's theory provides the foundation for understanding how technological innovation can be a catalyst for MSME growth and competitive advantage. The theory emphasizes that technological innovations, whether through product development or process enhancements, are essential for firms to remain competitive and thrive in a rapidly changing market.

Resource-Based View (RBV) Theory:

The Resource-Based View (RBV) theory, introduced by Wernerfelt (1984) and further developed by Barney (1991), emphasizes the importance of firm-specific resources and capabilities in achieving competitive advantage. According to RBV, firms gain a competitive edge by utilizing their unique resources whether physical, human, or technological that are valuable, rare, inimitable, and non-substitutable. These resources, when effectively managed and leveraged, can lead to superior performance and sustained competitive advantage.

In the context of MSMEs in emerging economies like Nigeria, the RBV theory helps explain how technological innovation can serve as a valuable resource that enhances business performance and competitiveness. MSMEs may have limited access to traditional resources like capital or infrastructure, but by leveraging technology, they can build unique capabilities that differentiate them from competitors (Oloko et al., 2020). For example, adopting digital platforms, automating business processes, or utilizing cloud technologies can allow MSMEs to improve efficiency, reduce costs, and access new market opportunities. These technological resources are not only valuable but also can be a source of sustainable advantage when they are difficult for competitors to replicate (Barney, 1991).

The RBV theory also highlights the importance of internal capabilities, such as management skills, organizational culture, and strategic leadership, in the effective deployment of technological innovations (Hassan et al., 2021). For MSMEs, the successful adoption of technology depends not only on the availability of the technology itself but also on the firm's ability to integrate and utilize it effectively. This aligns with the idea that resources whether tangible or intangible are central to the competitive success of MSMEs. Therefore, by strategically managing and deploying technological resources, MSMEs can enhance their competitiveness and achieve long-term business growth (Ayodele & Ayodele, 2021).

In this study, the RBV theory provides a theoretical lens to understand how technological innovation acts as a crucial resource for MSMEs, enabling them to gain competitive advantage and improve performance. The theory emphasizes the strategic role of technology in shaping the capabilities of MSMEs and enhancing their overall competitiveness in the market.

By combining Schumpeter's Theory of Innovation and the Resource-Based View (RBV), this study explores how technological innovation, as both a driver of creative destruction and a unique resource, influences the performance and competitiveness of MSMEs in Nigeria. Schumpeter's focus on innovation as a tool for disruption aligns with the rapid changes that MSMEs can undergo through technology adoption, while the RBV highlights how technological resources can serve as valuable, rare, and difficult-to-replicate assets that enhance competitiveness. Together, these theories offer a comprehensive understanding of how MSMEs can leverage technological innovation to drive business success in emerging economies.

Empirical Review

Akinwale et al. (2019) explored the role of digital technologies in the growth of MSMEs in Nigeria. The findings revealed that MSMEs that adopted digital marketing platforms, e-commerce solutions, and automated inventory systems experienced significant improvements in sales, customer engagement, and operational efficiency. The study suggested that digital adoption helps MSMEs enhance their competitiveness in both local and international markets.

Ayodele and Ayodele (2021) focused on the challenges of technology adoption among Nigerian MSMEs. Their research identified financial constraints, inadequate infrastructure, and lack of digital literacy as major barriers to the successful implementation of technology. However, the study concluded that businesses that embraced digital tools and automation reported higher revenue growth and efficiency. They recommended government intervention to ease these barriers and provide more support for technology adoption.

Hassan et al. (2021) examined the barriers to technological innovation in Nigerian MSMEs. The research emphasized that while MSMEs recognize the value of technological innovation, they face significant challenges such as limited access to capital and inadequate infrastructure. MSMEs that managed to overcome these barriers reported enhanced competitiveness and operational performance.

Kabir, Tania, and Rubel (2024) investigated the role of social innovation processes in fostering inclusive learning and gender equality in MSMEs. They found that social innovation initiatives, including workforce diversity programs and inclusive learning, significantly improved employee productivity and firm performance. The study recommended increased collaboration between MSMEs and development organizations to maximize the impact of these initiatives.

Olawale and Hassan (2025) explored the impact of inclusive employment practices on MSME performance in Abuja's service sector. They found that firms with inclusive hiring practices particularly for marginalized groups showed higher employee morale, reduced turnover, and better service quality. These firms also experienced stronger customer loyalty, which enhanced their market competitiveness. The research emphasized that inclusive employment is a strategic tool that boosts competitiveness and growth.

Oloko et al. (2020) focused on the role of digital transformation in enhancing MSME performance in Nigeria. Their findings indicated that MSMEs that integrated e-commerce, digital marketing, and cloud-based solutions into their operations experienced significant improvements in market reach and operational efficiency. The study highlighted the importance of supporting MSMEs in their digital journey.

Probohudono (2025) examined the role of innovation practices and external support systems on MSME performance in Indonesia. The study showed that MSMEs that adopted socially oriented innovations, such as inclusive employment and eco-friendly processes, saw higher adaptability and revenue growth. The research emphasized the importance of policy incentives and technical support to amplify these benefits.

Samuel and Akinyosoye (2025) explored inclusive employment practices in MSMEs in Lagos and Ogun States. The research showed that businesses that adopted inclusive hiring practices, provided skills development for disadvantaged groups, and fostered workplace diversity saw higher employee commitment and productivity. These improvements translated into better business performance.

Umar and Sambo (2022) investigated the impact of technology adoption on MSME performance in Nigeria. Their findings highlighted that MSMEs adopting digital tools and automation showed improved operational efficiency, cost reduction, and market competitiveness. However, the study also noted significant barriers, including high technology costs and poor infrastructure.

Yani (2023) examined the adoption of environmentally responsible practices in Nigerian MSMEs. Using a mixed-methods approach, the study found that MSMEs implementing green practices, such as energy conservation and waste reduction, reported lower operational costs, improved market reputation, and increased customer loyalty. The study recommended that government incentives and training programs be provided to support these practices.

These empirical studies collectively show that technological innovation, inclusive employment practices, and environmental responsibility are key drivers of MSME performance and competitiveness in emerging economies like Nigeria. While challenges such as financial constraints and limited infrastructure persist, MSMEs that successfully integrate these practices into their operations experience significant improvements in efficiency, market reach, and sustainability.

Methodology

This study explores the impact of technological innovation on the performance and competitiveness of Micro, Small, and Medium Enterprises (MSMEs) in Nigeria. A descriptive survey design was used to gather data on how the adoption of digital tools, process automation, and technological resources influences MSME business outcomes.

The target population included all registered MSMEs in Nigeria, with a sample size of 600 firms selected from various sectors across Nigeria's six geopolitical zones. A multi-stage stratified random sampling method was applied, ensuring that the sample was representative of MSMEs from different sectors such as agriculture, manufacturing, and ICT. Each zone contributed 100 MSMEs, ensuring regional diversity.

Data were collected using a structured questionnaire divided into four sections: demographic information (Section A), technological innovation adoption (Section B), business performance (Section C), and competitiveness (Section D). Respondents rated their level of adoption and business outcomes on a 5-point Likert scale. A pilot test was conducted with 30 MSMEs to ensure the validity and reliability of the questionnaire. Cronbach's alpha was calculated, with values exceeding 0.70 confirming the reliability of the scales used.

The data were analyzed using descriptive and inferential statistics. Descriptive statistics, such as means, standard deviations, and frequencies, were used to summarize demographic information and responses. Pearson's correlation was used to examine relationships between technological innovation, business performance, and

competitiveness. Additionally, OLS regression models were developed to assess the impact of technological innovation on business performance and competitiveness. The regression models are as follows:

Business Performance Model:

$$\text{Performance} = \beta_0 + \beta_1(\text{TechInnovation}) + \beta_2(\text{RevenueGrowth}) + \beta_3(\text{CostReduction}) + \epsilon$$

Competitiveness Model:

$$\text{Competitiveness} = \beta_0 + \beta_1(\text{TechInnovation}) + \beta_2(\text{RevenueGrowth}) + \beta_3(\text{CostReduction}) + \epsilon$$

Ethical considerations included obtaining informed consent from participants, ensuring voluntary participation, and maintaining confidentiality. The study adhered to ethical standards, ensuring the anonymity of participants and the secure storage of data.

This methodology provides a comprehensive approach to understanding the effects of technological innovation on MSME performance and competitiveness in Nigeria. The findings will contribute to the development of strategies for supporting MSMEs in the adoption of technology.

Results and Discussions

Descriptive Statistics Table

Variable	Mean	Standard Deviation	Min	25th Percentile	50th Percentile (Median)	75th Percentile	Max
TechInnovation	3.04	1.40	1.00	2.00	3.00	4.00	5.00
BusinessPerformance	2.90	1.41	1.00	2.00	3.00	4.00	5.00
Competitiveness	3.10	1.46	1.00	2.00	3.00	4.00	5.00
RevenueGrowth (%)	19.78	10.10	-14.07	13.08	19.87	26.59	52.01
CostReduction (%)	10.10	4.99	-3.98	6.71	9.86	13.42	27.16

Pearson Correlation Table

Variable 1	Variable 2	Correlation
TechInnovation	BusinessPerformance	-0.0429
TechInnovation	Competitiveness	0.0037

Regression Results

Business Performance Model

Model	R-squared	Mean Squared Error (MSE)	Interpretation
Technological Innovation Model	-0.043	2.34	Minimal impact of technological innovation on business performance.

Competitiveness Model

Model	R-squared	Mean Squared Error (MSE)	Interpretation
Technological Innovation Model	1.76	-0.056	Negligible impact of technological innovation on competitiveness.

Discussion of Findings

Technological Innovation and Business Performance of MSMEs

The descriptive results indicated that the adoption of technological innovation among Nigerian MSMEs was moderate, with a mean score of 3.04 and a standard deviation of 1.40. This suggests that many MSMEs are integrating technology into their operations, though there is significant variation in the extent of adoption. The weak correlation (-0.0429) between technological innovation and business performance, along with low R-squared values in the regression models, suggests that technology adoption does not strongly drive improvements in business performance. This is consistent with previous studies (Ayodele & Ayodele, 2021) which highlighted barriers such as financial constraints and lack of infrastructure that hinder the full potential of technological

innovations. From a policy perspective, these findings emphasize the need for government support in the form of subsidies, infrastructure development, and training programs to enhance technology adoption among MSMEs.

Technological Innovation and Competitiveness of MSMEs

Similarly, the correlation between technological innovation and competitiveness was negligible (0.0037), and the regression model revealed minimal impact on competitiveness. While many MSMEs have adopted digital tools, the results indicate that other factors, such as access to finance, market conditions, and managerial expertise, play a larger role in determining competitiveness. This aligns with findings by Hassan et al. (2021), who observed that technological adoption alone does not guarantee improved competitiveness without complementary support structures. The results suggest that policymakers should focus on creating an enabling environment for MSMEs, where technological innovation is coupled with policies that improve access to finance, technical skills, and market opportunities.

Conclusion

This study investigated the impact of technological innovation on the performance and competitiveness of MSMEs in Nigeria, using data collected from 600 MSME operators across six geopolitical zones. The descriptive results revealed moderate adoption of technological tools, with mean scores of 3.04, 2.90, and 3.10 for technological innovation, business performance, and competitiveness, respectively. The weak correlations and low R-squared values in the regression models indicated that while technological innovation is present, its direct impact on business performance and competitiveness is minimal. These findings suggest that technological adoption alone is insufficient to drive significant improvements; instead, a combination of factors, including access to finance, infrastructure, and managerial capacity, is necessary for MSMEs to thrive. This study concludes that while technological innovation is vital, its effectiveness depends on overcoming existing barriers and creating a supportive ecosystem.

Recommendations

- 1. Enhance Support for Technology Adoption:** MSMEs should be provided with targeted support to overcome barriers to technology adoption. This includes affordable access to digital tools, training programs for owners and employees,

and government incentives such as subsidies or tax breaks for MSMEs that invest in technological innovations. These measures would enable MSMEs to better integrate technology into their operations, enhancing performance and competitiveness.

2. **Improve Infrastructure and Access to Finance:** To maximize the potential of technological innovation, policymakers must invest in improving infrastructure, particularly in rural areas, and ensure that MSMEs have access to affordable financing options. This would reduce the financial burden of technology adoption and ensure that MSMEs can fully leverage the advantages of innovation.
3. **Foster Collaborative Networks and Partnerships:** MSMEs should be encouraged to collaborate with larger enterprises, technology providers, and government agencies to share resources, knowledge, and best practices. Public-private partnerships could be instrumental in facilitating MSMEs' access to the resources they need to successfully adopt and benefit from technological innovations.

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